

Renovation of the De Colores Children’s Center & Safety Net Services Hub

PROJECT MANUAL INTRODUCTORY INFORMATION TECHNICAL SPECIFICATIONS

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SECTION 01010

SUMMARY OF WORK

1.0 **WORK COVERED BY CONTRACT DOCUMENTS**

All excavations, grading, trenching and construction, including but not limited to all utilities within the building, and all interior/exterior finishes and attachments to the building as shown in the plans and described in the project specifications.

2.0 **WORK SEQUENCE AND CONSTRAINTS**

- A. Furnish and install one project sign at locations designated by the Owner.
- B. To minimize public inconvenience, possible hazards, and to restore streets and other work areas to their original condition as soon as practicable, the Contractor shall diligently prosecute the work to completion. If, in the Construction Manager's opinion and based on the schedule, the Contractor fails to prosecute the work to the extent that the above purposes are not being accomplished, the Contractor shall, upon orders from the Construction Manager, immediately take the steps necessary to fully accomplish said purposes. All costs of prosecuting the work as described herein shall be absorbed in the Contractor's bid. Should the Contractor fail to take the necessary steps to fully accomplish said proposed purposes, after orders of the Construction Manager to do so, the Construction Manager may suspend the work in whole or in part, until the Contractor takes said steps. With or without such suspension, the Construction Manager may cause such steps to be taken by force account or other means at the Contractor's expense.
- C. Install 6 ft high chain link fencing as directed by the Construction Manager and as needed to protect the public from the job site. Except as otherwise provided, the Contractor shall enclose the site of the Work with a fence adequate to protect the Work and temporary facilities against acts of theft, violence, or vandalism.
- D. The Owner reserves the right to perform or allow performance of other work, within or adjacent to the limits of this project, at any time, by other forces. Construction work by other contractors and utility companies may be ongoing simultaneously within or adjacent to the limits of work for this project. The Contractor shall coordinate and cooperate with all other contractors and utility companies throughout the duration of this project to avoid delays and conflicts. It is the responsibility of the Contractor to install the necessary traffic control for such work where needed to avoid delays and not disrupt the adjacent work. The Contractor shall remove any and all traffic control installed when no longer needed and as directed by the Construction Manager.
- E. The time of construction activities shall be limited to between 7 AM and 6 PM or dusk, whichever occurs first, unless approved by the Construction Manager. No work shall be done on the weekends, holidays and before or after these specified hours, unless otherwise approved by the Construction Manager. No mechanical equipment, including hauling by trucks, shall start before 7 AM and must shut down before 6 PM or dusk, whichever occurs first, unless approved by the Construction Manager.

Summary of Work

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- F. The Contractor shall confine his construction operations to property or right-of-way owned by the City of San Rafael. If necessary, the Contractor shall, at his own cost and initiative, make special arrangements with the property owners for additional work area. Any damage to property, either inside or outside the limits of construction, shall be the responsibility of the Contractor. The Contractor will be required to furnish the Owner through the Construction Manager, prior to working outside the Owner's property, written releases from property owners where side arrangements or special easements have been made or where the Contractor's operations, for any reason, have not been kept within the property owned by the Owner.
- G. At all times, including weekends and holidays, during construction and until final completion and acceptance of the work, the contractor shall prevent the formation of an airborne dust nuisance by watering as required by the Construction Manager, and to treat the site of the work in such a manner that it will confine dust particles to the immediate surface of the work. The Contractor shall perform such treatment immediately during the construction contract and within two (2) hours after notification by the Construction Manager that the airborne nuisance exists. If the Contractor fails to remove the nuisance within the above time frame, the Owner may order that the treatment of the site be done by Owner personnel and equipment or by others. All expenses incurred in the performance of this treatment shall be charged to the Contractor. The cost shall be paid for by the Contractor separately or be deducted from the periodic payments to the Contractor as the Owner incurs such costs. The Contractor shall make every reasonable effort to control noise generated as a result of this construction to the satisfaction of the Construction Manager and the City of San Rafael Noise Ordinances. Use of air compressor, jackhammer and other vibrating and loud sound generating equipment shall be limited to between the hours of 7 AM and 6 PM or dusk, whichever occurs first, unless otherwise authorized by the Construction Manager. All hauling trucks or other construction vehicles leaving the site shall be cleaned of mud or dirt clinging to exterior body surfaces or wheel rims before traveling on City of San Rafael streets outside the work limits. All trucks coming to or leaving the site with materials or loose debris shall be loaded in a manner, which will prevent dropping of materials or debris on City of San Rafael streets. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately at the Contractor's expense.
- H. Unless otherwise shown on the plans or specified herein, all excess materials shall become property of the Contractor and disposed of by the Contractor. The Contractor shall be responsible for disposing all excess materials in a safe and legal manner. No material shall be placed on private property or public property without prior approval from the property owner. The Contractor shall not allow any refuse, excavated material, surplus concrete or mortar, or any washings there from, to be disposed of upon paved streets, into catch basins, or otherwise into the City storm drain system. The Contractor shall be charged prevailing dumping fees at the landfill site, should the Contractor elect to dispose of waste material (not hazardous material) at that particular site.
- I. The Contractor is required to take due precautionary measures regarding the existing underground, overhead, and at-grade utilities (including their associated structures), which are not to be changed in location, by carefully supporting and protecting them from damage. In case of damage, the Contractor, without additional compensation, shall restore them to as good a condition as that in which they were found. Any damage to the

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infrastructure is the contractor’s responsibility and shall be restored to the state it was in prior to the start of work. It is the Contractor’s responsibility under the afore mentioned section to contact Underground Service Alert (USA) and thus also to notify and coordinate with the various utility companies at least 14 days in advance of any work scheduled to be performed near their facilities, and to schedule their own work accordingly. As necessary, the Contractor shall pothole these utilities prior to working in this area to avoid damage to them. It shall also be the Contractor’s responsibility to provide if requested by the utility company(s) detailed plan(s) prepared by a California Registered Civil Engineer showing necessary support of their utilities during coordinated work. The Contractor is directed to contact these agencies before submitting bids and to be familiar with their requirements. Potholing shall be considered as part of the other contract bid items, and as such, no separate payment will be made. The Contractor agrees to assume liability and to hold the owner, its officers, employees and consultants harmless from any damages resulting from the existence of underground utilities and structures not reported to the Construction Manager, not indicated on the public records examined, or located at variance with that reported or shown on records examined.

- J. The Contractor shall furnish and install “No Parking” signs within the project site as necessary. These signs shall be placed at least seventy-two 72 hours prior to the scheduled construction work. These signs will bear the “No Parking” time limits, dates and name of the Contractor. For any violation of these “No Parking” signs by the citizens, the Contractor will contact the City’s Police Department for removal of vehicles in accordance with California Vehicle Code.
- K. The Contractor shall submit for record to the Construction Manager for review and approval, any restricted, or no parking plans with estimated dates of restriction or no parking at which time may be subject to modification, postponement or denial per City of San Rafael advertised community activities.
- L. The Construction Manager shall approve location and duration of no parking limits. All “No Parking” signs shall be stamped/signed by Construction Manager before posting. “No Parking” signs shall be removed when no work is under construction and reposted before resumption of construction activities.

3.0 OWNER FURNISHED MATERIALS

- A. Products furnished and paid for by the Owner are described in the contract documents.
- B. Owner’s Responsibilities:
 - 1. Arrange for and deliver the reviewed shop drawings, product data, and samples to the contractor.
 - 2. Arrange and pay for product delivery to the storage site in accordance with the construction schedule.
 - 3. Deliver suppliers’ bills of materials to contractor.
 - 4. Inspect deliveries jointly with contractor.
 - 5. Submit claims for transportation damage.
 - 6. Arrange for replacement of damaged, defective, and missing items.
 - 7. Arrange for manufacturers’ guarantees/warranties and bonds.

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- C. Contractor's Responsibilities:
1. Designate delivery date required for each product in the construction schedule.
 2. Review shop drawings, product data, and samples, and submit to Construction Manager with notification of discrepancies, conflicts, or problems anticipated in the installation of the product or its being placed in service.
 3. Receive, unload, and store products.
 4. Promptly inspect products jointly with Owner; record shortages and damaged or defective items.
 5. Handle products at the site, including uncrating and secure storage.
 6. Protect products from exposure to the elements and from other damage.
 7. Assemble, install, connect, adjust, and finish products as specified in the applicable specification section.
 8. Repair or replace, as required, items damaged subsequent to inspection with Owner.

4.0 TRENCH EXCAVATION

The maximum length of trench excavation in advance of the pipe laying operation shall be 200 feet, and the maximum amount of trench remaining open without backfill shall be 200 feet. No trench in public areas shall be left open during periods when the Contractor is not at the site of work. Trenches in these areas shall either be back filled and temporarily paved, where applicable, or covered with steel trench plates as specified in the technical specifications.

5.0 CONTRACTOR'S WORK PERCENTAGE

The Contractor shall perform at least ten (10) percent of the Contract bid amount. This portion of work shall encompass the performance of work by the Contractor's forces and equipment and the procurement of materials and equipment by the Contractor.

Subcontractors shall not be responsible for the performance of any work or procurement of materials and equipment within the above Contractor's work percentage allotment.

6.0 UNDERGROUND FACILITIES

- A. The Contractor is responsible for coordinating all project documentation, including but not necessarily limited to, the Contract Documents and existing record drawings for the determination of the location of all underground facilities.
- B. The Contractor shall exercise care in all excavations to avoid damage to existing underground facilities. This shall include potholing or hand digging in those areas where underground facilities are known to exist until they have been sufficiently located to avoid damage to the facilities.
- C. Prior to fabrication, the Contractor shall verify the location and elevations of existing underground facilities that the Contractor is connecting to.

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- D. No additional compensation shall be provided the Contractor for compliance with the provisions of this section or for the damage and repair of facilities due to the lack of such care.

END OF SECTION 01010

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SECTION 01400 QUALITY CONTROL

1.0 INSPECTION AND TESTING

- A. Additional requirements for tests are described in Section 01660, TESTING, ADJUSTING AND BALANCING OF SYSTEMS, and other Technical Sections of these Specifications.
- B. General:
 - 1. Where the Contract Documents require work to be field tested or approved, it shall be tested in the presence of the Construction Manager or its authorized representative. The Construction Manager shall have the right to witness all on-site tests performed by the Contractor and any shop tests. The results of any tests performed by the Contractor shall be made available for the information of the Construction Manager. Inspections, tests or favorable reviews by the Construction Manager shall not relieve the Contractor of its obligation to perform the work in accordance with the requirements of the Contract Documents or for its sole responsibility to the quality of workmanship and materials.
 - 2. Except as specifically required under the technical specifications for testing and inspection, all tests for materials furnished by the Contractor will be done in accordance with commonly recognized standards of national organizations. Where tests are to be performed by the Construction Manager or an independent testing laboratory or agency, the Contractor will provide all samples of materials without charge. The Construction Manager and not the Contractor will select the sample or samples of materials to be tested. No material for which the Contract Documents require the submittal and approval of tests, certificates of compliance or other documentation shall be incorporated in the work until submittal and approval of the submittal has been made.
 - 3. The Contractor shall provide safe access for the Construction Manager and its inspectors to inspect the quality of work and the works conformance with the Contract Documents. The Contractor shall furnish the Construction Manager the necessary labor and facilities for such things as excavation in compacted fills to the depths required to take samples and/or density tests. The Contractor shall provide adequate lighting, ventilation, ladders and other equipment or protective facilities as may be necessary for the safe performance of inspections.
 - 4. Upon completion of the Work, the Construction Manager will conduct a final inspection. Records shall be available at all reasonable hours for inspection by other local and State agencies to ascertain compliance with laws and regulations.

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- C. Notice:
1. The Contractor shall notify the Construction Manager at least 24 hours before any field testing or special inspections are required to be performed by the Construction Manager or the independent testing laboratory furnished by the Owner. The Contractor shall notify the Construction Manager at least two hours before any inspection is required to be performed or to witness the Contractor's on-site field testing.
 2. Whenever the Contractor varies the period during which work is carried on each day, the Contractor shall give the Construction Manager due notice so proper and timely inspection may be provided. Any work done in the absence of the Construction Manager shall be subject to rejection by the Construction Manager and/or the Owner.

2.0 QUALITY CONTROL

- A. All materials and equipment shall be new and of the specified quality and equal to the samples found to be acceptable by the Design Consultant if samples have been submitted. It shall be the duty of the Contractor to call the Construction Manager's attention to apparent errors or omissions and request instructions before proceeding with the Work. The Construction Manager may, by appropriate instructions, correct errors and supply omissions not involving extra cost, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.
- B. At the option of the Construction Manager, materials and equipment to be supplied under this Contract will be tested and inspected either at their place of origin or at the site of the Work. The Contractor shall give the Construction Manager written notification at least thirty (30) days prior to the shipment of materials and equipment to be tested and inspected at point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the materials and equipment nor shall such tests and inspections preclude retesting or re-inspection at the site of the Work.
- C. Inspection of the Work by the Owner, Construction Manager and/or Design Consultant shall not relieve the Contractor of its obligations to conduct comprehensive inspections and quality control of the Work and to furnish materials and perform acceptable Work, and to provide adequate safety precautions, in conformance with the intent of the Contract.

3.0 INSPECTION

- A. All work and materials are subject to the inspection of the Construction Manager. The Contractor shall notify the Construction Manager before noon of the working day before inspection is required.
- B. If the Specifications, the Construction Manager's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the

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Contractor shall give timely notice, in writing, of its readiness for inspection. Unless otherwise determined by the Construction Manager, all inspections shall be done only in the presence of the Construction Manager or its authorized representatives.

- C. The Owner, Construction Manager, Design Consultant and authorized government agents and their representatives shall at all times be provided safe access to the Work wherever it is in preparation or progress and to all warehouses and storage yards wherein materials and equipment are stored, and the Contractor shall provide facilities for such access and for inspection, including maintenance of temporary and permanent access.
- D. Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract, and improper work will be subject to rejection. Work and materials not meeting such requirements shall be made good, and unsuitable work or materials may be rejected; notwithstanding that such work or materials have been previously inspected by the Construction Manager or that payment there for has been included in a progress estimate.
- E. Code compliance inspections shall be requested by the Contractor in writing on a form acceptable to the Construction Manager.
 - 1. Inspections shall be requested no later than 3:00 p.m., 24 hours in advance of inspections requested.
 - 2. Inspection requests forms shall include but not be limited to the following information
 - a. Date
 - b. Project Name
 - c. Project Permit Number
 - d. Address of Project
 - e. Type of Inspection
 - f. Date of desired inspection
 - g. Location of inspection on project site
 - h. Name of Company requesting inspection
 - i. Name of person requesting inspection
- F. Re-inspections: The contractor shall be allowed one re-inspection. Additional re-inspections of the same work will be charged at the City's standard rate and discretion.

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- G. Special inspections shall be requested by the Contractor in writing with the exception; re-inspections will be charged at the published laboratory or special inspection rate of the testing and special inspection firm that is selected for the project.

3.1 WORK COVERED PRIOR TO INSPECTION AND/OR TESTING

- A. No portion of any work or installed materials shall be covered or concealed in any manner whatsoever without first being inspected by the Construction Manager. If any work should be covered up without the approval or consent of the Construction Manager, the Construction Manager shall have the authority to require that such work be uncovered for examination; defective work, if any, corrected; and recovered at the Contractor's expense.

4.0 SAMPLES AND TESTS

- A. At the option of the Construction Manager, the source of supply of materials for the Work shall be subject to tests and inspection before the delivery is started and before such materials are used in the Work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of materials to be used in the Work in sufficient quantities or amounts for testing or examination.
- B. All tests of materials furnished by the Contractor shall be made in accordance with the commonly recognized standards of national technical organizations, and such special methods and tests as are prescribed in the Contract Documents.
- C. Certificates of compliance shall be provided by the Contractor as required in the Technical Specifications or at the request of the Construction Manager.

4.1 SAMPLING

- A. The Contractor shall furnish such samples of materials as are requested by the Construction Manager, without charge. No material shall be used until the Construction Manager has had the opportunity to test or examine such materials. Samples will be secured and tested whenever necessary to determine the quality of the material. Samples and test specimens prepared at the jobsite, such as concrete test cylinders, shall be taken or prepared by the Construction Manager or an authorized Testing Firm in the presence and with the assistance of the Contractor.

4.2 TESTING

- A. Unless otherwise provided, all initial testing for concrete and soils shall be at no expense to the Contractor and shall be performed in the Owner's laboratory or in a laboratory designated by the Owner. Any retesting required due to failed test or defective material or sample shall be at the Contractor's expense. When required by the Contract or the Construction Manager, the Contractor shall

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furnish, at no extra charge, certificates of tests of materials and equipment made at the point of manufacture by a recognized testing laboratory.

- B. The Contractor is responsible for all system and equipment testing as provided for in these Contract Documents.
- C. Owner reserves the right to deduct monies from payments due the Contractor to cover additional testing costs incurred from failure of testing, sampling, etc., Additionally, the Owner reserves the right to deduct monies from payments due the Contractor to cover acquisition of certificates of testing of materials and equipment not provided by the Contractor when requested or otherwise required as part of the Contract Documents.

4.3 TEST STANDARDS

- A. All sampling, specimen preparation, and testing of materials shall be in accordance with the standards of nationally recognized technical organizations.
- B. The physical characteristics of all materials not particularly specified shall conform to the latest standards published by the American Society for Testing Materials, where applicable.

END OF SECTION

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SECTION 01630

PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide products listed in Contract Documents, products by manufacturers listed in Contract Documents, and products meeting specified requirements.
 - 1. Contract Amount: Base on materials and products included in Contract Documents.
 - a. Where listed in Contract Documents, materials and products by manufacturers not listed shall not be used without Owner and Architect approval of Contractor's written request for substitution.
 - 2. Purpose: After bidding, substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to no fault of Contractor.
 - a. Owner benefits either from a Contractor proposed reduction of the Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.
 - b. List proposed cost or time reductions on request for substitution.
 - c. Requests not including a proposed cost or time reduction will not be considered unless Contractor submits supporting information indicating specified materials are not available.
- B. Procedures are described for requesting substitution of unlisted materials in lieu of materials named in Specifications or approved for use in addenda.

1.2 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard, select product meeting referenced standard.
- B. For products specified by naming one or more products or manufacturers, select products of any named manufacturer meeting Specifications.
- C. For product or manufacturer that is not specifically named submit request for substitution.
- D. Where terms "or equal", "or approved equal", or similar references are made, submit request for substitution for product or manufacturer not specifically named in Specifications.

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1.3 SUBSTITUTIONS

- A. Within a period of 35 days after award of Contract, Owner and Architect will consider formal requests for substitutions only from Contractor as specified under 1.1 Requirements Included.
 - 1. Owner and Architect will consider only one request for substitution for each material; where requests are denied Contractor shall be required to provide specified materials.
 - 2. After initial 35-day period, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.
- B. Submit each request with sequentially numbered “Substitution Request Transmittal” acceptable to Owner and Architect; submit separate request for each product and support each request with:
 - 1. Product identification with manufacturer's literature and samples where applicable.
 - 2. Name and address of similar projects on which product has been used, and date of installation.
- C. Submit itemized comparison of proposed substitution with product specified and list significant variations.
- D. Submit data relating to changes in construction schedule.
- E. Note effect of substitution on other work, products, or separate contracts.
 - 1. Note if acceptance of substitution could require revision of Contract Documents, Drawings, details or Specifications.
- F. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price.
 - 1. Include costs to other contractors and costs for revisions to Drawings, details or Specifications.
- G. Substitutions will not be considered for acceptance when:
 - 1. They are indicated or implied on submittals without a formal request from Contractor.
 - 2. They are requested directly by a subcontractor or supplier.
 - 3. Acceptance will require substantial revision of Contract Documents.
- H. Substitute products shall not be ordered without written acceptance of Owner and Architect.

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- I. Owner and Architect will determine acceptability of proposed substitutions and reserves right to reject proposals due to insufficient information.

1.4 CONTRACTOR'S REPRESENTATION

- A. Requests constitute a representation that Contractor:
 1. Has investigated proposed product and determined it meets or exceeds, in all respects, specified product.
 2. Will provide same warranty or longer warranty for substitution as for specified product.
 3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.
 4. Waives claims for additional costs which subsequently become apparent.
 5. Will pay costs of changes to Contract Documents, Drawings, details and Specifications required by accepted substitutions.

1.5 ARCHITECT'S DUTIES

- A. Review Contractor's requests for substitutions with reasonable promptness.
 1. Architect will recommend that Owner accept or reject substitution request.
 2. Upon request, Architect will provide cost for changes to Contract Documents, Drawings, details and Specifications required for substitutions.
- B. Notify Contractor in writing of decision to accept or reject requested substitution.

END OF SECTION

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SECTION 01700 CONTRACT CLOSEOUT

1.0 OPERATION AND MAINTENANCE

- A. Prior to the delivery and installation of any item of machinery or equipment the Contractor shall submit the Operation and Maintenance Manual. The manual will be reviewed by the Construction Manager for general content, and the Construction Manager will advise the Contractor within twenty (20) working days of receipt if the manual is acceptable in general content for the delivery and installation of the equipment or machinery. No equipment or machinery shall be delivered or installed if the general content of the manual is found to be deficient. The final Operation and Maintenance Manuals must be submitted and favorably reviewed prior to final acceptance.
- B. All manuals shall be bound and marked to indicate the specific equipment furnished for this project and shall include:
1. Start-up instructions
 2. Assembly and disassembly instructions
 3. Trouble shooting instructions
 4. Lubrication instructions
 5. Maintenance and reinstallation instructions
 6. Parts identification
 7. List of spare parts recommended to have on hand
 8. Operator safety
 9. Installation drawings
- C. In addition, all operation and maintenance manuals for electrical equipment shall include:
1. Equipment ratings
 2. Calibration curves and rating tables if appropriate
- D. Operation and maintenance manuals for complex equipment shall also include:
1. Alternate specified operating modes
 2. Normal shutdown instructions

CONTRACT CLOSEOUT

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3. Long term shutdown instructions

2.0 EQUIPMENT START-UP

- A. After all acceptance tests have been completed by the Contractor and Owner but prior to final acceptance, the Contractor shall at no additional cost to the Owner, recheck all equipment for proper alignment and adjustment, check and fill all oil levels, re-lubricate all bearing and wearing points, replace all filters with new or cleaned as approved by the Construction Manager, and in general assure that all equipment is in proper, new condition for regular continuous operation. Contractor shall make sure that all equipment is working efficiently together to the satisfaction of the Owner and Owner's Representative. Contractor shall provide training for staff on the proper functioning and maintenance of the equipment.

3.0 FINAL CLEANING

- A. Final Clean Up
 1. Before final inspection of the Work, the Contractor shall clean the construction area, material sites, adjacent property and streets, and all ground occupied by the Contractor in connection with the Work of all rubbish, excess materials, form lumber, etc.
 2. All parts of the Work shall be left in a neat and presentable condition.
- B. Final Building Clean-Up: On all building projects and wherever else applicable, besides general broom cleaning, the following special cleaning shall be performed at completion of the Work:
 1. Putty stains and paint shall be removed from glass; glass shall be washed and polished, inside and outside. Care shall be exercised so as not to scratch glass.
 2. Marks, stains, fingerprints, and other soil and dirt shall be removed from painted, decorated, or stained work.
 3. Waxed woodwork shall be cleaned and polished.
 4. Hardware shall be cleaned and polished of all traces; this shall include removal of stains, dust, dirt, paints, and blemishes.
 5. Spots, soil, paint, plaster, and concrete shall be removed from tile; tile work shall be washed afterwards.
 6. Fixtures and equipment shall be cleaned and stains, paint, dirt, and dust shall be removed.

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7. Temporary floor protections shall be removed; floors shall be cleaned, waxed, and buffed.
8. Dust, cobwebs, and traces of insects and dirt shall be removed.

4.0 RECORD DRAWINGS

- A. The Contractor shall keep at the Site a copy of the plans and specifications, including addenda and change orders, to which the Design Consultant, Construction Manager, Owner's Representative and Building Inspector(s) shall have access at all times.
- B. The Contractor shall maintain one (1) set of specifications and full-size prints and mark thereon any deviation from plan dimensions, elevations, or orientations, and all changes from addenda, change orders, and clarifications. The Contractor shall submit the record drawings in good condition to the Construction Manager upon completion of the Work as a condition of acceptance of the Work. Marked prints shall be updated at least weekly and shall be available to the Owner and its representatives for review. The Owner may withhold partial payments if it does not find the record drawings to be satisfactory.

5.0 WARRANTY

- A. The Contractor hereby agrees to make, at its own expense, all repairs or replacements necessitated by defects in materials or workmanship, supplied under terms of this Contract, and pay for any damage to other works resulting from such defects, which becomes evident within one (1) year after the date of acceptance of the project or the Substantial Completion date whichever is applicable or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. The Contractor further assumes responsibility for a similar guarantee for all work and materials provided by subcontractors or manufacturers of packaged equipment components. The Contractor also agrees to indemnify, defend, and hold the Owner harmless from liability of any kind arising from damage due to said defects.
- B. The Contractor shall execute and submit a completed Warranty Form. The Warranty Form shall be submitted prior to the Substantial Completion date or the final acceptance of the project or within five (5) days of the occupancy or use of a portion of the Work, whichever is applicable.
- C. The Contractor shall, upon the receipt of notice in writing from the Owner, promptly make all repairs arising out of defective materials, workmanship, or equipment. The Owner is hereby authorized to make such repairs, and the Contractor and its Surety shall be liable for the cost thereof, if seven (7) days after giving of such notice to the Contractor, the Contractor has failed to make or undertake the repairs with due diligence. In case of emergency, where in the opinion of the Owner delay could cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and the expense in connection

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therewith shall be charged to the Contractor, and its Surety shall be liable for the cost thereof.

- D. Prior to the expiration of the Warranty period, the Owner reserves the right to hold a meeting and require the attendance of the Contractor. The purpose of the meeting is to review warranties, bonds and maintenance requirements and determine required repair or replacement of defective items.
- E. For the purpose of this paragraph, acceptance of the Work or a portion of the Work by the Owner, shall not extinguish any covenant or agreement on the part of the Contractor to be performed or fulfilled under this Contract that has not, in fact, been performed or fulfilled at the time of such acceptance. All covenants and agreements shall continue to be binding on the Contractor until they have been fulfilled.
- F. The Owner and the Contractor agree that warranty on the parts of the work possessed and used by the Owner, shall commence on the date that the Owner takes possession of such work and so notifies the Contractor in writing. The Owner and Contractor further agree that such possession and use of the work shall not be deemed as Substantial Completion or acceptance of any other part of the Work.

END OF SECTION

CONTRACT CLOSEOUT

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SECTION 01730 CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Contractor shall be responsible for cutting, fitting and patching required to complete Work and to:
 - 1. Make its parts fit together properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to Contract Documents.
 - 5. Remove samples of installed work as required for testing.
 - 6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

1.2 SUBMITTALS

- A. Submit a written request to Architect well in advance of executing cutting or alteration which affects:
 - 1. Work of Owner or separate contractor.
 - 2. Structural value or integrity of any element of Project.
 - 3. Integrity of weather-exposed or moisture-resistant elements.
 - 4. Efficiency, operational life, maintenance or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
- B. Request shall include:
 - 1. Identification of Project and description of affected work.
 - 2. Necessity for cutting or alteration.
 - 3. Effect on work of Owner or separate contractor.
 - 4. Effect on structural integrity, or weatherproof integrity of Project.
 - 5. Alternatives to cutting and patching.

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6. Cost proposal, when applicable.
7. Written permission of separate contractor whose work will be affected.
8. Description of proposed work including:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Products proposed to be used.
 - c. Extent of refinishing to be included.
- C. Should conditions of Work or schedule indicate a change of products from original installation, Contractor shall submit request for substitution as specified in Section 01630 - Product Substitution Procedures.
- D. Submit written notice to Architect designating date and time work will be uncovered.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with Specifications and standards for each specific product involved.
- B. Where Specifications and standards have not been provided, provide materials and fabrication consistent with quality of Project and intended for commercial construction.
- C. Provide new materials for cutting and patching unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions to Architect in writing; do not proceed with work until Architect has provided further instructions.

3.2 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

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1. Provide services of licensed engineer for designing temporary support where required by applicable authorities for temporary supports and for shoring; submit engineering calculations directly to applicable authorities upon request.
- B. Protect other portions of Project from damage.

3.3 PERFORMANCE

- A. Execute cutting by methods that provide proper surfaces to receive installation of repairs and finishes.
 1. Execute excavating and backfilling by methods which will prevent settlement and which will prevent damage to other work.
- B. Employ same installer or fabricator to perform cutting and patching work as employed for new construction for:
 1. Weather-exposed or moisture resistant elements.
 2. Sight-exposed finished surfaces.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- D. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.
- E. Fit work tight to pipes, sleeves, ducts, conduit and penetrations through surfaces.
- F. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:
 1. For continuous surfaces, refinish to nearest intersection.
 2. For an assembly, refinish entire unit.

END OF SECTION

CUTTING AND PATCHING

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SECTION 01780 WARRANTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Compile required and incidental warranties required by Contract Documents.
- B. These warranties shall be in addition to and not a limitation of other rights Owner may have against Contractor under Contract Documents and which may be prescribed by law, regardless of wording of warranty.

1.2 FORM OF SUBMITTAL

- A. Provide duplicate copies, notarized or on Contractor and Manufacturer's letterhead.
 - 1. Assemble documents executed by subcontractors, installers, suppliers, and manufacturers.
 - 2. Provide table of contents and assemble in binder with durable plastic cover, clearly identified regarding extent of contents.
 - 3. Electronic Format: Submit computerized compact disk (CD's) of warranties, in Microsoft Word.
- B. Warranty Form: Use form acceptable to Owner; completed form shall not detract from or confuse interpretations of Contract Documents.
 - 1. Manufacturer shall countersign warranty.
 - 2. Subcontractor and installer shall countersign warranty where specified.
 - a. Provide required warranties for waterproofing and roofing systems countersigned by subcontractor and installer.
- C. Submit final warranties prior to final application for payment.
 - 1. For equipment put into use with Owner's permission during construction, submit within ten days after first operation.
 - 2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.
- D. Provide information for Owner's personnel regarding proper procedure in case of failure and instances that might affect validity of warranty.

WARRANTIES

Section 01780

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- E. Size: 8-1/2" by 11" for three-ring binder; fold larger sheets to fit.

1.3 WARRANTIES

- A. Warranties are intended to protect Owner against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.
- B. Limitations: Warranties are not intended to cover failures that result from:
 - 1. Unusual or abnormal phenomena of the elements.
 - 2. Owner's misuse, maltreatment or improper maintenance of work.
 - 3. Vandalism after substantial completion.
 - 4. Insurrection or acts of aggression including war.
- C. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of warranted work.
- D. Warranty Reinstatement: After correction of warranted work, reinstate warranty for corrected work to date of original warranty expiration, but not less than half original warranty period.
- E. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.
- F. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse interpretations of Contract Documents.

END OF SECTION

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SECTION 06100

ROUGH CARPENTRY

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes: All labor, materials and equipment and all operations required to complete all rough carpentry and structural framing as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:
1. Structural floor, wall framing.
 2. Floor, wall sheathing.
 3. Rough hardware, framing connectors and fasteners.
 4. Treatment of wood.
 5. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and other work requiring supporting blocking.
 6. Miscellaneous wood nailers and furring strips, including roof applications, other wood framing, furring, shims or blocking as required to complete the work.
- B. Related Sections:
1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
 2. Pertinent sections of Division 01 specifying Structural Product Requirements: Structural Product Options, Substitution procedures and limitations, transportation, handling and storage.
 3. Pertinent sections of other divisions specifying steel or concrete construction.
 4. Pertinent section of Division 06 specifying wood construction and materials.

1.2 REFERENCES

- A. ANSI/AF & PA National Design Specification for Wood Construction.
- B. California Building Code, CBC, Part 2, latest edition.

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- C. PS 1 - Construction and Industrial Plywood; National Institute of Standards and Technology (Department of Commerce).
- D. PS 2 – Performance Standard for wood-based structural-use panels (Department of Commerce).
- E. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
- F. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; Redwood Inspection Service.
- G. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17, September 1991, rev. January 2004; West Coast Lumber Inspection Bureau.
- H. WWPA G-5 - Western Lumber Grading Rules, October 2004; Western Wood Products Association.
- I. AWWA- American Wood- Preservers Association.

1.3 SUBMITTALS

- A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication. Submittals that do not meet these requirements will be returned for correction without review.
 - 1. Substitutions for products specified require conformance to substitution requirements in Division 1.
 - 2. Review of materials and hardware for substitution to products specified is at the additional expense of the Contractor.
- B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.
- C. Product Data:
 - 1. Submit manufacturer's product data, specifications, location and installation instructions for framing connectors, wood preservative materials, application instructions, and fasteners. Include complete, accurate equivalence data when submitting alternate products to those specified. Provide samples of these items upon request.
 - 2. Submit product data and current ICC-ES report for machine-driven nails, fasteners and equipment, including dimensions of all fasteners, including nails, head, shank diameter and nail length.

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3. Submit samples of each and every type and size of proposed machine placed nails and fasteners.
- D. Shop drawings:
1. Indicate profiles, sizes, and spacing locations of structural members.
 2. Cross-reference all shop drawing detail references to contract document detail references.
 3. Secure all field measurements as necessary to complete this work.
- E. Manufacturer's Certificate: Submit all certifications of physical and chemical properties of materials as specified below in Article titled QUALITY ASSURANCE.
1. Certify that wood products supplied for rough carpentry meet or exceed specified requirements, including specified moisture content.

1.4 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies, refer to pertinent sections of Division 01 and CBC Chapter 19.
- B. All tests shall be performed by a recognized testing agency as specified in pertinent sections of Division 01.
- C. Inspection of fabricators is required per unless fabricator is registered and approved by the City building official. Wood product quality standards:
1. All wood products to comply with article REFERENCES.
 2. Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
- D. End-Jointed lumber shall not be used.
- E. Hardware and engineered wood products shall have current ICC ES Evaluation/research reports that are equivalent to products specified.
- F. Employ competent workmen experienced in work of the types specified and required.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Comply with pertinent requirements of Division 01.

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- B. Delivery: Time delivery and installation of carpentry products to avoid delaying other trades whose work is dependent on or affected by this section and to comply with moisture content, protection and storage requirements.
- C. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood to prevent deformation and provide air circulation within stacks.
 - 1. Store materials for which a maximum moisture content is specified only in areas where relative humidity has been reduced to a level where specified moisture content can be maintained.
 - 2. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or foreign materials.
 - 3. Provide special protection for horizontal plywood and OSB. Deformation of panels due to moisture is not acceptable.

1.6 PROJECT/SITE CONDITIONS

- A. Verify all condition at project site affecting the work; work to field dimensions as required. Coordinate carpentry installation with size, location and installation of service utilities.
- B. Sequence rough carpentry installation activities to allow sufficient time for:
 - 1. Review of all submittals, including Nailing Sample Submittals.
 - 2. Indicate submittal review, procurement, mock-up and testing activities in the project schedule prior to the start of installation. Installation durations shall be based on hand-nailed installation methods specified.
 - 3. Attainment of specified maximum lumber moisture content.

PART 2 – PRODUCTS

2.1 DIMENSIONED LUMBER

- A. Size per industry standards for nominal sizes shown; S4S.
- B. Moisture content of framing: All lumber to be maximum 19% at time of fastener installation, except 3x and 4x studs may be 25% at time of sheathing nailing. All lumber to be a maximum 19% at time of close-in U.N.O.
 - 1. The Owner's Testing Laboratory may test for moisture content prior to commencement of close-in.

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2. The Contractor shall recognize that excessive shrinkage of lumber results from excess moisture content at the time of installation and will compensate for use of such lumber by waiting for acceptable moisture content before close in and/or by replacing/repairing lumber that has sagged, twisted, or warped prior to close in.
 3. Deviation from this specification would require structural redesign of connections and fasteners.
- C. Interior structural framing shall be Douglas Fir with grades as noted below, unless otherwise specified on the drawings. All grades are per WCLIB standard grading rules.
1. All permanently exposed (interior or protected from weather) framing shall be select structural grade with no box heart.
 2. Except per 1 above, U.N.O., minimum grades are:

Floor and roof joists and rafters (2x) and 2x8 studs: D.F. No. 2
2x4 and 2x6 studs and plates: D.F. No. 2
4x and larger: D.F. No. 1
Blocking: D.F. No. 2.
6x8 and larger posts and beams: shall be SGL/CGL per 2.2.A below when so noted on the drawings.
- D. Framing not otherwise shown or specified: Douglas Fir, construction grade per WCLIB paragraphs applicable to uses and sizes required.
- E. Splits and checks are to be limited to 1x the depth of the member.
- F. Warped/twisted and excessively checked members shall not be used regardless of grade marks.

2.2 MANUFACTURED LUMBER

- A. Structural Glued Lumber (SGL) or Certified Glued Lumber (CGL): When so noted on the drawings, beams and posts 6x8 and larger (not specified as glu-laminated post or beams) are to be SGL/CGL conforming to WCLIB grading rules and ICC AC 47 for D.F. #1 Grade. All SGL/CGL lumber shall be graded and stamped accordingly. Glu-laminated Timber of equal size and grade meeting the requirements of section 06180 may be substituted for SGL/CGL
- B. Laminated Veneer Lumber (LVL); when so noted on the drawings, for use as joist, beams, blocking or studs. Conform to ICC AC 47.
- C. Laminated Strand Lumber (LSL); for use as blocking (flat or vertical) or rim joist when used with IJ or LVL. Conform to ICC AC 124.

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- D. Parallel Strand Lumber (PSL); for use as beams and posts when so noted on the drawings. Conform to ICC AC 47.

2.3 MANUFACTURED STRUCTURAL PANELS

- A. Plywood: All structural plywood shall be grade marked for conformance with PS 1 and shall be fabricated with exterior glue. Grades shall be as required on the drawings.
- B. Oriented Strand Board (OSB): All structural OSB shall be grade marked for conformance with PS2 and shall be fabricated with exterior glue. Grades shall be required on the drawings.

2.4 TREATED WOOD:

- A. Treated Lumber and Plywood: Comply with requirements of AWPA V1- use category systems for wood treatments determined by use categories, expected service conditions and specific applications.
- B. Preservative Treated Lumber
 - 1. General
 - a. Lumber in contact with concrete or masonry, and at other locations required by Code shall be pressure treated in accordance with CBC 2303, using waterborne preservatives. Lumber shall be Douglas Fir No. 2 (or better). Cut faces of treated wood shall be brush treated (two complete applications) prior to installation.
 - b. Kiln dry to 15% moisture content after treatment, and stamp "DRY".
 - c. Each piece of wood shall be stamped by the wood preservative applicator to indicate and identify its treatment. Markings shall include minimum retention of preservative treatment as required in applicable UBC Standards for lumber and plywood.
 - 2. Preservative Pressure Treatment of Lumber Above Grade: AWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention. Penetration of preservative shall conform to AWPA guidelines.
 - a. Kiln dry lumber after treatment to maximum moisture content of 15 percent.
 - b. Treat lumber in contact with roofing, flashing, or waterproofing.
 - c. Treat lumber in contact with masonry or concrete.

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- d. Treat wood less than 12 inches above grade or 6 inches above adjacent concrete paving or mow strip.
3. Treated Lumber, Poles, Posts and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
4. Preservative Types: Either of the following;
 - a. Copper Azole (CA-B) per ICC-ES AC143.
 - b. Alkaline/Copper/Quaternary (ACQ).
- C. Fire Retardant Treatment: Product and application process must be recommended by manufacturer of treatment as being suitable for painting. Application shall be by a California State Fire Marshal approved licensed contractor.
 1. Exterior Type: AWWA Use Category UCFB, Commodity Specification H (Treatment C20 for lumber and C27 for plywood), chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D 2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat exposed exterior rough carpentry items, including stairways, balconies, and covered walkways
 - c. Do not use treated wood in direct contact with the ground.
 2. Interior Type A: AWWA Use Category UCFA, Commodity Specification H (Treatment C20 for lumber and C27 for plywood), low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat rough carpentry items as indicated.
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

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2.5 FASTENERS AND ACCESSORIES

A. General requirements for fasteners:

1. Fasteners shall be of adequate size, spacing and number to resist design loads under intended use, and types shall be appropriate for the materials or conditions for which used.
2. Provide washers, pre-drilling, etc. required for proper installation.
3. Fasteners shall be hot-dip galvanized (ASTM 153), stainless steel, or silicon bronze or copper by approved methods for the following applications:
 - a. Exterior, exposed use.
 - b. In contact with preservative or fire-retarded treated wood.
4. Fasteners in moist corrosive atmosphere to be of stainless steel.
5. All fasteners specified by manufacturer shall be installed in framing hardware.

B. Nails and nailing not otherwise shown or specified:

1. Comply with requirements of governing building code.
2. For securing materials to hardened concrete or masonry: hardened steel masonry nails or Titen screws.
3. For framing and general woodwork: Common bright wire nails (not box nails) per ASTM F 1667. 16d cement coated sinker nails may be used in lieu of common nails for framing, unless noted otherwise on the drawings.
4. Nails for plywood shall be of common wire with full round heads and shall be of sufficient length to fully develop the nails.
5. Pneumatically driven nails of all types must comply with the requirements of this section. All proposed nails shall match diameter and penetration of specified nails.
6. Staples shall conform to length and gauges specified and shall be installed to match specified patterns and spacing.
7. Powder-actuated Fastenings: Use only as approved by the Architect/Engineer; operators shall be qualified.

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- C. Bolts: ASTM A-307 and ANSI B18.2.1, standard semi-finished machine bolts as shown or required. Malleable iron washers or steel plate washers, unless otherwise shown, shall be provided under all bolt heads and nuts.
 - 1. Bolts in Concrete: Wedge or expansion anchors set after casting shall be Hilti KB TZ 3, or Simpson Strong Bolt or Titan Screws.
 - 2. Anchor bolts are to be formed from ASTM A36 Steel, or to be ASTM A307 Machine Bolts with standard head or plate washer in concrete. No upset threads allowed. No L or J bolts allowed. Other grades of steel materials as noted on the drawings. All bolts and washers in treated lumber exposed to weather or soil to be galvanized.
 - 3. For contact with preservative or fire-retardant or exterior exposed use provide zinc coating in accordance with ASTM B695, Class 55 minimum.
- D. Lag screws: Standard hex lag screws per ANSI B 18.2.1.
- E. Wood screws: Standard wood screws per ANSI B 18.6.1.
- F. Framing hardware: Fabricated sheet metal timber framing connectors shall be manufactured from painted or galvanized G90 steel by "Simpson Company", Dublin, CA; (Simpson Co. per catalogue C-2009 are identified on the drawings), "USP Lumber Connectors", Livermore, CA, or approved equivalent. Connectors shall be at least 16-gauge material, (1/8" plate materials where welded), unless otherwise noted, punched for nailing. All heavy hardware to be fabricated from A-36 steel per Division 5, Metals. All hardware intended for exterior exposed use shall be galvanized per G185 ASTM 653.
 - 1. For contact with preservative or fire-retardant treated wood, provide minimum G185 galvanizing per ASTM A 653/A 653M.
 - 2. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. Nails to be used with framing accessories, subject to the requirements specified in this section for fasteners and anchors.
- G. Subfloor Glue: Water proof, water base, air cure type, cartridge dispensed AFG-01.

2.6 SOURCE QUALITY CONTROL

- A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following tests:
 - 1. Moisture content of all lumber at time of delivery.
- B. The Testing Agency will submit reports as specified in Division 01.

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PART 3 – EXECUTION

3.1 REQUIREMENTS FOR STRUCTURAL FRAMING

A. General

1. Refer to drawings for layouts, notes and details, provide framing as required; comply with governing building code requirements.
2. Provide framing to achieve true alignments as surfaces receiving finish materials.
3. It shall be the responsibility of the Contractor to provide and install all wood blocking, furring strips, or grounds detailed or required to provide anchorage for all finishes, accessories, fixtures, etc. as required to complete all work. All blocking and/or backing shall be securely bolted or otherwise anchored in place.
4. Contractor shall be responsible for layout of anchor bolts, and other hardware embedded in concrete when placed by other trades.
5. Provide and install all structural framing, blocking, fasteners, brackets, clips, etc. as required to complete work specified in the Construction Documents.

B. Framing

1. Sill Plates and Ledgers:
 - a. Sill plates and ledgers on concrete shall be anchored with bolts, shall have full bearing on concrete, and shall be placed for plywood nailing as indicated. All bolt nuts shall be provided with a cut plate steel washer for bearing on wood.
 - b. Provide a minimum of two sill anchor bolts per sill piece with a bolt no less than 4 1/2 "and no more than 9" from the end of the sill. Bolts to be 5/8" diameter x 10" long at 4' on centers, with unless otherwise shown or noted. Provide additional anchorage bolts where sill plates are cut, notched, or drilled in excess of 50% of the sill width each side of the notch or hole as per end of the sill at shear walls, provide a plate washer 3" x 3" x 0.229" between the sill and nut at anchor bolts.
 - c. Anchor bolt holes in sill plates or ledgers shall be 1/16" maximum larger than anchor bolt.
2. Stud Walls and Framing:

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- a. Cut studs and posts with square ends, unless otherwise shown or noted. All posts and beams shall be "cut to bear" unless otherwise detailed.
 - b. All studs in walls shall be placed with the shortest dimension parallel to the run of the wall. Bearing studs shall extend full height to be the supporting framing as shown; non-bearing studs shall extend to the supporting framing.
 - c. Provide double studs on each side of all openings, unless shown or noted otherwise.
 - d. All openings in stud walls and partitions shall be framed with headers across the top, as shown, with a minimum size (6" deep x stud width) resting on short cripple studs, and as shown on the drawings.
 - e. All stud partitions and walls shall have horizontal solid blocking not less than 2 x and of the same width as the stud, fitted and nailed into the studs at mid-height of stud, for studs over 8 feet in height, except as otherwise shown or specified. This blocking shall be so spaced that there shall be no concealed air spaces greater than eight feet in any dimension.
 - f. Stud partitions containing plumbing, heating or other pipes shall be so framed as to give proper clearance for piping. Plumbing, heating and vent pipes exceeding 1-1/2" in inside diameter shall not be placed in partitions used as bearing or shear walls unless completely furred clear of the wall. No notching shall be allowed. Pipes shall be placed in the center of the plate using a neat bored hole and the plates shall be strapped on each side with 3" x 36" x 14 gauge steel punched for 10d nails 3" on center, staggered, or as shown on the drawings.
3. Top Plates
- a. Top plates shall be double, set single. Corners where stud wall or partitions meet shall be framed with studs on all surfaces and blocking to form a "rigid" corner with nailing for all corners. Double top plates shall be lapped at corners. Lap splices and nailing per the drawings.
4. Floor, Roof and Ceiling Framing
- a. Joists and beams shall be accurately aligned and the position and spacing of all joists and beams shall be as shown and be coordinated with other framing and to other trades prior to actual construction.

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- b. Place all joists and beams with crown up. Cantilevered joists and beams shall be placed with the crown down.
- c. Cutting of wood girders, beams or joists for electrical and mechanical lines shall be limited to cuts and bored holes not deeper than 1/5 of the beam depth from the top and located not farther from the support than three times the beam depth and not less than the beam depth. Cuts in excess of this, or single bored holes with a diameter of more than 1" are not permitted without special provisions for framing the beams. Location of all cuts in framing shall receive the prior review of the Architect/Engineer.
- d. Provide vent holes in rafters and/or blocking as shown and/or directed by the Architect.

3.2 STRUCTURAL SHEATHING

A. General

- 1. Sheathing nailing shall be as required on the drawings. Do not overdrive (Do not break skin of sheathing face sheet). Over driving will be cause for rejection.
- 2. Form sheathing may be re-used for concealed sheathing provided the lumber at the time of re-use is approved by the Architect, meets with the framing grade requirements specified herein, is in good condition, and is thoroughly cleaned with all nails removed.
- 3. Pneumatic nailing devices shall be adjustable so that nail heads do not penetrate skin of sheathing. Contractor shall submit equipment and nails for review prior to use.

B. Roof and Floor Sheathing: Except "Panelized Roofs", lay with face grain perpendicular to roof rafters, roof trusses or floor joists. Stagger sheets. Block all unsupported sheet edges with 2x material unless noted otherwise.

C. Wall Sheathing: Lay with face grain either parallel or perpendicular to studs. Exposed bottom edges shall be sealed as recommended by manufacturer. Block all unsupported sheet edges with 2x materials unless noted otherwise.

D. Panelized Roofs: Where sheathing is set @ 8'-0 1/8" spacing, cut every fourth sheet short by 1/2" to re-align structural framing that has been specified to be spaced at even units of 2, 4 or 8 feet.

3.3 ROUGH HARDWARE

A. General: Nails, spikes, screws, fabricated sheet metal anchors, ties, hangers and any other materials shown or required for the attachment of wood to

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concrete and wood to steel and wood to wood shall be furnished and installed as part of this work.

- B. Framing Nailing: All framing nailing shall conform to minimum requirements of the Building Code, and with details shown on the drawing.
- C. Bolts, Lag Screws and Washers:
 - 1. Bolts in wood shall be machine bolts unless otherwise noted and shall be of such length that the bearing length of the threads does not exceed $\frac{1}{4}$ of the full bearing length in the member holding the threads. Bolt holes in wood shall be $\frac{1}{32}$ " oversized. Bolt holes for sill plates may be $\frac{1}{16}$ " maximum oversize. Holes in steel shall be $\frac{1}{16}$ " oversize. See Section 3.1 B.1.b for anchor bolts at sill plates and ledgers.
 - 2. Provide square plate or malleable iron washer and nut at head where bearing is against wood; cut washer under nut where it is against steel. Washer will not be required under head of carriage bolts. Provide malleable iron washers where exposed.
 - 3. All nuts shall be tightened when placed and retightened at completion of the job or immediately before closing with final construction.
 - 4. Lag screws shall be screwed (not driven) into place. Drill holes same diameter and depth as shank, then drill pilot holes same diameter as at base of thread for the threaded portion.

3.4 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

- A. Coordinate installation of wood decking, wood chord metal joists, glue laminated structural units, prefabricated wood trusses, and plywood web joists.
- B. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members. Fasten curbs corner-to-corner and to rafters with framing connectors configured for this application.
- C. Blocking:
 - 1. Provide fire blocking at locations and spacings as required by CBC Chapter 7. Locate other blocking, supplementary framing, backing plates and bracing to facilitate installation of finish materials, fixtures, equipment, services, accessories and trim requiring attachment and support.
 - 2. Solid block joists and rafters over all supports with blocking of the same size and material as the joist or rafter.
- D. Furring:
 - 1. Nominal 1 inch x 3 inch minimum, continuous and spaced at 16 inches on

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center, maximum.

2. Install plumb, rigid, and level. Shim where necessary to provide a true, even plane suitable to receive the finish required.
 3. Attach to concrete and masonry as shown in the contract drawings.
- E. Bridging: Use 2-inch solid cross bridging. Nail bottom ends of bridging only after sheathing has been nailed.
- F. Install miscellaneous metal angles, bolts and other items; secure into formwork where embedded in concrete.
- G. Install accessory items not otherwise set under other sections; after completion of painting and other finishing work; in locations shown or directed by the Architect. Set items plumb, level and secure using appropriate fastening as applicable.

3.5 FIELD APPLIED WOOD TREATMENT

- A. Field treat all end cuts and holes in preservative treated materials per section 2.4.
- B. Apply two brush coats; or fill-immersion dip not less than 15 minutes; or as required to thoroughly saturate all surfaces after cutting.
- C. Air dry 2-hours minimum before installation.

3.6 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- C. Variation from Plane (Other than Floors): 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum. Provide framed substrates meeting requirements for application of finishes specified in other sections.
- D. Exposed surfaces shall be free from dents and tool marks, un-sanded rough or torn faces and corners, and other defects.

3.7 FIELD QUALITY CONTROL

- A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following tests and submit reports as specified in Division 01:
 1. Moisture content of all lumber at time of close-in.

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2. Periodic special inspection of nailing, bolting, and other fastening within the seismic-force-resisting system including shear walls, wood diaphragms etc per CBC 1707.3.

3.8 ADJUSTING

- A. Replace all defective work at Contractor's expense.
- B. Replace defective or damaged work with conforming work.
- C. Correct defects using means that will not injure the materials.
- D. Replace defective or damaged work which cannot be corrected in the field with new work, or return defective items to the shop for repair.
- E. Repair or replace framing lumber sagged, twisted or warped due to shrinkage from excessive moisture content at time of installation, or from other causes.
- F. Adjust to meet specified tolerances.
- G. Architect/Engineer shall review all proposals for the repair or replacement of damaged, defective, or missing work.
- H. Pay expenses incurred by Owner for Architect/Engineer's costs for (re-)design and obtaining approvals of Authorities Having Jurisdiction (AHJ) necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work.
- I. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work.

3.9 CLEANING AND PROTECTION

- A. Clean all surfaces upon completion of erection, leave free of grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave surfaces broomed clean.
- B. Waste Disposal: Comply with the requirements of pertinent sections of Division 01 specifying cleaning and disposal.
 1. Comply with applicable regulations.
 2. Do not burn scrap on project site.
 3. Do not burn scraps that have been pressure treated.
 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

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- C. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- D. Prevent sawdust and wood shavings from entering the storm drainage system.
- E. Protect work from damage by subsequent operations.

END OF SECTION

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SECTION 06200

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide finish carpentry with accessories as required for complete installation.
- B. Related Sections:
 - 1. Section 06400: Architectural woodwork, including casework and countertops.

1.2 SUBMITTALS

- A. Product Data: Submit literature for manufactured items.
- B. Shop Drawings: Indicate materials and wood species, component profiles, fastening, joining details, finishes, and accessories.
- C. Certificates:
 - 1. Quality Standards Certification: WI MoM certification will not be required however Owner reserves right to retain Woodwork Institute if quality of work is questionable.
 - 2. Wood Product Certification: Furnish certification indicating wood products are from "well-managed" forests.

1.3 QUALITY ASSURANCE

- A. Standards: Perform finish carpentry in accordance with standards of Woodwork Institute (formerly Woodwork Institute of California) "Manual of Millwork."
- B. Certified Wood Products: Wood products to be from forests certified "well-managed" by an agency accredited by Forest Stewardship Council (FSC) including SmartWood Program and Forest Conservation Program.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver materials until site conditions are adequate to receive work; protect items from weather while in transit.
- B. Store materials indoors, in ventilated areas with constant but minimum temperature of 60 degrees F and maximum relative humidity of 25% to 55%.
- C. Do not begin installation of finish carpentry until space is fully enclosed and mechanical systems are fully operational.
 - 1. Maintain interior installation areas at 70 degrees F and 50% to 55% relative humidity.
- D. Immediately remove from site materials with visible mold and materials with mildew.

FINISH CARPENTRY

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PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wood Shelving: Provide wood board or Medite Corp./Medite II medium density fiberboard (MDF) shelves, minimum 3/4" thick.
 - 1. Quality: WI MoM/Custom Grade, for opaque paint finish.
 - 2. Fixed Wood Shelf Supports: WI MoM/Custom Grade, softwood for opaque finish.
- B. Anchors, Nails and Screws: Select the material, type, size and finish required by each substrate for secure anchorage; provide toothed steel or lead expansion bolt screws for drilled-in-place anchors.
- C. Wood Filler: Color to match wood being filled.

2.2 FABRICATION

- A. Fabricate finish carpentry items in accordance with specified quality standard.
- B. Use exposed fastening devices or nails only when approved and unavoidable; arrange neatly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible; do not delay job progress, allow for trimming and fitting.
- B. Verify surfaces are ready to receive work and field measurements are as shown on shop drawings.
 - 1. Beginning installation signifies acceptance of conditions.
- C. Ensure mechanical and electrical items affecting work are properly placed, complete, and have been inspected by applicable authorities prior to commencement of installation.
- D. Inspect each piece of finish carpentry and discard damaged and defective pieces.

3.2 INSTALLATION

- A. Install work consistent with specified WI MoM quality grade, plumb, level, true and straight with no distortions; shim as required, using concealed shims.
 - 1. Prime paint surfaces in contact with cementitious materials prior to installation; comply with requirements of Section 09900 – Paints and Coatings.
- B. Secure work to blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.
- C. Scribe and cut for accurate fit to other finished work.

FINISH CARPENTRY

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- D. Accessories: Install accessories in accordance with manufacturer's recommendations in locations indicated or as directed by Architect.
- E. Acceptable Tolerances:
 - 1. Variation from True Position: Maximum 1/16" at any position and maximum 1/8" in any 10'-0" length.
 - 2. Adjoining Surfaces of Same Material: No variation permitted.
 - 3. Offset with Abutting Materials: Maximum 1/32".
- F. Preparation for Field Finishing:
 - 1. Sand work smooth and set exposed nails and screws.
 - 2. Apply wood filler in exposed nail and screw indentations and leave ready to receive site-applied finishes.
 - 3. Seal concealed and semi-concealed surfaces; brush apply only, using primer consistent with finish coats specified under Section 09900 - Paints and Coatings.

END OF SECTION

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SECTION 06400

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide mill fabricated architectural woodwork with accessories as required for complete finished installation including cabinetwork hardware.
 - 1. Provide cabinetwork.
 - 2. Provide countertops.
- B. Related Sections:
 - 1. Section 06200: Finish carpentry including trim as required.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's literature for manufactured items.
- B. Shop Drawings: Indicate materials and wood species, component profiles, fastening, joining details, finishes, and accessories.
 - 1. Certification: Provide WI MoM Certified Compliance Label on shop drawings.
- C. Samples: Furnish samples of each of the following.
 - 1. Plastic laminates.
 - 2. Wood veneer.
- D. Certificates: WI MoM certification is required.
 - 1. General: Before delivery to jobsite, provide WI MoM Certified Compliance Certificate indicating grade of millwork products to be furnished and certify WI MoM requirements for specified grades shall be met.
 - 2. Casework: Each unit to bear WI MoM Certified Compliance Label.
 - 3. Provide bamboo veneer plywood cabinetry and wall panels as shown on the drawings
 - 4. Plastic Laminate Countertop: Each unit to bear WI MoM Certified Compliance Label.
 - 5. Installation: Provide WI MoM Certified Compliance Certificate for Installation.
 - 6. Wood Product Certification: Furnish certification indicating wood products are from "well-managed" forests.

ARCHITECTURAL WOODWORK

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1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Member of Woodwork Institute with minimum five years successful experience fabricating architectural woodwork similar to that required for Project.
- B. Standards: Perform architectural woodwork in accordance with recommendations Woodwork Institute "Manual of Millwork" (WI MoM).
 - 1. Installation Certification Program: Install work in this section as specified in the WI MoM Manual of Millwork and provide WI MoM Certified Compliance Certificate for installation at completion of Project installation.
- C. Certified Wood Products: Wood products to be from forests certified “well-managed” by an agency accredited by Forest Stewardship Council (FSC) including Smart Wood Program and Forest Conservation Program.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver architectural woodwork until site conditions are adequate to receive work; protect items from weather while in transit.
 - 1. Allow architectural woodwork shop finish to completely dry prior to delivery to site; allow materials to off-gas volatile organic compound (VOC) emissions off site.
- B. Store materials indoors, in ventilated areas with constant but minimum temperature of 60 degrees F and maximum relative humidity of 25% to 55%.
- C. Do not begin installation of architectural woodwork until space is fully enclosed and mechanical systems are fully operational.
 - 1. Maintain interior installation areas at 70 degrees F and 50% to 55% relative humidity.
- D. Immediately remove from site materials with visible mold and materials with mildew.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Finished Casework:
 - 1. Quality: WI MoM/Premium Grade, Type II, Style A, flush overlay type.
 - a. Inside Surfaces: White Birch stained to match general color of exterior veneers; melamine interior is not acceptable.
 - 2. Particleboard Core: Provide Medite Corp. (Sierrapine)Medite II or Rodman Industries/Resincore I formaldehyde-free medium density fiberboard (MDF) or particleboard made from recycled wood products.
- B. Plastic Laminate Finished Countertops:

ARCHITECTURAL WOODWORK

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1. Quality: WI MoM/Custom Grade.
2. Plastic Laminates:
 - a. Types: NEMA LD-3.1 high pressure laminates.
 - 1) Horizontal Surfaces: General Purpose Type, nominal 0.050".
 - 2) Vertical Surfaces: Vertical Surface Type, nominal 0.032".
 - 3) Unexposed Surfaces: Balanced with 0.030" melamine backing sheet.
 - b. Manufacturers:
 - 1) Formica Corp.
 - 2) Wilsonart, Ralph Wilson Plastics.
 - 3) Micarta Div., Westinghouse Electric Co.
 - 4) Nevamar Corp.
 - 5) Pioneer Plastics Corp./Pionite.
 - 6) Substitutions: Refer to Section 01630.
 - c. Colors: As selected by Architect from manufacturer's full range of available colors and patterns, excluding metallics.
3. Particleboard Core: Provide Medite Corp. (Sierrapine)Medite II or Rodman Industries/Resincore I formaldehyde-free medium density fiberboard (MDF) or particleboard made from recycled wood products.
- C. Casework Hardware: Provide casework hardware items as required for complete installation as indicated; provide types as listed in WI MoM "Manual" but no less than following types.
 1. Plug-In Pin Type Shelf Supports: Provide holes 1" on center.
 2. Cabinet Hinges: European concealed type, minimum 160 degree opening, with spring closer.
 3. Cabinet Hinges: European concealed type, minimum 160 degree opening, without spring closer.
 4. Cabinet Hinges: Pivot type, polished chrome finish.
 5. Cabinet Pulls: Wire type, 3" center to center, clear aluminum.
 - a. Manufacturers:
 - 1) Baldwin Hardware Manuf. Corp./No. 4672.
 - 2) Stanley Hardware/No. 4483.
 - 3) The Engineered Products Co./No. MC-4023.
 - 4) Substitutions: Refer to Section 01630.

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6. Drawer Slides: Full extension, rail mounted type, minimum 100 lb. capacity with ball-bearing rollers.
 - a. Manufacturers:
 - 1) Accuride.
 - 2) Knape & Vogt.
 - 3) Substitutions: Refer to Section 01630.
7. Cabinet Locks: Pin and tumbler slide bolt lock, two keys each.
 - a. Manufacturers:
 - 1) Schlage Lock Co./46-002 Cabinet Locks.
 - 2) Best Access Systems/5L Series.
 - 3) CompX International/Timberline Locks.
 - 4) Substitutions: Refer to Section 01630.
- D. Anchors, Nails and Screws: Select material, type, size and finish required by each substrate for secure anchorage; provide toothed steel or lead expansion bolt screws for drilled-in-place anchors.
- E. Wood Filler: Color to match wood being filled.

2.2 FABRICATION

- A. General: Fabricate architectural woodwork in accordance with specified quality standards.
- B. Plastic Laminate:
 1. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes.
 2. Make corners and joints hairline; slightly bevel arises.
 3. Locate butt joints at least 2'-0" from cutouts.
 4. Cap exposed edges with solid wood trim.
 5. Apply laminate backing sheet to reverse side of laminate surfaces.
 6. Provide cutouts for inserts, fixtures and fittings; verify locations from on-site dimensions.
 7. Prime paint contact surfaces of cutouts.
 8. Plastic Laminate Countertops: Square butt joints and self edging; applied plastic or metal edging not permitted.
- C. Use exposed fastening devices or nails only when approved and unavoidable; arrange neatly.

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- D. Assemble woodwork in shop in sizes easily handled and to ensure passage through building openings.
- E. Cabinet doors to be flush overlay style. Interiors of cabinets to be melamine.

2.3 FINISHES

- A. Finished Woodwork: Finish architectural woodwork in shop unless otherwise indicated.
 - 1. Sand work smooth; seal, stain and varnish concealed and semi-concealed surfaces of transparent finished woodwork; brush apply.
 - 2. Finish: WI MoM/Premium Grade clear finish producing a dull rubbed effect, as approved by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible; do not delay job progress, allow for trimming and fitting.

3.2 INSTALLATION

- A. Install work consistent with specified quality grade, plumb, level, true and straight with no distortions.
 - 1. Shim as required, using concealed shims.
- B. Ensure mechanical and electrical items affecting architectural woodwork are properly placed, complete, and have been inspected by Architect prior to commencement of installation.
- C. Secure work to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.
- D. Scribe and cut for accurate fit to other finished work.
- E. Install architectural woodwork under supervision of factory-trained mechanics.
- F. Attach architectural woodwork securely in place with uniform joints providing for thermal and building movements.
- G. Acceptable Tolerances:
 - 1. Variation from True Position: Maximum 1/16" at any position and maximum 1/8" in any 10'-0" length.
 - 2. Adjoining Surfaces of Same Material: No variation permitted.

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3. Offset with Abutting Materials: Maximum 1/32".

END OF SECTION

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SECTION 07210

BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide insulation and accessories as required for complete installation.
 - 1. Provide thermal batt insulation with integral vapor retarder.
 - 2. Provide un-faced insulation
- B. Related Work:
 - 1. Section 07840: Firestopping.
 - 2. Section 09260: Acoustical insulation concealed in gypsum board systems.

1.2 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for each type of insulation.
 - 1. Submit Underwriter's Laboratory approval numbers for required fire ratings; approvals of other laboratories contingent upon acceptance of applicable authorities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Thermal Batt Insulation: Preformed slag mineral or glass fiber with thermosetting resin binders, conforming to ASTM C665; formaldehyde-free.
 - 1. Manufacturers:
 - a. USG Interiors, Inc./Thermafiber FS25 Insulation.
 - b. Johns Manville/FSK-25 Thermal-Shield Insulation.
 - c. Owens-Corning Fiberglas Corp./Fiberglas FS-25 Insulation.
 - d. Substitutions: Refer to Section 01630.
 - 2. R-Value: Minimum R-19 at walls, unless otherwise indicated.
 - 3. Flame Spread/Smoke Density Rating: Maximum 25/450, ASTM E84.
 - 4. Vapor Retarder: Type III, aluminum vapor retarder on one side.
 - 5. Vapor Retarder Tape: Minimum 2" wide self-adhering type designed to maintain vapor retarder integrity and complying with fire resistance ratings as required by applicable codes.
 - 6. Penetration Type Insulation Supports: Galvanized or electroplated steel penetration supports with adhesive attachment to substrate and support disc.

BUILDING INSULATION

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- B. Accessories: Furnish as recommended by insulation manufacturer for insulation types, substrates, and conditions involved.
 - 1. Fasteners and Attachment Devices: Comply with insulation and roofing material manufacturer recommendations for attachment of insulation to deck.
 - 2. Fasteners to withstand loads specified for system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate and adjacent materials are dry and ready to receive insulation; beginning installation signifies acceptance of conditions.
- B. Ensure mechanical and electrical items affecting work are properly placed, complete, and have been inspected by Architect prior to commencement of installation.

3.2 INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
 - 1. Install insulation with integral vapor retarder with vapor retarder toward inside of building.
- B. Cut and trim insulation neatly, to fit spaces.
 - 1. Backed Insulation: Use insulation free of ripped backs and edges.
- C. Fit insulation tight within spaces and tight to and behind mechanical and electrical services within insulation plane; leave no gaps or voids; maintain integrity of thermal barrier.
- D. Friction fit batt insulation in place; use tape or penetration supports as necessary to assure permanent installation.
 - 1. Taping: Tape joints and tears in integral vapor retarder, including joints between insulation and surrounding construction, to ensure vapor-tight installation.
 - 2. Penetration Supports: Cut or bend pins in locations accessible to maintenance personnel, to eliminate potential hazards from exposed pin points.

END OF SECTION

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SECTION 07840

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide firestopping as required to maintain effective barrier against spread of flame, smoke and gases, and to retain integrity of time-rated construction as indicated and at following types of locations.
 - 1. Provide at fire rated system perimeters, and at duct, conduit, piping penetrations through time-rated construction, and as required by applicable codes.
 - 2. Coordinate requirements for firestopping with work involving penetrations through fire rated assemblies.
 - a. Review Project and Contract Documents to ascertain extent of penetrations in fire rated assemblies and methods included in other sections for maintaining fire ratings.

1.2 SYSTEM DESCRIPTION

- A. Design Requirements: Provide materials tested in accordance with following standards, unless otherwise specified.
 - 1. American Society for Testing and Materials (ASTM) Publications:
 - a. ASTM E84, Surface Burning Characteristics of Building Materials.
 - b. ASTM E119, Fire Tests of Building Construction and Materials.
 - c. ASTM E814, Fire Tests of Through-Penetration Fire Stops.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature including data for materials and prefabricated devices, including descriptions sufficient to identify materials and devices on job.
 - 1. Submit Underwriter's Laboratory approval numbers for required fire ratings; approval of other laboratories contingent upon acceptance of applicable authorities.
- B. Shop Drawings: Submit manufacturer's installation details.
- C. Certificates of Compliance: Submit certificates, accompanied by classifications, indicating material or combination of materials used meets requirements specified for flame spread and fire resistance.
 - 1. Certificates to be by nationally recognized testing authority or otherwise satisfactory to authorities.

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- D. Manufacturer's Instructions: Maintain copy of manufacturer's installation instructions and recommendations at each work area.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with California Building Code, Chapter 7 requirements for firestopping, including both F Ratings and T Ratings as applicable.

1.5 DELIVERY, STORAGE, AND HANDING

- A. Deliver materials in their original unopened packages and store in location providing protection from damage and exposure to elements.
- B. Damaged or deteriorated materials shall be removed from site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. 3M Fire Protection Products Div./3M Fire Barrier Products.
- B. Specified Technologies, Inc. (STI)/SpecSeal and Pensil Firestopping.
- C. Hilti, Corp./Hilti Firestop Systems.
- D. W.R. Grace & Co./Flamesafe Products.
- E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

- A. General: Choose products and methods meeting applicable codes and Specification requirements for each firestopping application, subject to Architect's acceptance.
- B. Firestopping Materials: Furnish materials for penetrations in time-rated floor, wall, and partition assemblies capable of preventing passage of flame, smoke, and hot gases.
 - 1. Penetration Test: Furnish materials passing ASTM E814 for penetration fire stopping indicating maintenance of time-rated adjacent assemblies.
 - a. Additional Tests: Where required by applicable authorities, provide materials passing ASTM E119 time-temperature fire conditions for fire ratings indicated for assemblies.
 - 2. Flame Spread: ASTM E84 flame spread rating of 25 or less.
 - 3. Smoke Density: ASTM E84 smoke density rating of 450 or less.
- C. Firestopping: Maintain fire rating of assembly in which firestopping is installed, such as floor, partition, or wall, in accordance with ASTM E119 tests.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and conditions receiving or affecting the work. Do not proceed until unsuitable conditions are corrected.

3.2 INSTALLATION

- A. Install firestopping in accordance with manufacturer's recommendations and installation instructions.
- B. Completely fill void space with firestopping materials regardless of geometric configuration, subject to tolerances established by firestopping manufacturer.
- C. Apply firestopping materials at penetrations of pipes, conduits, and ducts prior to application of insulation.
 - 1. Remove insulation already in place at penetration prior to application of firestopping materials.
 - a. Insulation which meets requirements for fire ratings are excepted from this requirement.

3.3 FIELD QUALITY CONTROL

- A. Inspection: Keep area of work available for inspection by Architect and applicable authorities before and after application of firestopping.

3.4 REPAIR AND CLEAN-UP

- A. Repair damage caused by work of this section; clean exposed surfaces soiled by work and leave work ready to receive following work.
- B. On completion of work, remove debris, excess materials, and equipment from site.

END OF SECTION

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SECTION 07900

JOINT SEALERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide joint sealers, for interior and exterior joints not specified elsewhere, with backing rods and accessories as required for complete installation.
 - 1. Joint sealers include sealants and calking as indicated.
- B. Related Sections:
 - 1. Section 07600: Flashing and sheet metal concealed sealants.
 - 2. Section 08800: Glazing sealants.
 - 3. Section 09260: Sealants used for acoustical treatment at gypsum board.

1.2 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Select materials for compatibility with joint surfaces and indicated exposures.
 - 2. Where not indicated, select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.
 - 3. Comply with applicable limitations on volatile organic compound (VOC) emissions.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's descriptive literature.
- B. Samples: Furnish samples of each type of exposed joint sealer in required colors.
- C. Certifications:
 - 1. Furnish manufacturer's certification joint sealers comply with Contract Documents and are suitable for Project applications.
 - 2. Furnish certification indicating installers are trained in proper use of specified products, qualified, and familiar with proper installation techniques.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with minimum five years successful experience on projects of similar type and size, using specified products.

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1. Installers shall be familiar with proper application procedures to ensure maximum joint sealer expansion and contraction capabilities.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, cure time, and mixing instructions.

1.6 SITE CONDITIONS

- A. Do not proceed with installation of joint sealers under unfavorable weather conditions.
- B. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer.

1.7 WARRANTY

- A. Special Warranty: Repair or replace joint sealers which fail to perform as intended, because of leaking, crumbling, hardening, shrinkage, bleeding, sagging, staining, loss of adhesion, and loss of cohesion.
 1. Special Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Elastomeric Sealants:
 1. Single Component Low Modulus Silicone Sealant: ASTM C920 Type S, Class 25, Grade NS; minimum 50% expansion and compaction capability.
 - a. Provide at exterior locations not exposed to traffic.
 - b. Manufacturers:
 - 1) General Electric Co./Silpruf, Silglaz or GESIL.
 - 2) Dow Corning Corp./790 or 795.
 - 3) Pecora Corp./864 Architectural Silicone.
 - 4) Tremco/Spectrum 3.
 - 5) Substitutions: Refer to Section 01630.
 2. Multi-Component Polyurethane Sealant: ASTM C920, Type M, Grade P, Class 25, self-leveling; minimum 25% expansion and compaction capability.
 - a. Provide at traffic bearing locations.
 - b. Manufacturers:
 - 1) Pecora Corp./NR-200 Urexpan.

JOINT SEALERS

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- 2) Tremco/Vulkem 245.
 - 3) Sonneborn Division of ChemRex /SL 2
 - 4) Substitutions: Refer to Section 01630.
3. Mildew-Resistant Silicone Rubber Sealant: ASTM C920, Type S, Grade NS, Class 25, compounded with fungicide, specifically for mildew resistance and recommended for interior joints in wet areas.
- a. Provide at interior joints in wet areas.
 - b. Manufacturers:
 - 1) General Electric Co./SCS 1702 Sanitary Sealant.
 - 2) Dow Corning Corp./786 Bathtub Caulk.
 - 3) Pecora Corp./898 Sanitary Mildew Resistant Sealant.
 - 4) Tremco/Tremsil 200.
 - 5) Substitutions: Refer to Section 01630.

B. Non-Elastomeric Sealants:

1. Acrylic-Emulsion Sealant: ASTM C834 acrylic or latex-rubber-modified acrylic sealant, permanently flexible, non-staining and non-bleeding; recommended for general interior exposure; compatible with paints specified in Section 09900.
 - a. Provide at general interior applications.
 - b. Manufacturers:
 - 1) Pecora Corp./AC-20.
 - 2) Sonneborn Division of ChemRex/Sonolac.
 - 3) Tremco/Ultrem 1500
 - 4) Substitutions: Refer to Section 01630.

C. Miscellaneous Materials:

1. Primers/Sealers: Non-staining types recommended by joint sealer manufacturer for joint surfaces to be primed or sealed.
2. Joint Cleaners: Non-corrosive types recommended by joint sealer manufacturer; compatible with joint forming materials.
3. Bond Breaker Tape: Polyethylene tape as recommended by joint sealer manufacturer where bond to substrate or joint filler must be avoided for proper performance of joint sealer.
4. Sealant Backer Rod: Compressible polyethylene foam rod or other flexible, permanent, durable non-absorptive material as recommended by joint sealer manufacturer for compatibility with joint sealer.
 - a. Oversize backer rod minimum 30% to 50% of joint opening.

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- D. Colors: Provide colors indicated or as selected by Architect from manufacturer's full range of colors.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare joint surfaces in accordance with ASTM C1193 and as recommended by joint sealer manufacturer.
- B. Clean joint surfaces immediately before installation of joint sealer; remove dirt, insecure materials, moisture and other substances that could interfere with bond of joint sealer.
- C. Prime or seal joint surfaces where recommended by joint sealer manufacturer; do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- D. Ensure protective coatings on surfaces in contact with joint sealers have been completely stripped.

3.2 INSTALLATION

- A. Comply with manufacturer's printed instructions and ASTM C1193, except where more stringent requirements are shown or specified.
- B. Set sealant backer rods at proper depth or position in joint to coordinate with other work, including installation of bond breakers and sealant; do not leave voids or gaps between ends of backer rods.
 - 1. Do not stretch, twist, puncture or tear backer rods.
- C. Install bond breaker tape as required to avoid three-sided bond of sealant to substrate and where required by manufacturer's recommendations to ensure joint sealers will perform properly.
- D. Size materials to achieve required width/depth ratios.
- E. Employ installation techniques that will ensure joint sealers are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of bond surfaces equally on opposite sides.
- F. Joint Configuration: Fill sealant joint to a slightly concave surface, slightly below adjoining surfaces, unless otherwise indicated.
- G. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture or dirt.
- H. Install joint sealers to depths recommended by joint sealer manufacturer but within the following general limitations, measured at center (thin) section of bead.
 - 1. Horizontal Joints: 75% width with minimum depth of 3/8".

JOINT SEALERS

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2. Elastomeric Joints: 50% width with minimum depth of 1/4".
 3. Non-Elastomeric Joints: 75% to 125% of joint width.
- I. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.
 1. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.
 - J. Cure joint sealers in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.
 - K. Maintain finished joints free of embedded matter, ridges and sags.

END OF SECTION

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SECTION 08210

WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide flush face wood doors.
 - 1. The intention of the plan is to re-use the existing room entry door and match or re-use the existing door hardware. If this is not feasible then contractor to supply replacement door and hardware.
 - 2. Contractor Option: Provide shop finished wood doors.
 - a. Coordinate with Section 09900 – Paints and Coatings.

1.2 REFERENCES

- A. Woodwork Institute Manual of Millwork.
- B. Window and Door Manufacturer's Association (WDMA): Guide Specifications.
- C. Underwriters Laboratories Inc. (UL): Building Materials Directory.
 - 1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature.
- B. Shop Drawings: Indicate general construction, jointing methods, hardware locations, and locations of cut-outs.
- C. Samples: Furnish samples of wood door corner section.
 - 1. Shop finished wood door section where doors are furnished shop finished.

1.4 PROJECT CONDITIONS

- A. Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized in accordance with referenced standards requirements applicable to Project location.

1.5 WARRANTY

- A. Special Warranty: Provide for replacing, re-hanging, and refinishing wood doors exhibiting defects in materials or workmanship including warp and de-lamination.

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1. Special Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Algoma Hardwoods, Inc.
- B. Eggers Industries Architectural Door Division.
- C. Marshfield Door Systems, Inc.
- D. VT Industries.
- E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

- A. Solid Core Flush Wood Doors: WI MoM/Premium Grade, 5 Ply Hot Press, 1-3/4" thick solid wood framed glued block construction.
 1. WDMA: In addition to WI MoM, conform to requirements of WDMA; where conflicts occur, comply with most restrictive requirement.
 2. Stained Wood Face Veneers: WI MoM/Premium Grade veneers for stained finish; nominal 1/40" thick before sanding, not less than 1/50" after sanding.
 - a. Wood: As indicated on Drawings.
 3. Opaque Painted Face Veneers: WI MoM/Custom Grade White Birch veneers for opaque finish; nominal 1/40" thick before sanding, not less than 1/50" after sanding.
 4. Edges: Stile edges to match face veneer, minimum 1-1/8" thick after trim.
 5. Core: Bond stiles and rails to core and sand prior to assembly of face veneers.
 6. Bond Type: Type II Bond, interior.
- B. Fire Rated Doors: 1-3/4" thick, match non-rated door appearance; comply with UBC Standard 7-2; UL or Warnock Hersey rated.
 1. Labels: Place fire rating labels where visible when doors are installed, in opened position.
 2. Fire Ratings: Refer to Drawings for fire rating requirements.
 3. Core: Use wood core construction for 20 minute rated flush doors, mineral core permitted for longer ratings.

2.3 FABRICATION

- A. Fabricate doors in accordance with requirements of specified standards.

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1. Pre-fit wood doors.
 2. Prepare doors to receive hardware in shop, refer to Section 08700 for hardware requirements and templates.
 3. Factory machine doors for mortise hardware.
- B. Bevel strike edge of single-acting doors, 1/8" in 2".
- C. Shop Finished Doors: Conform to requirements specified in Section 09900 – Paints and Coatings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood doors in accordance with manufacturer's recommendations and installation instructions, and reference standards, plumb and square, and with maximum diagonal distortion of 1/16".
1. Coordinate hardware installation with requirements of Section 08700 - Hardware.
 2. Install fire rated wood doors in accordance with requirements for specified fire label and requirements of NFPA 80.
 - a. Field cutting of fire rated doors shall not be acceptable.
 3. Coordinate installation of glass and glazing in wood doors with Section 08800 - Glazing.
- B. Re-hang or replace doors that do not swing or operate freely.

3.2 PROTECTION

- A. Protection: Protect doors as recommended by door manufacturer to ensure doors are without damage at time of substantial completion.
1. Shop Finished Doors: Refinish or replace damaged doors.

END OF SECTION

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SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide gypsum board systems including gypsum board, joint treatment, acoustical accessories, resilient channels, and general accessories for complete installation.
- B. Related Sections:
 - 1. Section 07210: Building Insulation.
 - 2. Section 07840: Firestopping.
 - 3. Section 09300: Cementitious backer unit tile substrates.

1.2 SYSTEM DESCRIPTION

- A. Fire-Rated Assemblies: Listed by Underwriter's Laboratory, Gypsum Association (GA) File No's in GA-600 Fire Resistance Design Manual or other listing approved by applicable authorities.
- B. Systems Responsibility: Provide products manufactured by or recommended by manufacturer of gypsum board to maintain single-source responsibility for system.
- C. Openings: Obtain dimensions and locations from other trades and provide openings and enclosures for accessories, specialties, equipment, and ductwork.

1.3 REFERENCES

- A. ASTM C840: Application and Finishing of Gypsum Board.

1.4 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for gypsum board and acoustical accessories.
- B. Manufacturer's Certification: Furnish manufacturer's certification indicating products comply with Contract Documents and applicable codes.

1.5 PROJECT CONDITIONS

- A. Do not begin installation of interior gypsum board until space is enclosed, space is not exposed to other sources of water, and space is free of standing water.
- B. Maintain areas to receive gypsum board at minimum 50-degree F for 48 hours prior to application and continuously after application until drying of joint compound is complete; comply with ASTM C840.

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- C. Immediately remove from site gypsum board for interior use exposed to water, including gypsum board with water stains, with signs of mold, and gypsum board with mildew.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. National Gypsum Co.
- B. Georgia-Pacific Corp.
- C. United States Gypsum Co., USG Corp.
- D. Substitutions: Refer to Section 01630.

2.2 MATERIALS

- A. Gypsum Board: Comply with ASTM C840; maximum permissible lengths; ends square cut, tapered edges on boards to be finished.
 - 1. Typical: ASTM C1396, Type X, fire rated gypsum board, unless otherwise indicated.
 - 2. Tile Substrates: Cementitious backer units specified in Section 09300 - Tile.
 - 3. Extended Exposure Gypsum Board: Fire rated Type X gypsum board designed specifically for extended exposure to moisture during construction; ASTM C1177; provide with score of 10 when tested using ASTM D3273 for mold resistance.
 - a. National Gypsum/eXP Extended Exposure Sheathing.
 - b. Georgia Pacific/DensArmor Plus or DensGlass.
 - c. USG/Sheetrock Fiberock Aqua Tough Sheathing.
 - d. Substitutions: Refer to Section 01630.
- B. Gypsum Board Accessories: Comply with ASTM C840.
 - 1. Provide protective coated steel corner beads and edge trim; type designed to be concealed in finished construction by tape and joint compound.
 - 2. Corner Beads: Manufacturer's standard metal beads.
 - 3. Edge Trim: "J", "L", "LK", or "LC" casing beads.
 - 4. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: Types recommended by system manufacturer and conforming to ASTM C475.
 - a. Typical Joint Compound: Chemical hardening type for bedding and filling, ready-mixed or powder vinyl type for topping.
 - 5. Control Joints: Back to back casing beads.

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- a. Back control joints with 4 mil thick polyethylene air seal.
- C. Acoustical Accessories:
 - 1. Resilient Channels: Provide resilient channels where indicated and where required to provide required sound transmission classifications.
 - a. Fasteners and Anchorages: As recommended by gypsum board system manufacturer for maximum STC and NRC ratings.
 - 2. Acoustical Insulation: Preformed mineral fiber, ASTM C665, Type I; friction fit type without integral vapor barrier; as required to meet STC ratings indicated, or of thickness indicated.
 - 3. Acoustical Sealant: ASTM C919, type recommended for use in conjunction with gypsum board.
 - a. Type: Paintable, non-shrinking and non-cracking where exposed, nondrying, non-skinning, non-staining, and non-bleeding where concealed.
 - 4. Electrical Box Pads: Provide at outlet, switch and telephone boxes in walls with acoustical insulation.
 - a. Manufacturers for Non-Fire Rated Partitions:
 - 1) Harry A. Lowry & Associates (800.772.2521)/Lowry's Electrical Box Pads.
 - 2) Tremco Sheet Caulking (650.572.1656).
 - 3) Fire rated partition material manufacturers.
 - 4) Substitutions: Refer to Section 01630.
 - b. Manufacturers for Fire Rated Partitions:
 - 1) Hevi-Duty Nelson (800.331.7325)/Fire Rated FSP Firestop Putty Pads.
 - 2) Specified Technologies, Inc. (800.992.1180)/Fire Putty Pads.
 - 3) Substitutions: Refer to Section 01630.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Gypsum Board Installation: Install in accordance with ASTM C840 and manufacturer's recommendations.
 - 1. Use screws when fastening gypsum board to furring and to framing.
 - 2. Erect gypsum board with ends and edges occurring over firm bearing.
 - a. Ensure joints of second layer do not occur over joints of first layer in double layer applications.

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3. For fire rated systems comply with requirements for fire ratings.
 4. Place control joints to be consistent with lines of building spaces and as directed by Architect.
 - a. Provide where system abuts structural elements.
 - b. Provide at dissimilar materials.
 - c. Lengths exceeding 30'-0" in partitions.
 - d. Ceiling areas exceeding 50'-0" or 2500 square feet.
 - e. Wings of "L", "U" and "T" shaped ceilings.
 5. Place corner beads at external corners; use longest practical lengths.
 6. Place edge trim where gypsum board abuts dissimilar materials.
 7. Tape, fill, and sand exposed joints, edges, corners and openings to produce surface ready to receive finishes; feather coats onto adjoining surfaces.
 8. Finishing: Comply with Gypsum Association (GA) "Levels of Gypsum Board Finish".
 - a. GA Level 4, three coat finishing and sanding is required for surfaces indicated to be painted; provide flush, smooth joints and surfaces ready for applied paint finishes.
 9. Remove and replace defective work.
- B. Acoustical Accessories Installation:
1. Resilient Channel Erection: Erect in accordance with manufacturer's recommendations for maximum acoustical ratings.
 - a. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8" in 10'-0" in any direction.
 2. Place acoustical insulation tight within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
 3. Place acoustical sealant within partitions in accordance with manufacturer's recommendations; install acoustical sealant at gypsum board perimeter at:
 - a. Metal Framing: One or two beads.
 - b. Base layer and face layer.
 - c. Penetrations of partitions.
 4. Tolerance: Maximum 1/4" space between gypsum board at floor, ceiling, and penetrations.

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5. Install electrical box pads with pads molded and pressed on back side of box, closing openings, in accordance with manufacturer's instructions, for complete acoustical barrier.

END OF SECTION

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SECTION 09656

LINOLEUM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide linoleum tile flooring with accessories as required for complete installation. Alternate:VCT
- B. Related Sections:
 - 1. Section 09657: Resilient base.

1.2 SYSTEM DESCRIPTION

- A. Flammability: Provide materials tested under ASTM E648, Flooring Radiant Panel Test, with results of 0.45 watts/cm² or higher.
 - 1. Smoke Developed: Less than 450, ASTM E662.
- B. Slip Resistance: Provide materials tested under ASTM D2047, James Slip Test with minimum 0.6 rating for floors.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's product literature.
- B. Samples: Submit each color and pattern selected of each type of flooring and exposed accessory.

1.4 PROJECT CONDITIONS

- A. Ensure floor surfaces are smooth and flat with maximum variation of 1/8" in 10'-0".
- B. Ensure concrete floors are dry and exhibit negative alkalinity, carbonizing and dusting.
- C. Maintain minimum 70-degree F air temperature at flooring installation area for 3 days prior to, during, and for 24 hours after installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Linoleum Tile Flooring: Marbleized linoleum consisting of oxidized linseed oil and natural resins mixed with wood or corkflour, limestone and pigments, conforming to FS LLL-F-1238A.
 - 1. Manufacturers:
 - a. Forbo Industries, Inc.
 - b. Armstrong Commercial Flooring.

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- c. Azrock Commercial Flooring/Linosom Linoleum.
 - d. Substitutions: Refer to Section 01630.
- 2. Type: Match Forbo/Marmoleum Dual.
- 3. Physical Characteristics:
 - a. Tile Size: Nominal 20" by 20" unless otherwise indicated.
 - b. Thickness (Gauge): Nominal 1/10" (2.5mm).
 - c. Backing: Polyester.
- 4. Colors and Patterns: As selected by Architect from manufacturer's full range of colors and patterns.
- B. Edge Strips: Homogeneous vinyl, rubber, or linoleum, tapered or bullnose edge, color as selected by Architect to be compatible with flooring.
- C. Primers and Adhesives: Waterproof; nontoxic types recommended by flooring manufacturer for specified material and application.
- D. Sealer and Wax: Type recommended by flooring manufacturer for material type and location.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove subfloor ridges and bumps and clean substrate.
- B. Prepare substrate in accordance with manufacturer's recommendations and ASTM F710.

3.2 INSTALLATION

- A. Flooring Installation: Conform to manufacturer's recommendations and installation instructions.
 - 1. Open floor tile cartons, enough to cover each area, and mix tile to ensure shade variations do not occur within any one area.
- B. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation; spread only enough adhesive to permit installation of flooring before initial set.
- C. Set flooring in place and press with heavy roller to ensure full adhesion.
- D. Lay flooring with joints parallel to building lines to produce symmetrical pattern.
- E. Install minimum 1/2 tile at room and area perimeter.

KAPPE + DU ARCHITECTS

- F. Terminate resilient flooring at centerline of door openings where adjacent floor finish is dissimilar.
- G. Install edge strips at unprotected and exposed edges where flooring terminates.
- H. Scribe flooring to walls, columns, floor outlets and other appurtenances, to produce tight joints.
- I. Consult with Architect for floor pattern desired in each area.

3.3 CLEAN-UP

- A. Remove excess adhesive from floor, base and wall surfaces without causing damage.
- B. Clean, seal and wax floor surfaces in accordance with manufacturer's recommendations.

3.4 PROTECTION

- A. Prohibit traffic from floor for 48 hours after installation.

END OF SECTION

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SECTION 09657

RESILIENT BASE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide resilient base, including base for VCT and carpeted areas, and accessories as required for complete installation.
- B. Related Sections:
 - 1. Section 09656, Linoleum tile
 - 2. Section 09680: Carpet, edge strips.

1.2 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide materials tested under ASTM E648, Flooring Radiant Panel Test, with results of 0.45 watts/cm² or higher.

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's product literature.
- B. Samples: Furnish samples of each base color and type.

1.4 PROJECT CONDITIONS

- A. Maintain minimum 70-degree F air temperature at installation area for 3 days prior to, during, and for 24 hours after installation.
- B. Store materials in area of application; allow three days for material to reach same temperature as area.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Resilient Base: Conform to ASTM F1861, with pre-molded end stops and external corners; 1/8" gauge; provide coved base at hard floor surfaces, straight base at carpet unless otherwise indicated.
 - 1. Type: Extruded rubber, available in nominal 100' lengths.
 - 2. Manufacturers:
 - a. Burke-Mercer Flooring Products.

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- b. Flexco Co.
 - c. Johnsonite, Inc.
 - d. Substitutions: Refer to Section 01630.
3. Height: 4" unless otherwise indicated.
4. Color: As selected by Architect from manufacturer's full range of available colors.
- B. Primers and Adhesives: Water-resistant nontoxic types recommended by base manufacturer for specified material and application.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Apply to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required.
 - 1. Fit base joints tight and vertical; maintain minimum measurement of 18" between joints.
- B. Miter internal corners; use molded sections for external corners and exposed ends.
- C. Install base on solid backing, adhere tightly to wall and floor surfaces; fill voids along top edge of base with manufacturer's recommended adhesive filler.
- D. Scribe and fit to doorframes and other obstructions.
- E. Install straight and level to variation of plus or minus 1/8" over 10'-0".

3.2 CLEAN-UP

- A. Remove excess adhesive from floor, base and wall surfaces without causing damage.
- B. Clean surfaces in accordance with manufacturer's recommendations.

END OF SECTION

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SECTION 09680

CARPET

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide glue-down indoor/outdoor type carpeting with required accessories, including edge strips where carpeting terminates at other floor finishes, as required for complete finished installation.
- B. Related Work:
 - 1. Section 09657: Resilient base for carpeted areas.

1.2 SYSTEM DESCRIPTION

- A. Flammability: Provide carpet having passed following tests.
 - 1. DOC-FF-1-70: Pass.
 - 2. NFPA 258 (Smoke Density): 450 or less.
 - 3. ASTM E648 (Flooring Radiant Panel Test): 0.45 or higher.
- B. Static: Carpet shall develop less than 3.5 kilovolts of static at 70 degrees F and 20 percent relative humidity.
- C. Indoor Air Quality Standards: Provide carpet materials that bear Carpet and Rug Institute "Green Label".

1.3 SUBMITTALS

- A. Product Data: Furnish manufacturer's literature for carpet and accessories.
- B. Shop Drawings: Clearly indicate location of seams, method of joining seams, direction of carpet, adhesive to be used, and method of integrating edge strips with carpet.
- C. Samples: Furnish each type, color and pattern of carpet and edge strip.
- D. Maintenance Recommendations: Prior to final acceptance of carpet installation, furnish carpet manufacturer's detailed maintenance recommendations for care, cleaning and repair of carpets installed.
- E. Certificate of Compliance: Furnish manufacturer's certificate of compliance stating each material delivered conforms to Specifications.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Approved by carpet manufacturer; upon request, submit letter from carpet manufacturer stating installer is acceptable.

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1.5 PROJECT CONDITIONS

- A. Do not commence carpet installation until painting and finishing work is complete and ceiling and other overhead work has been tested, approved and completed, unless specifically approved.
- B. Maintain room temperature at minimum 60 degrees F for at least 24 hours prior to installation; relative humidity shall be approximately that at which the area is to be maintained.
- C. Schedule, receive and place carpet on floors indicated; protect from soiling and damage during transit, storage, and installation.

1.6 WARRANTY

- A. Special Warranty: Provide for promptly repairing or replacing, at no cost to Owner, carpet that exhibits evidence of defective materials or workmanship.
 - 1. Repairs: Make repairs within ten days of Owner's written notification.
 - 2. Special Warranty Period: Two years.

1.7 MAINTENANCE

- A. Extra Materials: Roll excess carpet on separate rolls for each type and size; label rolls to identify type, width, length, and locations installed.
 - 1. Wrap and deliver unused portions greater than 2 feet square and more than 12" wide.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Mannington Carpet.
- B. Lees Carpets, Division of Burlington, Inc.
- C. Mohawk Industries.
- D. Manufacturers Listed on Finish Schedules.
- E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

- A. Carpet: Types as indicated on Finish Schedules; where not otherwise indicated as selected by Architect based on following criteria.
 - 1. Type: Dense tufted level loop pile indoor/outdoor type carpet.
 - 2. Yarn: Sixth or later generation continuous filament soil hiding nylon.
 - 3. Face Weight: 32 to 34 oz/sy as directed by Architect.
 - 4. Primary Backing: Polypropylene.

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5. Secondary Backing: Polypropylene or ActionBak.
- B. Adhesive: Non-toxic type recommended by carpet manufacturer to suit application and expected service.
- C. Leveling and Ramping Material: Latex-cement material designed for providing thin solid surface for leveling and minor ramping of subsurface to adjacent floor finishes.
 1. Use material capable of being applied and feathered out to adjacent floor without spalling.
- D. Edge Strips: Vinyl or rubber; manufacturer's standard colors as selected by Architect to match carpet primary color.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean floors of dust, dirt, solvents, oil, grease, paint, plaster and other substances detrimental to proper performance of adhesive and carpet; allow floors to thoroughly dry.
- B. Ensure floors are level, with maximum surface variation of 1/4" in 10 feet.
- C. Ensure concrete floors are free from scaling and irregularities and exhibit neutrality relative to acidity and alkalinity.
- D. Use leveling and ramping material to patch cracks, small holes, leveling and for ramping to provide finished carpet within 1/2" of adjacent flooring materials.

3.2 INSTALLATION

- A. Check matching of carpet before cutting and ensure there are no visible defects or variations between dye lots.
 1. Lay out rolls of carpet for Architect's approval.
- B. Install carpet in accordance with manufacturer recommendations and installation instructions.
 1. Cut carpet, where required, in manner to allow proper seam and pattern match; ensure cuts are straight, true, and unfrayed.
- C. Where possible and practical, locate seams in areas of least amount of traffic; no seams shall be perpendicular to doors or entries; seams parallel to doors shall be centered directly under door.
 1. Follow wall line parallel to carpet direction for seams occurring at corridor change of directions.

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2. Join seams in recommended manner so as not to detract from appearance of carpet installation and decrease its life expectancy; ensure seams are straight, not overlapped or peaked, and free of gaps.
- D. Prime substrate if required and as recommended by manufacturer; spread adhesive in quantity recommended by manufacturer to ensure proper adhesion over full area of installation.
1. Apply only enough adhesive to permit proper adhesion of carpet before initial set.
- E. Lay carpet with run of pile in direction of anticipated traffic; do not change run of pile in any one room or from one room to next where continuous through a wall opening.
- F. Cut and fit carpet neatly around projections through floor and to walls and other vertical surfaces.
- G. Fit carpet snugly to walls and other vertical surfaces where no base is scheduled, leaving no gaps.
- H. Do not place heavy objects such as furniture on carpeted surfaces for minimum of 24 hours or until adhesive is set.
- I. Lay installation tight and flat to sub-floor, well fastened and uniform in appearance; ensure monolithic color, pattern and texture match within any one area.
- J. Edging Strips: Install in accordance with manufacturer recommendations and installation instructions.
1. Install edging strips where carpet terminates at other floor coverings.
 2. Use full length pieces only, butt tight to vertical surfaces. Where splicing cannot be avoided, butt ends tight and flush.

END OF SECTION

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SECTION 09775

FIBERGLASS WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide glass fiber reinforced polyester resin fabricated wall panels, with trim pieces and accessories as required for complete installation.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate design parameters, adjacent construction, materials, dimensions, thickness, fabrication details, tolerances, colors, finishes, methods of support and anchorages.
- B. Product Data: Furnish manufacturer's literature.
- C. Maintenance Instructions: Include manufacturer's recommended cleaning materials and application methods, including precautions in use of cleaning materials that may be detrimental to surfaces.
- D. Samples: Furnish fiberglass wall panels and exposed trim.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store panels in clean and dry area where temperatures are maintained at minimum 40 degrees F with normal humidity.
 - 1. Do not store in upright position.
- B. Take precautionary measures with adhesives and solvents to prevent fire hazards.

1.4 PROJECT CONDITIONS

- A. Maintain surfaces and materials at minimum 60 degrees F three days before and during application period.
- B. Provide continuous ventilation during work and after installation of wall covering.

1.5 SCHEDULING

- A. Schedule installation of wall paneling as late in construction schedule as possible to prevent damage during construction.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Marlite/Marlite FRP Panels, Class A.
- B. Kemlite Company/Kemlite Glasbord Plus.
- C. Sequentia, Inc./Structoglas System.
- D. Nudo Products, Inc./Fiber-Lite Panels.
- E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

- A. Panels: Fiberglass reinforced plastic (FRP) panel system acceptable for use as toilet room wall panels, adjacent to water closets and to urinals.
 - 1. Thickness: 0.090" nominal thickness.
 - 2. Fire-Rating: Class III (UL Class C), maximum 200 flame spread, 450 smoke generation, ASTM E84.
 - 3. Surface: As selected by Architect from manufacturer's full range of surface textures.
 - 4. Color: As selected by Architect from manufacturer's full range of colors.
- B. Trim Pieces: Manufacturer's standard matching moldings and trim pieces as required for complete, finished installation, and as required for joints, corners and panel edges; suitable for applications indicated.
- C. Adhesive: Manufacturer's standard nontoxic, waterproof adhesive suitable for substrates indicated.
- D. Primer: Provide non-staining nontoxic release coat primer as recommended by wall panel manufacturer where panels are applied to gypsum board.
 - 1. Primer: Type designed to allow removal of wall paneling from gypsum board without damaging paper facing of board, and without premature separation of wall paneling from wall.
- E. Mechanical Fasteners: Concealed type only; types as recommended by system manufacturer.

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PART 3 - EXECUTION

3.1 INSPECTION

- A. Ensure surfaces to receive wall paneling are clean, true and free of irregularities, do not commence with work until surfaces are satisfactory.
- B. Ensure wall surface flatness tolerance does not vary more than 1/8" in 10'-0", nor vary at a rate greater than 1/16" per running foot.

3.2 INSTALLATION

- A. Handle and install wall panels in accordance with manufacturer's recommendations and installation instructions.
- B. Cope and miter trim pieces.
- C. Securely adhere panels to wall surfaces; use blind nailing methods as required to support panels until adhesive dries; exposed mechanical fasteners shall not be acceptable.
 - 1. Install panels in maximum size increments available.
- D. Remove excess adhesive from edges; wipe seam clean with dry cloth towel.
- E. Install wall paneling before installation of plumbing, bases, hardware, and similar accessories.

3.3 CLEANING

- A. Clean panel system in accordance with manufacturer's instructions.
- B. Remove debris and leave areas neat and clean.
- C. Replace accessories.

END OF SECTION

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SECTION 09900

PAINTS AND COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Provide painting and finishing of exposed items and surfaces.
 - a. Specified surface preparation, priming and coats of paint are in addition to shop-priming and surface treatment specified under other sections of work.
 - b. Painting and finishing includes field finishing of exterior and interior items not listed as "Surfaces not to be Painted" unless clearly indicated otherwise.
 - c. Painting and finishing includes field finishing of select shop finished items where indicated as required to match adjacent surfaces, such as mechanical grilles and registers.
 - d. Field paint exposed bare and covered pipes, ducts, and hangers, exposed steel and ironwork, and primed metal surfaces of equipment installed under mechanical and electrical work in occupied spaces.
2. As required, paint 2" stripes at interior stair nosing, full tread and landing width, in accordance with California Code of Regulations, Title 24, Access Compliance requirements; provide at landing and last tread at each stair run.
3. As required, Wood Doors: Contractor option to factory finish or field finish, coordinate with Section 08210 - Wood Doors.

B. Related Sections: Shop priming of ferrous metal items is included under various Specification sections, but not limited to:

1. Section 06400: Shop finishing of architectural woodwork.

C. Surfaces Not To Be Painted:

1. Finished items including finished metal surfaces.
2. Walls and ceilings in concealed areas and generally inaccessible areas.
3. Moving parts of operating mechanical and electrical units.
4. Labels: Keep equipment identification and fire rating labels free of paint.
5. Plastic smoke stops and weather-stripping at doors.

PAINTS AND COATINGS

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1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information, including paint label analysis and application instructions for each material.
- B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.
 - 1. Brush-Outs: Submit samples of each color and material with texture to simulate actual conditions, on hardboard.
 - a. Submit 8" by 10" samples of wood finishes on actual wood surfaces; label and identify each as to location and application.
 - b. Submit samples of concrete masonry (maximum 4" square) defining filler, prime and finish coats.
 - 2. Field Samples: Duplicate painted finishes of approved samples on actual wall surfaces and components for approval prior to commencing work.
 - a. Size: Minimum 100 sf located where approved.
 - b. Components: One full component as directed.
 - c. Simulate finished lighting conditions for review.
- C. Certificates: Furnish certificates from each manufacturer stating materials are top quality lines and suitable for intended use on this Project.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Furnish materials approved for use by applicable air quality management district for limitations of volatile organic compounds for architectural or special coatings as applicable.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, with:
 - 1. Name of material, color and sheen.
 - 2. Manufacturer's name, stock number and date of manufacture.
 - 3. Contents by volume, for major pigment and vehicle constituents.
 - 4. Thinning and application instructions.

1.5 SITE CONDITIONS

- A. Apply water-base paints when temperature of surfaces and surrounding air are between 50 and 90 degrees F.
- B. Do not apply paint in rain, fog or mist; or when relative humidity exceeds 85 percent; or to damp or wet surfaces.

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- C. Painting may be continued during inclement weather if areas to be painted are enclosed and heated within temperature limits specified.
- D. Provide additional temporary ventilation during interior application of paints to eliminate volatile organic compound (VOC) emissions from interior spaces as quickly as possible.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Kelly Moore Paint Co.
- B. Benjamin Moore & Co.
- C. Sherwin-Williams Co.
- D. Dunn-Edwards Corp.
- E. Substitutions: Refer to Section 01630.

2.2 MATERIALS

- A. Definition: "Paint" as used herein means coating systems including primers, emulsions, enamels, stains, sealers and fillers, whether used as prime, intermediate or finish coats.
- B. Material Quality: Provide top line quality commercial grade (professional painter) paints; materials not bearing manufacturer's identification as a best-grade product shall not be acceptable.
 - 1. Primers: Provide premium grade primers recommended by paint manufacturer for substrates indicated and for finish systems specified.
 - 2. Undercoats and Barrier Coats: Provide undercoat paints produced by same manufacturer as finish coats; use only thinners approved by paint manufacturer, and use only within recommended limits.
 - 3. Finish Coats: Provide finish coats capable of being washed with mild detergent without loss of color, sheen, or pigments.
 - a. Color pigments: Pure, non-fading, applicable types to suit substrates and service indicated; no lead content permitted.
 - 4. Finish Coat Coordination: Provide finish coats which are compatible with prime paints, undercoats, and barrier coats used.
 - a. Review other Specification sections in which prime paints are provided; ensure compatibility of total coatings systems.
 - b. Upon request from other trades furnish information on characteristics of finish materials proposed for use.

PAINTS AND COATINGS

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- c. Provide barrier coats over incompatible primers or remove and prime as required.
 - d. Notify Architect in writing of any anticipated problems in use of specified coating systems with substrates primed by others.
- C. Colors and Finishes: Prior to commencement of painting work, Architect will furnish color chips for surfaces to be painted.
 - 1. Use of proprietary names in color selection is not intended to imply exclusion of equivalent products of other manufacturers.
 - 2. Final acceptance of colors will be from samples applied on site.
- D. Volatile Organic Compound (VOC) Emissions: Select materials that generate least amount of pollution; consider pollution and volatile organic compound (VOC) emissions generated during manufacturing, transport, installation, use, and disposal.
 - 1. Avoid materials that contain ozone depleting chemicals and that emit potentially harmful volatile organic compound (VOC) emissions.
 - 2. Avoid materials that can leach harmful chemicals into ground water; do not allow potentially harmful chemicals to enter sewers nor storm drains.
 - 3. Select materials that can be reused or recycled and materials with significant percentage of recycled content; set specific recycled content percentages for individual materials; avoid materials difficult to recycle.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Inspection: Examine areas and conditions under which painting work is to be applied.
 - 1. Start of painting work indicates acceptance of surfaces and conditions of surfaces and conditions within any particular area.
 - 2. Where exposed items or surfaces are not specifically mentioned in Schedules, paint same as adjacent similar materials or areas.
 - 3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable paint film.
- B. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified for substrate condition.
- C. Remove hardware, accessories, and items in place and not to be painted, or provide protection prior to surface preparation and painting; after painting reinstall removed items.

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- D. Clean surfaces before applying paint; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly painted surfaces.
- E. Cementitious Materials: Prepare by removing efflorescence, chalk, dirt, grease, oils, and by roughening as required to remove glaze.
 - 1. Determine alkalinity and moisture content of surfaces to be painted.
 - 2. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, neutralize before application of paint.
 - 3. Do not paint over surfaces where moisture content exceeds manufacturer's printed directions.
- F. Wood: Clean wood surfaces of dirt, oil, and other foreign substances; sandpaper smooth surfaces exposed to view, and dust off.
 - 1. Scrape and clean seasoned knots and apply thin coat of recommended knot sealer, before application of priming coat.
 - 2. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job; prime edges, ends, faces, undersides, and backsides of wood.
 - 3. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler; sandpaper smooth when dry.
- G. Ferrous Metals: Touch up shop-applied prime coats wherever damaged using same type of primer as applied in shop or barrier coat compatible with finish paint.
 - 1. Bare Surfaces: Clean surfaces that are not galvanized or shop-coated, of oil, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
 - 2. Galvanized Surfaces: Clean free of oil and surface contaminants, using non-petroleum based solvent; primer and touch-up primer to be zinc-rich primer.
- H. Mix painting materials in accordance with manufacturer's directions.
- I. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
- J. Stir materials before application to produce mixture of uniform density, and stir as required during application; do not stir surface film into material, if necessary, strain material before using.

3.2 APPLICATION

- A. Apply paint in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and type of material being applied.

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1. Apply additional coats when stains or blemishes show through final coat, until paint is a uniform finish, color and appearance.
 2. Provide extra attention to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.
 3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces; paint surfaces behind permanently fixed equipment and furniture with prime coat only.
 4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
 5. Paint backsides of access panels and removable or hinged covers to match exposed surfaces.
 6. Finish doors on tops, bottoms and side edges same as faces.
 7. Sand lightly between each succeeding enamel coat and each varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or prepared for painting as soon as practicable after preparation.
1. Allow time between successive coatings to permit proper drying.
 2. Do not recoat until paint feels firm and does not deform or feel sticky under moderate thumb pressure.
- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.
- D. Prime Coats: Apply to items not previously primed; recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.
- E. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections. Finish coat should completely cover the substrate.
1. Opaque Finishes: Provide opaque, uniform finish, color and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness, and other surface imperfections are not acceptable.
 2. Transparent and Stained Finishes: Produce glass smooth surface film of even luster; provide with no cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, and other surface imperfections.
- F. Completed Work: Match approved samples for color, texture and coverage; remove, refinish or repaint work not accepted.

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3.3 PAINTING SCHEDULE

A. Interior Work: Provide following paint systems.

1. Gypsum Board Systems: Eggshell (satin) sheen at walls, flat sheen at ceilings, semigloss sheen at toilet rooms.
 - a. 1st Coat: Universal primer.
 - b. 2nd and 3rd Coat: Interior latex or acrylic latex emulsion.
2. Metal: Semigloss sheen.
 - a. 1st Coat: Touch-up primer, prime if none.
 - b. 2nd and 3rd Coat: 100% acrylic enamel.
3. Opaque Finished Wood: Semigloss sheen.
 - a. 1st Coat: Primer undercoat.
 - b. 2nd and 3rd Coat: 100% acrylic enamel.
4. Stained Wood: Satin rubbed sheen.
 - a. 1st Coat: Wood stain.
 - b. 2nd Coat: Sanding sealer.
 - c. 3rd and 4th Coat: Acrylic modified urethane.
 - d. Fill open grained wood with filler and wipe before 2nd coat.
5. Transparent Finished Wood: Satin rubbed sheen.
 - a. 1st Coat: Bleached shellac.
 - b. 2nd and 3rd Coat: Acrylic modified urethane rubbing varnish.
 - c. Fill open grained wood with filler and wipe before 1st coat.

B. Sheens: Comply with ASTM D523, reflectance of paint.

1. Flat: 1-10.
2. Satin: 15-30.
3. Eggshell: 30-45.
4. Semigloss: 45-75.
5. Gloss: 75-100.

3.4 CLEAN-UP, PROTECTION, AND REPAIR

A. Clean-Up: During progress of work, remove discarded paint materials, rubbish, cans and rags from site at end of each work day.

1. Clean glass and paint-spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

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- B. Protection: Protect work of other trades, whether to be painted or not; correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
 - 1. Provide "Wet Paint" signs to protect newly-painted finishes.
 - 2. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
- C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces or defaced painted surfaces.

END OF SECTION

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SECTION 15400

PLUMBING

PART 1 - GENERAL

1.1 SCOPE

- A. The General Conditions, Supplementary Conditions and Division 1.

1.2 DESCRIPTION OF WORK

- A. Work Included: Work under this Section includes, but is not necessarily limited to:
1. All labor materials, tools, appliances and equipment that are required to furnish and install the complete installation shown on the Drawings for this Section of the work and/or specified in the following Specifications, including that which is reasonable inferred.
 2. Soil, waste, and vent and rainwater leader piping including connection to piping outside the building.
 3. Hot and cold water piping including installation of water heating equipment and hot water return pumping system. Work includes connection to cold water piping outside building.
 4. Gas piping including connections to gas fired appliances, water heater, and connection to gas meter outside building.
 5. Furnishing and installing plumbing fixtures.
 6. Rainwater leader piping and connection to roof drains.
 7. Condensate piping including connection to mechanical equipment.
 8. Installation of flexible joints where piping enters the building and where piping crosses seismic expansion joints.
 9. Drains, cleanouts, and floor sinks.
 10. Trap primers and piping as required.
 11. Repair of all damage done to premises as a result of this installation and removal of all debris left by those engaged in this installation.
 12. Excavation, trenching and backfilling.
 13. Flashing and counterflashing of piping through roof.
 14. Cutting, patching, sawcutting, and core-drilling.

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15. Testing and adjusting of piping and equipment.
 16. Be responsible for all damage to any part of the premises caused by leaks or breaks in pipe or equipment furnished or installed under this Section of the Work for a period of one (1) year after date of acceptance of the Work.
 17. Cleanliness of all exposed materials and equipment at time building is turned over to the Owner.
 18. All insurance, fees and taxes required and applicable shall be included.
 19. All rigging, hoisting, transportation and associated work necessary for placement of all equipment in the final location shown.
- B. Related Work in Other Sections:
1. Electrical material and connections to equipment.
 2. Interior and exterior painting: Prime and finish painting.

1.3 GENERAL REQUIREMENTS

- A. Visit the site of the work, compare it with the Drawings and Specifications as to the conditions under which Work is to be performed, ascertain and check all conditions and elevations and take all measurements which may affect the Work. Where revisions or changes to the Work are required to permit the installation of new work, they shall be made by this contract without extra cost. No allowance shall subsequently be made for any expense due to failure or neglect under this Section to make such an examination, or to observe areas of difficult working conditions which may affect the contract cost.
- B. Pay all fees and obtain all permits and licenses necessary for the completion of the Work and notify all interested authorities when this Work is ready for any necessary or required inspections. Deliver to the Owner a certificate of all inspections and acceptances issued by the jurisdictional authorities, approving the complete plumbing installation.
- C. All work shall be in strict accordance with the latest rules of any local or State ordinances and codes, UPC, building codes, and the NFPA. No extra charge will be paid for furnishing items required by the regulations but not specified herein or shown on the Drawings. Rulings and interpretations of the agencies shall be considered as part of the regulations if commonly known to the trade prior to the submittal of bids.
- D. Follow manufacturers' directions in all cases where manufacturers of equipment used in this Contract furnish directions covering points not shown on the Drawings or specified herein.
- E. Quiet and vibration-free operation of all equipment is a requirement of this installation. Properly adjust, repair, balance or replace any equipment producing objectionable noise or vibration in any of the occupied areas of the building, including providing additional brackets, bracing, etc., to prevent objectionable noise or vibration.

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- F. The general arrangement and location of piping, apparatus, etc., is shown on the Drawings or specified herein. Changes may be necessary to accommodate other work and existing building conditions. Should it be necessary to deviate from arrangement or location indicated in order to meet new and/or existing building conditions, mechanical or electrical work, or due to interference with work of other trades, such deviations as offsets, rises and drops in piping that may be necessary, whether shown or not, shall be made by this Contractor without extra expense to the Owner. Extreme accuracy of data given herein and on Drawings is not guaranteed. The Contractor shall verify locations of existing utilities before making any new connections. The Drawings and Specifications are for the assistance and guidance of this Contractor, and exact locations, distances and elevations will be governed by actual site conditions.
- G. Coordination and Clearance: It is the essence of this Contract that all work be completely coordinated with all other trades and Sections and that all lines, grades, slopes and vertical and horizontal location of pipes be exactly determined in the field and cleared with all other Divisions and Sections before the installation of these items is begun. No extra compensation shall be made for Contractor's failure to observe this clause. Carefully coordinate all work in and around mechanical equipment enclosures with Mechanical Division prior to installation.
- H. The Drawings and Specifications do not undertake to list every item that will be installed. When an item is necessary for the satisfactory operation of the equipment or is required by the equipment manufacturer, law, ordinance or rule, furnish without change in Contract cost. Work called for in the Specifications, but not on the Drawings, or vice versa, shall be done as though required by both. Lack of specific mention of any work necessary for proper completion of the work in the Specifications and/or Drawings shall not lessen the Contractor's responsibility or entail any change in Contract cost.
- I. All saw cutting and patching necessary for the installation of the work and repair of all damage to work under other trades shall be included in the work. No cutting shall be done except with the Architect's approval.
- J. Do not permit or cause any Work to be covered or enclosed until it has been inspected, tested and approved. Should any of the Work be enclosed or covered before inspection and test, the Contractor shall, at his own expense, uncover the Work; and, after it has been inspected, tested and approved, make all repairs with such materials as may be required to restore his Work and that of the other Work to its original and proper condition.
- K. Be responsible for damage to any of this work before acceptance. Securely cover all openings, apparatus, fixtures, and appliances, both before and after setting into place, to prevent obstructions in the pipes and breakage or disfigurement of equipment. Should the equipment become damaged, restore it to its original condition and finish before final acceptance without change in Contract cost.

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PART 2 - MATERIALS

2.1 MATERIALS

- A. Equipment and Materials: Shall be new.
- B. Substitutions of Materials and Equipment:
 - 1. Specific names used in connection with materials are mentioned as standard, but this implies no right on the part of this Section to substitute other materials or methods without written permission of the Architect. The decision of the Architect shall govern as to what material may be substituted, but the burden of proof as to the quality of any proposed substitution shall be upon the Contractor.
 - 2. Within thirty (30) days after awarding of the Contract, submit to the Architect for approval, five (5) copies of a list of all materials to be used. This list shall include the manufacturer's name, the model, type, number and size of equipment and the capacity of the equipment. All equipment shall be submitted at one time. If the material is not definitely specified, use the product of any manufacturer as listed under the specific material or equipment, or approved equal, if approved in writing. Any material or equipment installed without the approval of the Architect shall be subject to immediate removal if found unsatisfactory.
- C. Pipe and Fittings:
 - 1. Drainage pipe shall be Schedule 40 ABS DWV or Schedule 40 PVC DWV.
 - 2. Copper Tubing: ANSI H23, Type "K," "L," or "M" hard drawn water service tubing, as hereinafter indicated.
 - 3. Fittings for Copper Tubing: ANSI B16.22, wrought copper sweat type.
 - 4. Steel Pipe: ANSI B36.10, Schedule 40 black.
 - 5. Malleable Iron fittings: ANSI B16.3, black, 150 PSI.
 - 6. Unions: For steel pipe shall be malleable iron or steel ground joint pattern, 150 PSI. For copper pipe shall be 150 PSI ground joint cast bronze unions with sweat connections.
 - 7. Nipples: Cut from same pipe as specified for the system in which the nipple is used.
 - 8. Solder for Copper Tubing Joints: Shall be 95/5. Charred and collapsed pipe and fittings due to excessive heating will not be permitted and shall be removed from the job site.
 - 9. Dielectric Insulating Unions: EPCO, or approved equal, dielectric nut-type or flange-type unions with gasket material suitable for service and temperature in which they are required.
 - 10. Threaded-to-Solder Adapter: As specified for solder-type fittings.

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- D. Valves:
1. Ball Valves: Nibco model T-580, or approved equal, bronze valve with teflon seats and rated at 400 PSI WOG.
 2. Gate Valves: Nibco, or approved equal, T-113 threaded, S-113 solder joint, 125 PSI, bronze.
 3. Check Valve: Shall be Nibco model 433, or approved equal, 300 PSI WOG bronze check valve with horizontal swing and renewable seats.
 4. Double Check Valve: Febco model 805Y, or equal, double check valve assembly with two in-line spring-loaded check valves, two gate valves, and four test cocks. Unit shall be an all bronze assembly.
 5. Balancing Valves: Armstrong series CB circuit balancing valves, Bell and Gosset, or Illinois, complete with brass trim, flow measurement, flow balancing, positive shut-off with no drip seat and disc, drain connection, 360 degree dial setting scale with hand wheel, and pressure meter.
 6. Gas Cocks: DeZurik Series 400, or approved equal, eccentric plug valve complete with 125 PSI cast iron body, flanged connection, and wrench. Valve should be AGA approved for gas service.
 7. Earthquake Gas Shutoff Valve: California Valve, model 315, or approved equal, 3" size earthquake shutoff valve complete with manual reset non-creeping rolling latch type tripping mechanism, visual open-close indicator and flanged connection parts.
- E. Strainers: Strainers (sediment separators) shall be Watts model 777, Mueller, or Bailey, screwed bronze strainers with 20 mesh stainless steel screen with seat gasket, built for a pressure of 125 PSI at 450° F.
- F. Water Pressure Regulator: Watts model #U5B, Zurn, or Mueller, unit with bronze construction, stainless steel seat, stainless steel integral strainer, high temperature diaphragm, union inlet, and built-in thermal expansion bypass equalizer.
- G. Trap Primers: Shall be Precision Plumbing Products, or approved equal, brass trap primer with vacuum breaker and union connections. Furnish and install as directed by local authorities and as indicated on the Drawings. Trap primers shall be installed in accessible locations behind a chromium-plated steel access panel.
- H. Hose Bibs:
1. Exterior: Chicago Faucet Co. #15T, or equal, 3/4" size, loose key, rough chrome with E-27 non removable vacuum breaker.
 2. Interior: Chicago Faucet Co. model 387, 1/2" size, with E-27 non-removable vacuum breaker.

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- I. Pipe Hangers and Supports:
 1. Superstrut, or approved equal.
 2. Piping Supported from Above: M-750 side beam brackets bolted through structural members and U-577 swing connector bolted to wood decks, all with C-711 hangers.
 3. Continuous Span (Parallel Piping) Hangers: Superstrut, 12-gauge, steel channels with nuts, pipe clamps, pipe straps, driven-in end caps, and all supporting devices and accessories.
 4. Pipes Supported from Wall or Floor: Superstrut A-1200, 12-gauge channel complete with pipe clamp and all nuts and bolts and end caps. Bolt channel to wall or floor.
 5. Hanger Rods: Shall be sized in accordance with the manufacturer's directions.
 6. Provide 26 gauge x 6" long galvanized steel shields around insulation at all pipe hangers.

- J. Drains, Floor Sinks, and Cleanouts: Zurn, Josam, or approved equal. Model numbers given are for Zurn.
 1. Roof Drains: Z-100, cast iron with removable dome strainer, flashing ring, and deck clamp.
 2. Overflow Roof Drains: Zurn model Z-100-89, cast iron with removable dome strainer, flashing ring, deck clamp, and 2" extension piece.
 3. Floor Drains: ZN-415, 3" size, dura-coated cast iron body with 5" diameter nickel bronze strainer, and flashing collar, and provide trap primer connection where noted on Drawings.
 4. Area Drain: ZS-1805, 12" x 12", pipe size as indicated on the Drawings, cast iron with white acid-resisting enamel body interior, nickel-bronze frame, seepage pan, standard white acid-resisting bucket with cushioned feet and stainless-steel mesh liner, and 1/2 grate.
 5. Shower Drains: ZN-415, 2" size, dura-coated cast-iron body with 5" diameter nickel-bronze strainer and flashing collar.
 6. Wall Cleanouts: Z-1440, polished stainless steel access cover and frame. Install flush with finished wall.
 7. Floor Cleanouts: Z-1400-2 cast iron cleanout with adjustable round heavy-duty scoriated nickel-bronze top, and gasketed cover.
 8. Cleanouts: Z-1400-2 cast iron no hub cleanout with neoprene seal, threaded bronze plug, and scoriated nickel-bronze cover.

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9. Cleanouts to Grade: Z-1420-25, dura-coated cast iron body, neoprene seal with bronze threaded plug and heavy duty tractor top. Set cleanout in 12" x 12" x 6" deep concrete pad.
 10. Cleanouts shall be the same size as the connecting pipe unless otherwise stated.
 11. Furnish suitable wrought iron or steel wrenches for each type of cleanout or plug cap.
 12. If not specifically shown, drains and cleanouts shall be same size as connecting piping.
- K. Plumbing Fixtures, AS APPLY:
1. Final selection of fixtures to be determined by owner
 2. Point up joints between fixtures and wall or floor with white mastic. Mastic shall have sufficient resiliency to prevent cracking or pulling away from the wall or floor due to fixture movement.
 3. Provide tubing supplies, traps, pipe escutcheons, and wastes to wall of not less than #17 "B&S" gauge polished brass, chromium-plated. Cast ironware shall be white acid-resisting enameled. Chinaware shall be twice-fired white vitreous china.
7. Lavatories:
- a. Insulate hot water piping, waste piping and P-trap exposed under all lavatories, intended for the use of the handicapped, with 1/2" thick flexible foamed insulation. Insulation shall be Skal-Gard, or approved equal, with all seams butted together and glued. Insulation shall have finished looking seams. Paint insulation as directed by the Architect.
- L. Water Heaters:
1. WH-1: A.O. Smith, or approved equal, AGA approved. Units shall be complete with glass lined insulated tank with steel jacket with enamel finish, fully automatic controls with 100% safety shut-off, draft diverter, magnesium anode protection, gas pressure regulator, three-year guarantee, and built to a working pressure of 150 PSI. Furnish and install ASME temperature and pressure-relief valve. Size as scheduled on the Drawings. Install aquastat and time clock and all wiring to control the hot water return pump.
- M. Hot Water Return Pump (P-1): Grundfos, or approved equal, in-line circulating pump, with bronze fitted, bronze impeller, bronze wear rings, stainless steel shaft, and mechanical seal. Pump shall be suitable for operation at 175 PSI. Pump shall be as scheduled on the Drawings.

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- N. Expansion Tank: Therm-X-Trol, model ST-12, or approved equal, in-line expansion tank complete with separate rigid polypropylene liner, heavy duty butyl diaphragm barrier, adjustable factory charged sealed air cushion, high strength ASME steel tank, air charging valve with protective cap, and 4.5 gallon capacity.
- O. Submersible Sump Pump (SP-1): Paco, or approved equal, all bronze submersible sump pumps with brass strainer, bronze impeller, and complete integral manual and automatic stop-start control. Pumps shall have a capacity as indicated on the Drawings. Pump shall be hard wired.
- P. High Water Alarm: Anchor Scientific Inc., or approved equal, 2000-1 Alarm-Pak, complete with prime coated steel enclosure, rotofloat mercury switch tilt bulb level control, watertight control cable, alarm buzzer, alarm silence button, alarm light, lockable latch, and auxiliary reversible dry contacts for wiring to remote alarm station. Unit shall be factory-wired ready for automatic 120 volt operation.
- Q. Instant Hot Water Unit: In-Sink-Erator model GN, or approved equal. Unit shall have a 750 watt, 115 volt, single phase heating unit, and self-closing hot water faucet. Faucet color shall be chrome.
- R. Catch Basin: Christy, or approved equal, concrete catch basin with heavy duty traffic rated galvanized grate. Size as indicated on the Drawings.
- S. Valve Box: Santa Rosa Precast, or approved equal, complete with concrete top. Size as required.
- T. Quick Disconnect Fittings: Hansen series HK coupling, or approved equal, with female NPT ends, brass construction, Buna "O" rings, and rated at a minimum of 500 PSI for sizes 1/2" and smaller.
- U. Flexible Pipe Connector: Metraflex, or approved equal, with bronze construction or steel construction to match the connecting piping, flexible braided hose, and threaded ends. Unit shall be rated at 130 PSI at 70°F. minimum.
- V. Condensate Pump: Little Giant model VCL-24-ULS, Bell and Gossett, or Grundfos pump with large receiver, 148 watt, 115 volt, single phase motor, 30 GPH flow rate at 25 feet of lift, safety switch to shut down the water source heat pump unit if the condensate gets to the high level point, check valve, and 6 foot cord.
- W. Water Filter System: Sta-Rite model 820080, or approved equal, taste and odor filter, with filter housing, carbon filter with 5 micron filtration capability, valve and accessories including all connecting devices. Install on water line to refrigerator ice machine.
- X. Hot Water Piping Insulation: Insulate all hot water piping with Owens-Corning 25 ASJ/SSL, or approved equal, 1" thick U.L. listed, non-combustible fiberglass segmented pipe insulation with an integral vapor barrier jacket. Jacket shall have lap for sealing and shall be additionally sealed with outward clenching staples 6" o.c. Fittings, valves, and couplings shall be insulated with pre-molded fittings, or segmented insulation covered with molded PVC form. Insulation density shall be between 4 and 7 PCF. Adhere factory furnished 3" wide pressure sealing strips to all butt joints and end joints. Insulation shall be unbroken at all pipe

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supporting devices. Install 26 gauge x 6" long galvanized sheet metal shields completely around insulation at each pipe supporting device.

- Y. Access Panel: Karp, or approved equal, with 14 gauge steel door, 16 gauge steel frame. Door shall have key operated cylinder lock. Door shall be minimum 12" x 12" size, or as noted on Drawings, or as required to provide proper access to valves and equipment and shall be flush with finished surfaces. Paint access door to match wall or ceiling.
- Z. Escutcheon Plates: Chromium-plated steel floor, wall, and ceiling plates with set-screw to hold firmly in place.
- AA. Flashing and Counterflashing: For all pipe penetrations exposed to weather areas shall be furnished and installed by this Section shall be Glenco, or approved equal, 4-lb. sheet lead with 12" skirt.
- BB. Pipe Sleeves: Adjust-O-Crete, 24-gauge, electro-galvanized sheet metal adjustable sleeve. Provide at all concrete penetrations. Refer to post tension slab restrictions.

PART 3 - EXECUTION

3.1 PIPING

- A. General:
 - 1. Carry all horizontal lines of pipe on specified hangers properly spaced and set to allow the pipe to adjust for expansion and contraction.
 - 2. Conceal all piping above ceilings, in furred walls and partitions and pipe spaces when possible. Check all piping runs beforehand with all other trades. Run piping to maintain proper clearance for maintenance and access. Run piping in strict coordination with mechanical ducts and equipment, all electrical conduit and equipment, structural, and architectural conditions. Where work of other trades prevents installation of the piping as shown on the Drawings, reroute piping at no extra cost. **Verify all inverts and pitches of lines before starting work.**
 - 3. All piping shall be installed free from traps and air pockets.
 - 4. Support all pipe from the building structure so that there is no apparent deflection in pipe runs. Fit piping with steel sway braces and anchors to prevent vibration and/or horizontal displacement under load when required. Do not support piping from, or brace to, ducts, other pipes, conduit, or any materials except building structure. Piping or equipment shall be rigid and immobile and shall not be supported or hung by wire rope, plumber's tape or blocking of any kind. Double wrap copper pipe with heavy vinyl tape where pipe comes in contact with ferrous materials.
 - 5. Support Piping From Structure By Hangers Spaced As Follows:
Horizontal piping shall be supported by pipe hangers as hereinbefore specified. Hangers shall be spaced as indicated in the Uniform Plumbing Code. Each branch over 4 feet long shall have at least one hanger.

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Vertical piping shall be supported at each floor level with approved pipe clamps. Vertical piping shall have not less than one intermediate support to resist horizontal loads. Provide pipe anchors and sway braces to basic building structure where shown and where required for rigidity. Provide 26 gauge full sheet metal sleeves around outside of insulation at each hanger and support. Provide insulation saddle and sheet metal sleeve at all pipes over 1 1/2" size. Hangers shall be sized to fit outside of pipe and insulation.

6. Furnish and install dielectric insulating unions or insulating flanges as hereinbefore specified at all connections of ferrous and nonferrous piping.
7. Install unions adjacent to threaded equipment and at other points where required for disassembly.
8. No valve and no piece of equipment or trim shall support the weight of any pipe. Install all valves, vents, traps, cleanouts and other trim in accessible locations.
9. Whenever changes in sizes of piping occur, make such changes with reducing fittings, as the use of face bushings will not, in general, be permitted. Install eccentric reducing fittings where necessary to provide free drainage of lines.
10. Where exposed pipes pass through walls, ceilings, or floors, fit pipes in all finished rooms and conspicuous locations with escutcheon plates. Escutcheon plates must be securely held in position allowing enough clearance to care for expansion and shall be sufficient size to cover the opening around the pipe.
11. Soil, Waste, Vent, Hot and Cold Water Branch Piping: To fixtures shall be as follows, unless otherwise shown on the Drawings and specified herein:

FIXTURE	SIZE WASTE	SIZE VENT	SIZE COLD WATER	SIZE HOT WATER
Water Closets (Flush Valve)	4"	2"	1"	--
Urinals	2"	1 1/2"	3/4"	--
Lavatories	2"	1 1/2"	1/2"	1/2"
Sink	2"	1 1/2"	1/2"	1/2"
Service Sink	3"	2"	1/2"	1/2"

Note: 1/2" Diameter piping shall not exceed 5'-0"

B. Soil, Waste, and Vent and Rainwater Leader Piping:

1. Piping below grade shall be hubless cast iron soil pipe and fittings with "Mission" heavy gauge stainless steel couplings with neoprene gaskets, or approved equal, couplings which are guaranteed for the life of the connecting pipe.
2. Piping above grade shall be hubless cast iron soil pipe with standard grade stainless steel fittings and neoprene gaskets.

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3. Provide cleanout plugs where shown or required for proper access to system.
 4. Where pipes pass through roof, flash and counter-flash with 4-lb. sheet lead, with collar minimum height of 6". Extend flat piece in plane of roof, 12" outside of pipe. Counterflash from top of pipe to roof line. Flashing shall be in accordance with the National Roofing Contractors' Association guidelines.
 5. Install vents through roof to keep 10'-0" clear to all air intakes.
 6. All fixtures shall be trapped and vented.
- C. Hot Water, Hot Water Return, Cold Water, Compressed Air, and Pumped Waste Piping:
1. Piping above grade shall be "L" copper tubing with wrought copper sweat type fittings.
 2. Cold water piping below grade shall be type "K" copper tubing and wrought copper sweat type fittings.
 3. Threaded Valves: Shall be installed with threaded-to-solder adapters.
 4. Each connection to, faucet, or plumbing fixture shall have an air chamber 18" long placed in a vertical position and shall be one (1) pipe size larger than pipe served.
- D. Natural Gas and Compressed Air Piping:
1. Schedule 40, black steel pipe with black malleable iron fittings. All exposed piping and fittings outside of the building shall be galvanized.
- E. Condensate Drain Piping:
1. All condensate drain piping shall be type "M" copper with sloped drainage fittings.
- ### 3.2 EXCAVATING, TRENCHING AND BACKFILLING
- A. Perform all excavating, trenching, and backfilling required for this section of the Work.
 - B. Trenches for underground piping shall have uniform grades same as for the pipe so that pipe will bear on solid ground. Loose earth shall be tamped solid around sides and top of the pipe and remainder thoroughly compacted to prevent settlement of the surface.
 - C. Provide and maintain dewatering pumps as required. After piping has been installed, it shall be inspected and approved before backfilling. Backfill shall not be placed on or around the piping for 24 hours after pipe joints have been made or before lines are properly tested and approved.

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- D. Provide shoring and cross bracing of sufficient strength to properly support the walls of all excavations at a depth of four (4) feet or more and as required to protect personnel.
- E. Minimum bury for piping exterior to the building shall be 30" or shall comply with the requirements of the soils report, and specification section 2 whichever is deeper.

3.3 CLEANING

- A. Clean fixtures with soap and water. Remove marks and labels. Clean and polish chrome. Remove paint, concrete, plaster and other foreign materials.
- B. Clean all drains of dirt and debris. Remove shipping paper from cleanout covers and drain strainers and polish.
- C. The intent of this specification is that all equipment and material furnished shall be completely dust and paint free, clean and rust free and freshly painted or polished when the final acceptance inspection is made.
- D. Thoroughly clean and flush all systems of all pipe contaminates such as cuttings, filings, lubricant, rust, scale, grease, solder, flux, welding residue, debris, etc., and thoroughly flush out with clear clean water until clean in the opinion of the inspector. Any piece of equipment or part of any system which malfunctions or is damaged due to failure or neglect to observe this paragraph shall be repaired or replaced to the satisfaction of the Owner, without extra expense.

3.4 ADJUSTMENTS

- A. Adjust all outlets and faucets to their normal working conditions.

3.5 TESTING

- A. Soil, Waste, Vent and Rainwater Leader Piping: Test and prove tight in accordance with the Plumbing Code.
- B. Hot Water, Hot Water Return, Cold Water, Compressed Air, and Pumped Waste Piping: Hydrostatically test and prove tight under a pressure of 125 PSI at the highest point.
- C. Gas Piping: Test and prove tight in accordance with Plumbing Code.
- D. Condensate Drain Piping: Test and prove tight at 50 PSI.
- E. All tests shall be maintained for 2 hours or until complete and acceptable in the opinion of the inspector.
- F. After completion, the different systems and pieces of apparatus shall be tested under their normal working conditions and shall be operated for a period as directed by the Owner for the purpose of adjusting and providing the performance of the apparatus.
- G. Furnish all labor, materials, and water for making the tests.

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3.6 STERILIZATION OF HOT AND COLD WATER SYSTEMS

- A. Industrial Supply Company (925) 284-1511, Bennett Marine Utility, Inc., or approved equal. At completion of testing and adjusting and before hot and cold water systems are put into use, they shall be sterilized in strict accordance with AWWA, U.S. Department of Public Health, and local and State requirements. All water shall be dechlorinated before discharge to the sewer. Until sterilization of the water system has been made, all water outlets shall have signs posted at their location stating the water system has not been sterilized and shall not be used for human consumption. Prior to final acceptance, submit a certificate of sterilization together with bacteriological reports to the Architect stating that the work has been done in accordance with the Specifications. At the same time, submit a copy of the final report to the Department of Public Health prior to placing the systems in use.
- B. All water used for disinfection or sterilization shall be dechlorination prior to discharge to the sanitary sewer. No water shall be discharged to storm drains.

3.7 OPERATING INSTRUCTIONS

- A. Furnish to the Owner three (3) complete copies, separately bound, of operating instructions including manufacturer's literature of all equipment controls covering all items of instruction, operation and maintenance. Final inspection will not be made until these instructions are received. The following items are suggested and not inclusive.
 - 1. Plumbing Fixtures and Accessories
 - 2. Valves
 - 3. Water Heaters and Accessories
 - 4. Compressed Air System Accessories
 - 5. Sump Pump and Accessories
 - 6. Trap Primers
 - 7. Garbage Disposal
 - 8. Water Filters
 - 9. Instant Hot Water Dispenser
 - 10. Emergency Eyewash Showers
 - 11. Fossil Filters
 - 12. Condensate Pump
- B. Bind these instructions together into Operating Manuals with Index and durable cover, 3-ring Mc Millan #1516 binder, or approved equal.

3.8 AS-BUILT DRAWINGS

- A. At completion of the work, turn over to the Architect one (1) complete set of reproducible drawings incorporating the original drawings and all changes made to the original drawings. Reproducible prints of the original drawings will be provided by the Architect. Make all changes to these reproducible drawings to provide a complete and accurate description and record of all the work as installed.

3.9 GUARANTEE

- A. At completion, furnish the Owner a written guarantee, in triplicate, that work has been performed in accordance with Plans and Specifications and guarantee to replace or repair, to the satisfaction of the Owner any portion of the new work

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that fails within a period of one (1) year after final acceptance provided such failure is due to defects in material or workmanship. Also agree to replace or repair, with like workmanship and materials any part of the building system or equipment installed by other trades but damaged by him in installing his work.

END OF SECTION

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SECTION 16050 BASIC CONSTRUCTION MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included in this Section are conduits, wires, and other miscellaneous materials that are not specifically mentioned in other Sections of Division 16, but necessary or required for equipment or system operation or function, and the labor to install them.
- B. Related work included in other Sections: All other Sections of Division 16.

1.2 SUBMITTALS

- A. Manufacturer's descriptive product literature and/or sample if requested by the Engineer.

PART 2 - PRODUCTS

2.1 CONDUITS AND OTHER RACEWAYS

- A. Rigid Steel: Hot dipped galvanized or sherardized, for indoor and overhead; PVC coated for outdoor and underground.
- B. Electrical Metallic Tubing (EMT): Cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot dipped-galvanized after fabrication.
- C. Flexible Metallic Conduit (Flexible conduit): Shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design. Liquid tight flexible conduit shall be water tight with gray PVC outer coat jacket for outdoors, corrosive areas, or where exposed to outside air.
- D. Provide fittings and accessories approved for the purpose and equal in all respects to the conduit or raceway. ALL connectors and couplings shall be electroplated steel, rain and concrete tight, UL listed compression type in wet locations, indoors or outdoors. Connectors shall have insulated throats. Use of set screw type fittings are not acceptable.

2.2 WIRES AND CABLES

- A. For power and lighting systems 600V or less:
 - 1. Conductor:

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#12 and #10 AWG: Solid copper.

#8 AWG and larger: stranded copper.

Minimum size: #12 AWG.

2. Insulation type:

#12 to #1 AWG: THWN for wet or underground locations and THHN for dry locations. All shall have minimum 70 degree C in solution.

#1/0 and larger or all panel and motor control center: XHHW-2.

Grounding wire: Same insulation as phase conductors.

B. For signal and communications circuits:

1. Special cables shall be as required by the contract documents.
2. Conductors for general use and to be installed in conduits: stranded copper conductor, #14 AWG minimum, with THWN insulation for underground or wet locations and THHN insulation for dry locations.
3. Match existing based on the contractor's survey.

C. Acceptable for 600 volt or less and products:

For conductors #4 AWG and larger: General Electric, Anaconda, Okonite, Paranite, Cyprus-Rome, Pirelli-General, Triangle, or equal products conforming or exceeding applicable IPCEA standards.

2.3 OUTLET BOXES, JUNCTION AND PULL BOXES

- A. Outlet boxes: Hot-dipped galvanized or sherardized of required size, 4" square, minimum, for flush mounted devices and lighting fixtures. Cast or stainless steel type with gasketed covers for outdoor or wet locations.
- B. Junction and pull boxes: Use outlet boxes with appropriate covers as junction boxes wherever possible. Larger junction and pull boxes shall be fabricated from sheet steel, sized according to code, with machine screw-on covers, finished gray baked enamel. Outlet boxes, where installed back to back in fire rated walls, shall be offset with minimum of 6" separation.

2.4 WIRING DEVICES

A. Wall (Local) Switches:

Totally enclosed, AC rated, silent type, ivory finish, except as noted below.

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Numbers used below are those of Hubbell. Arrow Hart, Bryant, Leviton, Pass & Seymour or equal.

Single Pole Switches #HBL1221-W 20 amps 277V

Two Pole Switches #HBL1222-W 20 amps 277V

Three Way Switches #HBL1223-W 20 amps 277V

- B. Duplex convenience receptacles: NEMA 5-20R: 2 poles, 3 wire grounded, white finish, rated 20 amps, 125V Hubbell 5362-W.
- C. Ground fault interrupter (GFI) receptacles: 2 poles, 3 wire grounded, white finish rated 20 amps, 125V, #GF-5362-W.
- D. Other special purpose receptacles shown on drawings shall be of same quality.
- E. Device plates: Unless noted otherwise, white finish unbreakable nylon-based thermoplastic for flush and for all surface mounted devices, Hubbell P Series, Bryant, Leviton or equal.
- F. DATA/VOICE OUTLET:
 - 1. Provide empty conduits, and raceway as indicated on the drawings.
 - 2. Data/voice outlet box: use single gang mud rings unless otherwise noted.
 - 3. Conduit Drops: Provide 1" minimum metal conduit with pull wire to run above ceiling and terminate in telecom room for communication vendor to provide telephone and data wiring and complete installation of the telephone and data system.
- G. Weatherproof covers shall be grey, flame-retardant, UV stabilized poly carbonate, NEMA 3R rated white in use, TayMac #10350 (vertical) or #50350 (horizontal).

2.5 CONDUIT HANGERS

- A. For individual conduit runs not directly fastened to the structure, use rod hangers manufactured by Caddy, Unistrut, Power-strut, or equal.
- B. For multiple conduit runs, use Unistrut, Powerstrut or equal trapeze type conduit support designed for maximum deflection not greater than 1/8". Conduit run shall be seismic braced per SMACNA.

2.6 WIRE CONNECTORS

- A. For wires size #8 AWG and smaller: insulated pressure type (with live spring)

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rated 105°C, 600V, for building wiring and 1000V in signs or fixtures. Scotchlok, Ideal or equal.

- B. For wires size #6 AWG and larger: T&B, Burndy or equal compression type with heat shrink insulation.
- C. All insulated joints shall be insulated with Scotchfil and double wrap of Scotch 33+ tapes. Made by Scotch 3M, Permacell or equal.
- D. Terminal lugs with bolting pads shall be tin-plated. Use Belleville type compression washers by T&B #60800 series, Burndy or equal for ambient temperature over 36°F.

2.7 TERMINAL CABINETS

- A. Fabricate from code gauge steel with flush latch and concealed hinge. Minimum size shall be 20"W X 24"H X 4"D. Finish shall be ANSI 61 light grey enamel. Provide engraved lamicoïd nameplate identifying the system for which the cabinet is provided.
- B. Provide inside terminal cabinet 3/4" thick plywood backboard and terminal strips, one terminal point for each wire within the terminal cabinet.

2.8 SAFETY DISCONNECT SWITCHES

- A. Heavy duty type, 600V, horsepower rated for motors, standard enclosure for indoors and stainless steel weathertight NEMA 4x, gasketed enclosures, for outdoors; fused or non-fused as required by nameplates of equipment served. General Electric, Siemens, Square D, Cutler-Hammer, or equal.

2.9 SEALANTS

- A. Sealants: One part polysulphide or polyurethane, Fed. Spec. TT-S-00230c or two-part polyurethane, Fed. Spec. TT-SS-227E. Established standard manufacturer and products: Mameco Vulkem 116 or 227. Other approved manufacturers subject to their recommendation of each product for its use: Products Research and Chemical Corporation, Pecora, Sika, Sonneborn, Tremco or equal.
- B. Fire retardant sealant: Dow Corning Co., Type 3-6548 silicone RTV foam sealant, closed cell, 18 lb. density, 2-part system with UL certification. Use Type 96-081 one-part sealant for small spaces and cracks. Also acceptable: 3M Fire Barrier Caulk CP25, or equal. See drawings U.L. Fire Resistance Directory for penetration system details.
- C. For other sealants, see Section 07900.

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2.10 EQUIPMENT MOUNTING AND SUPPORT HARDWARE

- A. Steel channels, bolts, washers, etc., used for mounting or support of electrical equipment shall be galvanized type. Where installed in corrosive environment and exposed to weather stainless steel hardware shall be used.

PART 3 - EXECUTION

3.1 GENERAL

- A. Electrical system layouts indicated on the drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of cable and wiring and the locations of outlets by the structure and the equipment served. Take all dimensions from field measurements.
- B. Consult all other drawings. Verify all scales and report any dimensional discrepancies or other conflicts to Engineer before submitting bid.
- C. All home runs to panelboards are indicated as starting from the outlet nearest the panel and continuing in the general direction of that panel. Continue such circuits to the panel as though the routes were completely indicated. Terminate home runs of signal, alarm, and communications systems in a similar manner.
- D. Avoid cutting and boring holes through structure or structural members wherever possible. Obtain prior approval of Engineer and conform to all structural requirements when cutting or boring the structure is necessary and permitted.
- E. Furnish and install all necessary hardware, hangers, blocking, brackets, bracing, runners, etc., required for equipment specified under this Section.
- F. Provide necessary backing required to insure rigid mounting of outlet boxes.

3.2 WIRING METHOD

- A. Install all wiring in raceway, unless specifically shown otherwise.
- B. Sizes for conduits, unless specifically shown otherwise, shall be determined from Appendix C, Chapter 9 of latest National Electric Code, for applicable conduit and conductor type.
- C. Minimum conduit size shall be 3/4" except 1/2" conduit is permitted for lighting between the last outlet boxes if wire fill permits it.
- D. Conduit shall be rigid steel, or EMT as follows, unless otherwise shown on drawings:

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1. Above ground: Use rigid steel, EMT or flexible conduits.
 - a. Wet locations: Rigid steel only.
 - b. Hazardous locations: Rigid steel conforming to NEC requirements.
 - c. Locations subject to mechanical injury: Rigid steel only.
 - d. In concrete walls or block walls: Rigid steel only.
 - e. Dry indoor and above ground locations and not subject to mechanical injury: EMT or rigid steel conduit.
 - f. Outdoor or exposed to weather: PVC coated rigid steel.
- E. Use flexible steel conduits, 6' maximum in length, in the following applications:
 1. Recessed lighting fixtures.
 2. Motor connections.
 3. Connection between fan plenum and structure..
 4. At wet locations or where exposed to weather, flexible steel conduit shall be liquid tight type.

3.3 INSTALLATION OF CONDUITS

- A. General:
 1. Run all conduits concealed unless otherwise noted or shown.
 2. Run exposed conduit parallel to or at right angles to center lines of columns and beams.
 3. Run no conduit in concrete slabs or floors except at point of penetration. All penetrations shall be at right angles to slab surfaces.
 4. Install conduits above ceilings to avoid blocking of access doors, obstructing removal of ceiling tiles, lighting fixtures, air diffusers, etc.
 5. Conduits shall not cross any duct shaft or area designated as future duct shaft. Conduit risers when allowed in duct shaft must be coordinated with Mechanical work to avoid any conflict.
 6. Install 1/8" diameter Tubbs Cordage Company, T&B or equal, yellow "polyline" pull line in all conduits provided under this contract that are intended for future use.

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7. Provide pull boxes where shown or as required to limit any conduit run to a maximum of three 90 bends (or equivalent), or to avoid "U" bends.
 8. Electrical metallic tubing (EMT) shall be used for: Feeders, power and lighting branch circuits, and low voltage distribution system where run concealed above suspended ceilings, in stud walls, furred spaces, and where exposed not less than 8 ft. above finished floors and sizes 2" and smaller.
 9. Flexible metallic conduit shall be used: In dry locations for connections from adjacent outlet boxes to motors, transformers, vibrating equipment and machinery, and to lighting fixtures installed in suspended ceilings.
 10. Rigid steel conduit:
 - a. Outdoor or exposed to weather.
 - b. Other areas and locations as shown on drawings or as required by this Division 16 here before or after.
- B. Conduit Supports:
1. Support conduits with UL listed steel conduit supports at intervals required by NEC. Wires or sheet metal strips are not acceptable for conduit support. Use conduit hangers for all conduits not directly fastened to structure and for all multiple conduit runs which shall be seismically braced per SMACNA.
 2. Individual conduits 1/2" and 3/4" size may be supported from ceiling support wires with Caddy clips. Only one conduit is permitted to be attached to any ceiling support wire. Hang such conduit so as not to affect level of ceiling.
 3. Avoid attaching conduit to fan plenums. When it is necessary to support conduit from fan plenum, provide a length of flexible conduit between portion attached fan plenum and portion attached to the building to minimize transmission of vibration to the building structure.
- C. Conduit Penetration:
1. Penetrating fire rated floor or wall: Install conduit in conduit sleeve or framed opening. Seal penetration with fire retardant sealant specified hereinbefore. Fire rating integrity shall be preserved. See drawings for details.
 2. Penetrating roof or exterior wall: Avoid penetrating roof or exterior wall where possible. Where penetrations are necessary, building

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weatherproof integrity shall be preserved. Clean penetration opening. Use FS-TT-S-001543A, single component, gun-grad, non-sag, silicone sealant, with movement capability + or - 50%, General Electric Silpruf, 3M or equal. Provide cast-iron escutcheon on the outside face of wall or roof to cover penetration and sealant.

3. Penetrating sound insulated or fan plenum wall: Install conduit in conduit sleeve and seal penetration.
4. Penetrating non-fire rated dry wall: Conduit sleeves are not required. Penetrations shall be sealed with plaster prior to painting. Penetrations made after wall finish is applied shall be as small as possible and provided with chromed plate round escutcheons, one on each side of wall.
5. Penetrating suspended ceiling: Cut hole as small as possible to permit conduit penetration. Provide chromed plate round escutcheon for each conduit below ceiling.

3.4 INSTALLATION OF WIRES

- A. Pull no wire into any portion of the conduit system until all construction work which might damage the wire has been completed, and all boxes are mounted and all strapping is complete.
- B. Install all wire continuous from outlet to outlet or terminal to terminal. Splices in cables when required shall be made in handholes, pull boxes or junction boxes. Make branch circuit splices in outlet boxes with 8" of correctly color-coded tails left in the box.
- C. Splices in wires and cables shall be made utilizing materials and methods described hereinbefore.
- D. Cable and or conductors bending radius shall be per applicable code and manufacturer's recommendations.
- E. Make all ground, neutral and line connections to receptacle and wiring device terminals as recommended by manufacturer. Provide ground jumper from outlet box to ground terminal of devices when the device is not approved for grounding through the mounting screws.
- F. Provide Brady, P&B or equal wire markers where number of conductors in a box exceeds four.

3.5 WIRE COLOR CODE

- A. Color code all conductors. Wire sizes #8 AWG or smaller shall have integral

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color coded insulation with separate color for each phase and neutral. Wire sizes #6 AWG and larger may have black insulation but identified by color coded electrical tape at all junction, splice, pull, or termination points. Color tape shall be applied ½ lap to at least 6" of the conductor.

B. Color code wires as follows:

<u>Conductors</u>	<u>120/208 Volts</u>	<u>277/480 Volts</u>
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	White or Grey
Ground	Green	Green

C. Color coding of wires used for signal and communication systems are specified under the respective sections for these systems.

3.6 MOUNTING HEIGHTS OF DEVICES: Unless otherwise noted on drawings, mounting heights of devices shall be measured to the center line of the device as follows:

Receptacles: 18"

Telephone & Computer Outlets: 18"

Mounting heights of devices shall be measured to the top of the devices as follows:

Switches: 48"

Install all receptacles uniformly with "U" ground slot up or down as directed by the Owner.

3.7 CONNECTIONS TO EQUIPMENT

A. General:

1. Furnish and install required power supply conduit and wiring to all equipment.
2. Furnish and install a suitable means of disconnect immediately ahead of and adjacent to each magnetic motor starter or appliance unless the motor or appliance is located adjacent and within sight of the serving panelboard, circuit breaker or switch. Verify all equipment nameplate current ratings prior to installation.

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3. Mount all motor starters and provide all power wiring to them, including those furnished under other sections of specifications.
4. Install all rough-in work for equipment from approved shop drawings to suit the specific requirements of the equipment.
5. Furnish and install all magnetic motor starters that are shown on the electrical drawings or specified under other Divisions to be furnished under this Division of work. Verify equipment nameplate ratings prior to installation and furnish adequately rated starters for the loads.
6. Furnish and install manual thermal protection for all motors not integrally equipped with thermal protection.
7. Furnish 120 volt power to each control panel and time clock requiring a source of power to operate.
8. All motor starters for motors 10HP or larger shall be Solid-State type, Cutler-Hammer "Advantage Series" or equal.

3.8 IDENTIFICATION

- A. Provide screwed-on engraved lamacoid plastic nameplates for switchgear, panels, motor starters, disconnect switches and all associated devices with 1/4" high letters for equipment designation and 1/8" high letters for voltage and phases.
- B. Provide transparent tape labels on all lighting switches and convenience and special purpose receptacles to show panel and circuit numbers to which the device is connected.
- C. Provide engraved lamacoid sign on all motors-driven equipment: "Caution. Automatic equipment. May start at any time." Use stainless steel screws with glue to attach signs on equipment disconnect switches.

END OF SECTION

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SECTION 16500 LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included in this Section:
 - 1. Lighting fixtures and installation.
- B. Related work included in other Sections:
 - 1. Basic Construction Materials and Methods: Section 16050

1.2 SUBMITTALS

- A. Shop drawings and/or manufacturer's literature describing product.
- B. Photometric test data by an independent testing laboratory when requested.

1.3 SUBSTITUTIONS:

- A. Substitutions will be allowed only when in the architect's opinion equal appearance, construction and photometric performance are achieved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Where only one fixture designation appears in a room or area, that designation applies to all fixtures in that room or area.
- B. Tandem wired units acceptable where appropriate.
- C. Electrical material and equipment furnished for the work shall be new. Material and equipment used shall bear the label of Underwriters' Laboratories, Inc. (UL) and be listed by UL in their lists of electrical material where applicable, unless otherwise specified.
- D. Equipment and material furnished by Contractor shall be constructed and tested in accordance with NEMA, IEEE, and ANSI standards, unless otherwise specified.

2.2 FIXTURE HANGERS AND SUPPORTS

- A. Provide proper supports and mounting accessories, such as hangers, stems,

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yokes, plaster frames, etc., for each lighting fixture as required by the type of ceiling installed. Provide special mounting per details shown on drawings.

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide and install all fixtures complete, including lamps, and ready for service.
- B. Verify ceiling type and conditions and order fixtures for proper application required by the type of ceiling installed.
- C. Architectural ceiling plans and/or elevations shall be used to determine exact locations of lighting fixtures.
- D. Install fixtures in such a manner as to avoid obstructions and to give proper illumination result. Verify layouts with Architect.

3.2 INSTALLATION OF RECESSED LIGHTING FIXTURES

- A. All recessed lighting fixtures shall be wired from adjacent junction boxes utilizing flexible metal conduit to permit future fixture relocation. Maximum flexible conduits shall be 6' length.
- B. Support for fixtures shall conform to NEC 410-15 and 410-16.
- C. Seismic Restraints: When installed in grid type ceilings, provide a slack #12 gauge galvanized tie wire permanently attached to the structure shall be provided at two diagonal corners of each fixture installed in a grid type ceiling. Minimum (4) 360° wraps per termination point.
- D. Coordinate with ceiling installation contractor for recessed fixtures in fire rated ceilings.

3.3 OUTLET BOXES

- A. Outlet box for surface or stem mounted fixtures shall be provided with fixture stud as well as tapped and drilled canopy covers.
- B. Flush outlet box shall be provided with fixture stud and plaster ring.

3.4 INSTALLATION OF POLE MOUNTED FIXTURES

- A. All fixtures shall be mounted per details on the drawings as a minimum. Contractor to provide calculations and details by a California licensed civil engineer.

3.5 TESTS

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- A. At substantial completion of project, verify all lamps and ballasts are operating properly. Replace all not operating lamps and ballasts with new. Replace ballasts exceeding 'A' sound rating.

END OF SECTION