PROJECT MANUAL

March 19, 2024

Relocation of Three Relocatable Classroom Buildings at Egling Middle School

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Colusa, Colusa County, California

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Relocation of 3 Relocatable Classroom Buildings at Egling Middle School, Colusa, Colusa County, California

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_____

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SECTION 01 10 00 SUMMARY OF WORK

PART 1 - GENERAL

1.01 GENERAL

A. The name of the project is Relocation of 3 Relocatable Classroom Buildings at Egling Middle School.

B. COMMUNICATIONS:

1. Communications and instruction from the Owner to the Contractor are to be through the Architect.

2. Communication from the Contractor to the Owner is to be through the Architect.

1.02 WORK INCLUDED

A. Under a single contract construct all site work, foundation and refurbish and relocate buildings for Relocation of 3 Relocatable Classroom Buildings at Egling Middle School and in conformance with Drawings and Specifications prepared by Eagle Architects.

1.03 WORK BY OTHERS

A. Work on the project which will be executed prior to start of work of this contract, and which is excluded from this contract, is as follows:
   1. District will have identified sources of friable asbestos which will be removed under a previous contract.
   2. District will remove furniture, supplies and salvageable items.

B. Work on the project which will be executed after completion of work of this contract, and which is excluded from this contract, as follows:
   1. NONE.

C. Work on this project which will be executed during the Work of This Contract which the Contractor shall coordinate with and facilitate:
   1. NONE

D. Work on this Project which will be executed after the Work of This Contract:
   1. District to install furniture, supplies and salvageable items.

1.04 DIMENSIONING AND TOLERANCES FOR ACCESSIBILITY

A. While it is recognized that construction practices generally permit a level of reasonable dimensional tolerance, the installation of any items subject to compliance with the Americans with Disabilities Act Accessibility Guidelines and Chapter 11 B of the California Building Code typically does not allow such tolerances. Therefore, these dimensions are to be considered absolute and will be strictly enforced. Items found to be out of tolerance may require

modification and/or replacement at contractor's expense.

1.05 SPECIAL INSPECTIONS

A. Some specification sections contain requirements for special inspection of the fabrication of materials.

B. The special inspection occurs as part of the on-site construction process or in the off-site plant of a supplier or Subcontractor.

C. The Owner is responsible for the cost of inspections, but has no control over the time required or the location of off-site fabrication facilities.

1. Reasonable inspection times have been established based on the quantity of material to be tested.
2. Time in excess of that established will be paid for by the Owner and backcharged to the Contractor.
3. The time specified for on-site and off-site inspections is computed on the basis that one man-day of inspection consists of six hours of actual inspection plus associated meals, lodging, subsistence, and travel.

1.06 HAZARDOUS MATERIALS

A. No asbestos or asbestos containing materials have been knowingly specified for this project.

B. If materials containing asbestos are brought to the site for use or installation in the Work, or if such materials are encountered in existing work upon which new work is being performed, notify Architect immediately.

C. Provide written certification that no asbestos or asbestos containing materials have been included in the work, and that no tools, devices, clothing or equipment containing asbestos have been used to construct the work.

D. Provide written certification that materials furnished and installed in the work comply with Rules on Architectural Coatings applicable in the area of the work as enforced by the local agency having jurisdiction in that area.

1.07 CONTRACTOR'S USE OF PREMISES

A. Confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents; do not' encumber site with extraneous materials or equipment.

B. Roads for access to and from site, loading areas, and parking space are as indicated. Confine traffic and materials delivery to these roads and locations

C. Assume responsibility for protection and safekeeping of products stored on the site. Coordinate area of storage and site fabrication with Owner's representative.

D. Specific areas for storage of materials and site fabrication will be agreed upon. Contractor's activities shall be confined to these areas.

E. Work shall proceed in such manner as not to interfere with Owner's activities in and about nearby facilities. Exceptions will be made only after previous agreement between Owner, Architect and Contractor.

F. Fire alarm, intercom, intrusion alarm and other such tests shall be conducted outside of school hours and shall be coordinated with site personnel, if such tests occur after occupancy.

1.08 WORK SEQUENCE

A. Schedule and construct work in stages to accommodate Owner's use of the premises before and after the primary construction period. Coordinate the construction schedule and operations with the Owner's representative. The three stages of the construction process following the bid award shall be:

1. Pre-construction: Pre-construction activities shall occur from the start date, to the first day of availability. Activities shall include, but are not limited to:
   a. Identification of long lead materials and equipment
   b. Shop drawing submittals
   c. Deferred approval submittals
   d. Field measuring
   e. Color and sample submittals
   f. Material ordering (particularly long lead items)
   g. Material stock piling
   h. Project scheduling/subcontractor coordination
   i. Activities to be performed by the District shall include:
      1) Removal of equipment and personal items from the buildings (although this may not fully occur by the first day)
   j. The architect and engineers will expedite all long lead item submittals as quickly as possible. Such items must be indicated as "critical" when submitted. Substitutions of finishes, materials and equipment will not be permitted due to the lack of availability unless submittals are made early and completely.

2. Construction: Primary construction activities shall occur from the date of availability, through the Date of Substantial Completion. Activities shall include work as described by the construction documents.
   a. It is the intention of the district to make these buildings available on the dates indicated below. Some work may occur before abatement begins if coordinated with the abatement contractor. Certain units also may be available earlier than the dates shown. The general contractor must coordinate with the abatement

contractor when access will be available.

b. Due to the nature of the work and the type of facilities, the schedule is fixed and cannot be altered. The premises will not be available prior to date of availability. All primary work must be completed prior to Date of Substantial Completion. Critical work, includes life safety, HVAC, plumbing, electrical service, security and general construction. Temporary measures will be required if primary work is uncompleted at start of school date.

c. As the district needs time for preparing classrooms for the new school session, the Contractor shall turn over spaces in an orderly sequence to allow occupancy and use of the spaces over the final 2 weeks of the construction period. This schedule must be prepared with the district's input.

3. Completion/Close-out: Completion and close-out activities shall occur from Date of Substantial Completion to Final Completion. Activities shall include:

a. Completion of minor finish work. Minor work shall be considered completion or installation of items which will not interfere or hinder the district from utilizing the facility, such as touch-up painting, hardware adjustment, etc.

b. Punch list work.

c. Project close-out.

d. All work performed during this period must occur outside of normal school hours. Arrangements must be made with the district representative and work schedules approved.

B. Delays:

1. Minor delays: Minor delays caused by parties other than the Contractor, such as the Owner, Architect, or Abatement Contractor, will not be considered critical path delays and will not result in a time extension to the project schedule. Minor delays shall be defined as delays due to the need for review, clarifications, consideration, detailing, etc. which typically do not last more than 48 hours, are addressed promptly and solved without significant changes to the work, as determined solely by the Architect. Such items which may cause delay must be identified by the Contractor at the time of origin.

2. Other delays: Other delays caused by unknown or unforeseen conditions or significant changes or modifications requested by or required by the Owner, Architect or DSA, will be permitted only if promptly submitted, reviewed and approved by the Architect and Owner. Such delays may result in time extensions to specific work or areas of work only, and not to other unaffected portions of the project. Such delays must directly affect the critical path of the work, be shown as unavoidable and be unable to be made up through rescheduling.

C. Occupancy: The project will be occupied by the School District Staff as shown below. Dates are fixed and cannot be changed. The premises will be occupied whether or not the work is completed regardless of time extensions (if any). Any

work performed after this date will need to be fully coordinated with the district and will be limited to after school hours or weekends.

D. Project Schedule:

1. The following schedule summarizes the major activity dates (Dates are approximate and actual start dates are subject to change):
   a. Bid
      1) Advertise to Bid (first)
      2) Advertise to Bid (second)
      3) Pre-Bid Conference
      4) Addendum (last)
      5) Bid Due
      6) Board Award
   b. Contracts
      1) Bond Preparation
      2) Contract Execution
   c. Pre-Construction Activities
      1) Start Date
      2) Submittals and Approvals
      3) Materials Ordering/Stockpiling
      4) School Concludes for Summer
   d. Construction
      1) Date of facility availability
      2) Construction, All Units
      3) Begin turning over spaces to District
      4) Owner Slack Period
   e. Occupancy: In order to accommodate a phased occupancy by the Owner, the Contractor will turn the buildings over for occupancy as follows:
      1) Occupancy - Staff
      2) Occupancy - Students
   f. Completion/Close-out
      1) Substantial Completion Date
      2) Complete Minor Finish Work
      3) Complete Punch List Work
      4) Close-out/Completion

1.09 EXTENDED LIQUIDATED DAMAGES

A. At the conclusion of the Punch List Work Completion date, all items are to be 100% finalized. Should work remain uncompleted beyond this date, the Owner may re-instate liquidated damages until all such work has been accepted. In addition, work uncompleted may, at the Owner's option, be completed by others and charged against the contract amount.

1.10 OWNER OCCUPANCY

A. Owner will occupy nearby premises during construction.

B. Refer to General Conditions for requirements for partial occupancy by Owner.

C. Owner will not occupy buildings included in this scope of work during the primary construction period. However, occupancy will occur as shown above.

D. Owner may occupy other buildings on premises during construction and may be present on site during summer construction period. Refer to General Conditions for requirements for partial occupancy by Owner.

1.11 EXISTING UTILITIES

A. It is recognized by the District and the Contractor that the location of existing utility facilities as shown on contract drawings and specifications are approximate; their exact location is unknown.

B. Recognition is given to the fact there may be additional utilities existing on the property unknown to either party to the Contract. Location of utilities as shown on drawings and specifications represent the best information obtainable from utility maps and other information furnished by the various agencies involved. The District warrants neither the accuracy nor the extent of actual installations as shown on the drawings and specifications.

C. Because of this uncertainty, it may become necessary for the Architect to make adjustments in the line or grade of sewers or storm drains. Installation of such adjusted lines shall be made at the regular unit price bid for the work, and no additional compensation will be paid therefore, unless the scope and character of the work has been changed.

D. The Contractor agrees and is required to coordinate and fully cooperate with the District and utility owners for the location, relocation, and protection of utilities. The Contractor's attention is directed to the existence of utilities, underground and overhead, necessary for all buildings within the area of work. Prior to start of drenching operations, the Contractor shall meet with District Representative(s) to fully review known utility locations which may affect the work.

E. In accordance with Section 4215 of the Government Code of the State of California, the District shall make provisions to compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating such main and trunk line utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work. Compensation will be in accordance with the provisions of these specifications providing for change orders. Nor shall the contractor be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of the District or the owner of the utility to provide for removal or relocation of such utility facilities.

F. Nothing herein shall be deemed to require compensation to the Contractor or to relieve him from being assessed liquidated damages for such delay when the presence of unidentifiable utilities can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of construction, and the damage to existing utilities or delay was caused in whole or in part by a failure of the District to indicate the presence of such service laterals or appurtenances.

G. In the event the Contractor discovers utilities not identified in the Contract plans or specifications, the Contractor shall immediately notify the Architect and the utility owner by the most expeditious means available and later confirm in writing.

H. Existing building utilities shall not be interrupted during normal operating hours.

1.12 PROTECTION

A. Observe safety precautions, and erect barricades, warning signs and handrails to protect persons in and around the work areas.

B. Conform to OSHA rules and regulations, and State Safety Regulations and Orders.

1.13 TEMPORARY UTILITIES

A. Contractor is responsible for temporary utilities as specified in Section 01 50 00.

END OF SECTION

SECTION 01 10 90 DEFINITIONS AND STANDARDS

PART 1 GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions and Division 1 and fully applicable to this Section, as if repeated herein.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to work of this section.

1.03 DESCRIPTIONS OF REQUIREMENTS

A. General: This section specifies procedural and administrative requirements for compliance with governing regulations and the codes and standards imposed upon the work. These requirements include the obtaining of permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

B. "Regulations" is defined to include laws, statutes, ordinances and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the work regardless of whether they are lawfully imposed by governing authority or not.

C. Governing Regulations: Refer to General Conditions for requirements related to compliance with governing regulations.

1.04 DEFINITIONS

A. General Explanation: A substantial amount of specification language consists of definitions for terms found in other contract documents, including the drawings. (Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated thereon.) Certain terms used in contract documents are defined in this Article. Definitions and explanations contained in this section are not necessarily either complete or exclusive, but are general for the work to the extent that they are not stated more explicitly in another element of the Contract Documents.

B. General Requirements: The provisions or requirements of Division 1 sections apply to entire work of Contract and, where so indicated, to other elements which are included in project.

C. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on drawings, to other paragraphs or schedules in the specification, and to similar means of recording requirements in contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by Architect", "requested by Architect", and similar phrases. However, no such implied meaning will be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

E. Approve: Where used in conjunction with Architect's/ Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Architect's/Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Architect Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.

F. Project Site: The term "project site' is defined as the space available to the Contractor for performance of the work, either exclusively of in conjunction with others performing other work as part of the project. The extent of the project site is shown on the drawings, and may or may not be identical with the description of the land upon which the project is to be built.

G. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, unloaded, ready for assembly, installation, etc., as applicable in each instance.

H. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

I. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

J. Installer: The term "installer" is defined as the entity (person or firm) engaged by the Contractor, its subcontractor or sub-subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (installers) be expert in the operations they are engaged to perform.

K. Testing Laboratory: The term "testing laboratory" is defined as an independent entity engaged to perform specific inspections or tests of the work, either at the project site or elsewhere, and to report, and (if required) interpret results of those inspections or tests.

L. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended to be the minimum for the work to be performed or provided. Except as otherwise specifically indicated, the actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are either minimums or maximums as noted, or as appropriate for context of the requirements. Refer instances of uncertainty to Architect for decision before proceeding.

M. Specialists, Assignments: In certain instar specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements should not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; they are also not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "experts for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

N. Trades: Except as otherwise indicated, the use of titles, such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradespersons of that corresponding generic name.

O. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual work abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in sections at first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular.

1.05 DRAWING SYMBOLS:

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., seventh edition.

B. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/Engineer for clarification before proceeding.

1.06 INDUSTRY STANDARDS:

A. General Applicability of Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, applicable standards of the construction industry have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies where bound herewith. Refer to other contract documents for resolution of overlapping and conflicting requirements which result from the application of several different industry standards to the same unit of work.

Refer to individual unit of work sections for indications of which specialized codes and standards the Contractor must keep at the project site, available for reference.

B. Reference Standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work.

C. Non-referenced Standards are hereby defined as having no particular applicability to the work, except as a general requirement of whether the work complies with standards recognized in the construction industry.

D. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.

E. Copies of Standards: The contract documents require that each entity performing work be experienced in that part of the work being performed. Each entity is also required to be familiar with recognized industry standards applicable to that part of the work. Copies of applicable standards are not bound with the contract documents.

1. Where copies of standards are needed for proper performance of the work, the Contractor is required to obtain such copies directly from the publication source.

2. Although a certain number of copies of these standards may be required as a part of the submittal, the Architect/Engineer reserves the right to require the Contractor to submit additional copies of these standards as necessary for enforcement of the

F. Abbreviations and Names: Where acronyms or abbreviations are used in the specifications or other contract documents they are defined to mean the industry recognized name of the trade association, standards generating organization, governing authority or other entity applicable to the context of the test provision. Refer to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.

1.07 GOVERNING REGULATIONS/AUTHORITIES

A. General: The procedure followed by Architect / Engineer has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing contract documents, recognizing that such information may or may not be of significance in relation to Contractor's responsibilities for performing the work. Contact governing authorities directly for necessary information and decisions having a bearing on performance of the work.

1.08 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipt for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

END OF SECTION

SECTION 01 26 14 REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 SUBMISSION PROCEDURES

A. Requests for additional information beyond that given in Contract Documents will be considered only when the request is in writing and fully documented on the form provided by contractor.

B. Prior to submitting a request conduct a review to determine that the information requested is not shown in the Contract Documents.

C. UNACCEPTABLE REQUESTS:

1. Requests that are confirmation of unauthorized changes to the work will be considered invalid.

2. Requests that are requests for substitution will be considered invalid.

D. Requests for Information will not be considered without Contractor's recommended solution.

E. Contractor may be backcharged by Owner for costs incurred by Architect related to responding to Requests for Information under the following conditions:

1. If information is already contained in Contract Documents.

2. If excessive time is required to resolve Contractor's remedial work.

3. If excessive time is required to evaluate Contractor's proposed solution.

4. If excessive time is required to evaluate Contractor's proposed substitution.

1.02 SUBMISSION REQUIREMENTS

A. RFI FORM

1. RFI Number: Sequential number starting with 1.

a. Number re-submissions with same number as original and add letter designation 01, 02, 03, etc., in order submitted until resolution is achieved.

2. Brief Description: Summary of content of request.

3. Date Issued: Date RFI is submitted to Architect.

4. Response Requested By: Date response is requested.

a. Allow at least 7 days for response.

b. Indicate if information requested is critical to project progress.

5. Contractor and Subcontractor/Supplier: Name, address, contact and phone number of Contractor and Subcontractor/Supplier.

6. Cost Impact: Indicate if RFI will affect Contract Cost.

7. Schedule Impact: Indicate if RFI will affect Project Schedule.

8. Detail/Drawing Reference: Indicate detail number and drawing number related to RFI.

9. Specification Reference: Indicate Specification Section and paragraph number related to RFI.

10. Information Requested: Description of information requested. Attach drawing or other documents required to clarify request.

11. Contractor's Recommended Solution: Description of Contractor's proposed solution. Attach drawing or other documents required to clarify Solution.

1.03 ARCHITECT'S RESPONSE

A. ARCHITECT'S REVIEW:

1. Allow seven (7) calendar days after receipt for Architect's response.

2. If more than ten (10) requests are received in one week Architect will schedule and extend response time as required to accomplish the reviews.

B. RFI FORM - PORTION FILLED OUT BY ARCHITECT/ENGINEER.

1. Response: Architect/Engineer response, Date Received, Response By, Date Answered.

2. Contractor is Directed To:

a. Proceed - No Cost or Time Impact: Contractor is directed to proceed with work described in response with no Contract cost or Time impact. Notify Architect prior to proceeding if Contract cost or Time impact will occur.

b. Do Not Proceed - Provide Cost Proposal: Contractor is directed to submit a cost proposal to Architect for the work described in response.

c. Proceed - Provide Cost Proposal: Contractor is directed to proceed with work described in response and to submit a cost proposal to Architect for the work within seven (7) days of date of response.

d. Proceed - Time and Materials: Contractor is directed to proceed with work described in response and to submit daily Time & Material worksheets to Inspector for verification.

3. RFI Classification: Architect will classify RFI as follows:

a. Information in Contract Documents: RFI is not valid because the information requested is contained in the Contract Documents.

b. Remedial Work: Response constitutes remedial work to repair completed construction that is deemed not in compliance with the Contract

Documents.

c. Unknown Condition: RFI is valid because it addresses an unknown condition.

d. Proposed Substitution: RFI is not valid because it is a request for substitution and should have been submitted with the Substitution Request form described in Section 01 62 00.

e. Confirmation: RFI is not valid because it is a request for confirmation of direction previously given.

f. Clarification: RFI is valid because the response provides information to assist Contractor in the execution of the Work.

END OF SECTION

SECTION 01 29 01 SCHEDULE OF VALUES/APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Submit Schedule of Values to Architect for review.

1.02 RELATED SECTIONS

A. GENERAL CONDITIONS.

B. SUBMITTALS: Section 01 33 01.

PART 2 – PRODUCTS

2.01 SCHEDULE OF VALUES

A. When reviewed by Architect, use as basis for Contractor's applications for payment.

B. Submit no later than 15 days after issuance of Notice to Proceed, and no later than 15 days prior to first application for payment.

C. Itemize portions of Work to facilitate monthly review to determine value of work completed.

D. Include proper share of Overhead and Profit with each item; do not list separately.

E. SUPPORTING DATA: As required by Architect to substantiate correctness of schedule.

F. After acceptance, modify only to show approved change orders at end of schedule; do not modify individual line items.

2.02 APPLICATION FOR PAYMENT

A. Submit on form acceptable to Architect.

B. Prior to first application, establish a cut-off date agreeable to the Inspector to determine period to which all applications will apply.

C. Prior to submission to Architect, obtain Inspector's approval and signature.

D. Submit one (1) original and two (2) copies of application with Contractor's and Inspector's original signatures. Electronic or faxed copies will not be accepted.

END OF SECTION

SECTION 01 31 14 ADDITIONAL REQUIREMENTS FOR DSA REVIEWED PROJECTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Additional requirements for projects reviewed by the Division of the State Architect (DSA).

B. DSA Forms:

1. DSA-6 – Verified Report.

2. DSA-103 – Statement of Structural Tests and Inspections.

1.02 RELATED SECTION

A. Section 01 45 29 –Testing Laboratory Services

B. Section 01 77 01 – Execution and Closeout Requirements: Project closeout requirements.

1.03 REFERENCES

A. The publications listed below form a part of this Section to the extent referenced. The publications are referred to in the text by the basic designation only. Refer to Section 01 42 00 for definitions, acronyms, and abbreviations.

B. Standards, manuals, and codes refer to the latest edition of such standards, manuals, and codes in effect as of the date of issue of this Project Manual, unless indicated otherwise in CBC Chapter 35 and CFC Chapter 80.

C. California Code of Regulations (CCR).

1. Title 8, Division 1, Chapter 3.2 – California Occupational Safety and Health Regulations (Cal/OSHA).

2. Title 8, Division 1, Chapter 4, Sub-Chapter 4 – Construction Safety Orders.

3. Title 8, Division 1, Chapter 4, Sub-Chapter 7 – General Industry Safety Orders.

4. Title 19, Division 1 – State Fire Marshal (SFM).

5. California Code of Regulations, Title 24, Part 1 – California Administrative Code.

a. All Code Section numbers in this Section refer to Chapter 4 “Administrative Regulations for the Division of the State Architect – Structural Safety”, Group 1 “Safety of Construction of Public Schools”.

D. Division of the State Architect Interpretation of Regulations Manual (DSA IR)

1. DSA IR A-6 – Construction Change Document Submittal and Approval Process.
2. DSA IR A-7 – Project Inspector Certification and Approval.
3. DSA IR A-8 – Project Inspector and Assistant Inspector Duties and Performance.
4. DSA IR A-12 – Assistant Inspector Approval.

E. Division of the State Architect Website: www.dsa.dgs.ca.gov

1.04 GENERAL REQUIREMENTS

A. Contractor‘s Duties:

1. Comply with California Administrative Code, Chapter 4, Article 6, Paragraph 4-343, “Duties of the Contractor” in addition to the duties described in the Contract Documents.
2. Comply with CCR Title 8, Division 1, Chapter 3.2, California Occupational Safety and Health Regulations (Cal/OSHA).
3. Comply with CCR Title 8, Division 1, Chapter 4, Sub-Chapter 4, Construction Safety Orders.
4. Comply with requirements of CCR Title 19, Division 1, State Fire Marshal (SFM).

B. Architect’s and Architect’s Consultants’ Duties: Comply with requirements of California Administrative Code, Chapter 4, Article 6, Paragraph 4-341, “Duties of the Architect, Structural Engineer or Professional Engineer” and Paragraph 4-344, “Duties of Mechanical and Electrical Engineers”, in addition to the duties described in the Contract Documents.

C. Arbitration: DSA is not subject to arbitration proceedings.

D. Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the DSA approved documents wherein the finished work will not comply with Title 24, California Code of Regulations (CCR), a Construction Change Document (CCD), or a separate set of Drawings and Specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work.

1.05 REGULATORY REQUIREMENTS

A. Perform all work in accordance with applicable laws, codes, ordinances, rules, and regulations including, without limitation, 2022 California Building Code (CBC) Parts 2 through 5, Part 9, and Part 12 in accordance with the 2022 Title 24, Part 1, 4-305. Maintain a copy of these documents at the project site at all times.

B. Codes adopted by the City, County, State, and Federal agencies govern minimum project requirements. Comply with the latest edition of applicable regulatory requirements and standards unless otherwise indicated or specified.

C. Work as described in Drawings and Specifications shall not be construed as to permit work not in accordance with applicable laws, codes, ordinances, rules, and regulations.

1.06 INSPECTION AND SUPERVISION

A. Supervision by DSA shall be in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-334.

B. Owner will select and pay for the services of a Project Inspector, certified and approved by the Architect, the Structural Engineer when applicable, and DSA in accordance with Title 24, Part 1, 4-333(b).

1. When required, Owner will select and pay for the services of additional full-time Assistant Project Inspector(s) certified and approved by DSA in accordance with DSA IR A-12.

C. Project Inspector shall have and maintain on the job at all times, the edition of Title 24, Part 1 through Part 6 referred to in the Drawings and Project Manual per Title 24, Part 1, 4- 342(b)3.

D. Project inspector shall inspect construction in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-333(b), “Inspection by a Project inspector”, and Article 6, Paragraph 4-342, “Duties of the Project Inspector” ; and DSA IR A-8.

1. Project Inspector performance rating by DSA shall be in accordance with DSA IR A-8, Section 2, “DSA's Rating of the inspector’s Performance”.

E. Reports: Project Inspector shall submit the following in accordance with DSA IR A-7.

1. Notice of Start of Construction: Notify DSA of start of construction in accordance with California Administrative Code, Chapter 4, Article 5, Paragraph 4-331.

2. Semi-Monthly Reports: Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-337.

3. Verified Reports: Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-336.

F. Special Inspection Requirements:

1. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-333(c), “Special Inspection”.

2. Special inspection costs to be paid by Owner.

3. Conduct special inspection in accordance with DSA–103, Statement of Structural Tests and Inspections.

1.07 TESTING AGENCY REQUIREMENTS

A. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4-335, “Structural Tests and Special Inspections”.

B. Owner will select the Testing Agency, acceptable to DSA, with the advice of Architect and Structural Engineer.

C. Sampling and testing shall be performed by properly qualified persons in accordance with applicable American Society for Testing and Materials (ASTM) standards.

D. Conduct tests in accordance with DSA-103, Statement of Structural Tests and inspections.

E. Submit one copy of test reports to DSA.

1.08 SUBSTITUTIONS AND REQUESTS FOR INFORMATION

A. Substitutions and Requests for Information (RFIs) that affect structural safety, fire and life safety, access compliance, or energy (as applicable) are Construction Change Documents and shall be submitted to DSA for review and approval prior to fabrication and installation on the project.

1.09 ADDENDA AND CONSTRUCTION CHANGES

A. Comply with California Administrative Code, Chapter 4, Article 5, Paragraph 4–338, “Addenda and Construction Changes”.

1. Addenda and Construction Changes, including supplementary drawings when applicable, shall be signed and stamped by the Architect and approved by DSA in accordance with Title 24, Part 1, 4-338.

B. Comply with DSA IR A-6.

C. Obtain DSA approval for changes to DSA approved Drawings and Specifications which affect Code-regulated construction and inspection/testing functions prior to start of that Work. Code-regulated construction refers to Work that is regulated by Code provisions applicable to public school construction, including those adopted by Division of the State Architect-Structural Safety Section (DSA/SS), Division of the State Architect-Access Compliance Section (DSA/AC), and Division of the State Architect-Fire and Life Safety Section (DSA/FLS).

1. All changes, substitutions, and Requests for Information (RFIs) that affect Structural Safety, Fire and Life Safety, Access Compliance, or Energy, as applicable, shall be submitted to DSA for review and approval as a construction change document prior to commencement of the Work in accordance with Title 24, Part 1, 4-338.

D. Changes can be approved by DSA through the CCD Category A or the CCD Category B review process, as applicable. Comply with DSA IR A-6, Article 3, Section 3.1, “CCD Category A” and DSA IR A-6, Article 3, Section 3.2, “CCD Category B”.

1. CCD Category A is defined as changes to or affecting the Structural, Access, or Fire-Life safety portions of the Project.

2. CCD Category B is defined as changes not affecting the Structural, Access, or Fire-Life safety portions of the Project.

E. Do not begin any work under addendum or construction changes until required DSA written approval is obtained.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 32 15 PROGRESS SCHEDULE

1.01 SUMMARY

A. Prepare and submit estimated progress schedule for Work.

B. Submittal of schedule is Contractor's representation that schedule meets requirements of the Contract.

1.02 REQUIREMENTS

A. Schedule should represent a practical plan to complete the work within the Contract Time.

B. A completion date beyond the contractual completion date is not acceptable.

C. If completion date is earlier than the contractual completion date Owner will not consider time extension requests until the contractual completion date is reached.

D. Show early start date, late start date, duration, early finish date and late finish date for each activity using the Critical Path Method.

1. Float is the time between the early finish date and late finish-date of an activity, or the time between a scheduled completion date and the contractual completion date.

2. Float is a resource available to Contractor and Owner and may be appropriated by either party without creating a compensable delay for the other, or affecting the right of the appropriating party to recover actual or liquidated damages for delay by the other party.

1.03 ALLOWANCE FOR ADVERSE WEATHER

A. The contract duration does not include allowance for normal adverse weather.

1.04 ACTIVITIES

A. Include each item described in Schedule of Values in sufficient detail to facilitate review of monthly progress payment.

B. Include the following activities with minimum calendar day durations noted:

1. Preparation of punch list, 3 days.

2. Correction of punch list items, 7 calendar days.

C. Include activities for required submittals. Refer to Section 01 33 01.

D. 3 week look ahead schedules

1. Provide 3 week look ahead schedules for the duration of construction.

1.05 UPDATES

A. Update schedule at mid-point of construction and when time extensions of more than two weeks have accumulated.

END OF SECTION

SECTION 01 33 01 SUBMITTALS

PART 1 GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 DESCRIPTION

A. Work Included:

1. To ensure that specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its review and acceptance or rejection by Architect.

2. Make all following submittals to Architect and/or Owner's Representative for review, in strict accord with provisions of this Section:

a. Subcontractor List

b. Progress Schedule

c. Schedule of Values

d. Shop Drawings

e. Product Data/Material Lists

f. Samples

g. Substitutions

h. Deferred Approvals

i. Request for Information (RFI)

j. Electronic Data Transfer

k. Certifications

l. Maintenance/Operating Manuals

m. Record Drawings

n. Guarantees

o. Extra Stock

B. Related Requirements:

1. Test reports: Pertinent Specification Sections.

2. Individual submittals required: Pertinent Specification Sections.

PART 2 PRODUCTS

2.01 PROGRESS SCHEDULE

A. Prepare and submit estimated progress schedule for work within 10 calendar days after issuance of Notice to Proceed. Submit up-dated schedules:

1. At mid-point of construction.

2. When time extensions of more than two weeks are necessary.

B. Relate progress Schedule to entire Project. All work shall be completed as described in the contract documents. It is the responsibility of the Contractor to provide a preliminary construction schedule, for approval by the Owner, identifying all critical milestone dates delineating the necessary sequencing and durations of activities for final completion of the project in accordance with the contract documents. It is expected that the contractor will accommodate critical PJUSD and/or Pierce High School operations by adjusting schedule of work including any interruptions or closures to specific areas on the Pierce High School Main Campus. This will be determined prior to mobilization. Include the following:

1. Dates for starting and completion of various sub-contracts.

2. Dates for submission of required submittals.

2.02 SCHEDULE OF VALUES

A. Before first Application for Payment, submit for the Architect and Owner's Representative approval a Schedule of Values of various portions of work, aggregating total Contract sum, divided so as to facilitate payment to Subcontractors, prepared in such form as Architect, Owner's Representative and Contractor may agree upon, and supported by such data to substantiate its correctness as the Architect and Owner's Representative may require. Breakdown shall include separation of site work from building work for all main categories including electrical, plumbing, concrete, etc. Separations shall also be provided for each building of a multiple building contract. Include proper share of overhead and profit with each item in Schedule of Values. This Schedule, when approved by Architect and Owner's Representative, shall be used as basis for Contractor's applications for payment. Payment shall not be released until Schedule of Values is accepted.

B. Schedule of Values shall appear similar to the following list. It shall be detailed at least as shown and portions shall not be more largely grouped so as to reduce its length unless appropriate to the scope of the Work. Mobilization/Start-up is limited to 2% on contracts greater than $1,000,000 and 4% on contracts less than $1,000,000. Contract closeout to be a minimum of 2%.

Mobilization/Start-up

Temporary Facilities
Grading
Paving
Building Concrete
Site Concrete
Concrete Reinforcement
Lumber
Millwork/Trim
Structural Steel/Metals
Rough Hardware
Hollow Metal Doors
Single Ply Roofing
Water Proofing
Insulation
Glass and Glazing
Caulking and Sealants
Ceramic Tile
Lath and Plaster
Drywall
Acoustical Ceiling
Paint/Wall Coverings
Finish Flooring
Finish Hardware
Toilet Accessories
Fire Extinguishers
Signage
Toilet Partitions
Plumbing – Site
Plumbing – Building
HVAC/Sheet Metal
Electrical - Site
Electrical - Building
Landscaping - Irrigation
Landscaping - Planting
Chain Link Fencing
Asphalt Striping
Labor/Supervision
Cleanup
Contract Closeout

2.03 CERTIFICATIONS

A. Where specifically indicated by pertinent Specification Sections, submit proper certification of recognized producer or association in lieu of or in addition to testing. Certification shall attest to product's compliance with requirements of Contract Documents. Provide certifications on enclosed forms.

B. Certifications for this project shall include:

1. Fire System Test Certificate

2. Statement of Fire Alarm Test & Operation, FLS-2

3. Certificate of Chlorination and Sterilization

4. Certificate of Compliance for Building Materials

2.04 SHOP DRAWINGS

A. Submit shop drawings as a copy of the original set maintained by the Contractor. Shop drawings are to include the name of the project, the name of Contractor and are to be numbered consecutively. Provide legible and complete copies in every respect. Provide quantity as described below. Do not reproduce bid document drawings in lieu of Contractor or subcontractor produced shop drawings.

B. If shop drawings show variations from Contract requirements because of standard shop practice or other reason, make specific mention of such variations in letter of transmittal, as well as on drawings, in order that (if acceptable) suitable action may be taken for proper adjustment of the Contract Documents. Unless specific changes have been noted and approved, no deviations from Contract Documents will be accepted.

C. If the shop drawings are accepted or rejected, all reviewed and stamped copies will be distributed to all parties. If corrections are required, the Contractor is responsible for making the necessary corrections and re-submitting the shop drawings in a timely fashion as to not affect the project schedule. The Contractor must secure final acceptance prior to commencing work involved.

2.05 PRODUCT DATA/MATERIAL LISTS

A. Manufacturer's Standard Schematic Drawings:

1. Modify drawings to delete information, which is not applicable to the Project.

2. Supplement standard information to provide additional information which is applicable to the Project

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.

1. Clearly mark each copy to identify pertinent materials, products or models. Mark out or remove all extraneous information.

2. Show dimensions and clearances required.

3. Show performance characteristics and capacities.

4. Show wiring diagrams and controls.

2.06 SAMPLES

A. Samples: Physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.

1. Include identification on all samples including product and material and location of proposed work.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of product or material, with integrally related parts and attachment devices.

2. After review, samples may be used in construction of project.

C. Field samples and mockups:

1. Erect at project site at location acceptable to Architect.

2. Construct each sample or mockup complete, including work of all trades required in finished work

2.07 SUBSTITUTIONS

A. Architect's Approval Required:

1. Contract is based on materials, equipment and methods described in Contract Documents.

2. Architect will consider proposals for substitution of materials, equipment and methods only when such proposals are accompanied by full and complete technical data and all other information required by Architect to evaluate proposed substitution. Substitution shall be submitted with completed Substitution Request Form. A copy of the form is provided at the end of this section.

3. Do not substitute materials, equipment or methods unless such substitution has been specifically approved for this work by Architect.

B. "Or Equal": Whenever, in Contract Documents, any material, process or specified patent or proprietary name and/or by name of manufacturer is indicated, such name shall be deemed to be used for purpose of facilitating description of material and/or process desired, and shall be deemed to be followed by the words "or equal" and Contractor may offer any material or process which shall be equal in every respect to that so indicated or specified; provided, however, that if material, process or article offered by Contractor is not, in opinion of the Architect, equal in every respect to that specified, then Contractor must furnish material, process or article specified or one that in opinion of Architect is equal thereof in every respect.

C. Coordination: Approval of substitution shall not relieve Contractor from responsibility for compliance with all requirements of Drawings and Project Manual, and Contractor shall be responsible at his own expense for any changes in other parts of his own work or work of others which may be caused by approved substitution.

2.08 MAINTENANCE/OPERATION MANUALS

A. General: Contractor shall incorporate in Maintenance/Operation Manual(s) all brochures, manufacturer's catalogs and written instructions for equipment and materials needing regular care or maintenance; i.e., carpets, resilient flooring, architectural finishes, mechanical and : electrical equipment and other items as required elsewhere in project documents. Prepare all such manuals in durable plastic loose leaf binders sized to accommodate 8-1/2" x 11" sheets with following minimum data:

1. Identification on or readable through, front cover stating general nature of manual.

2. Neatly typewritten index of all contents.

3. Site plan and building plans indicating location of equipment referenced (reduced scale).

4. Complete instructions regarding operation and maintenance of all equipment involved.

5. Complete nomenclature of all replaceable parts, their part numbers, current cost and name and address of nearest vendor of parts.

6. Copy of all guarantees and warranties issued.

7. Copy of approved shop drawings (reduced scale) with all data concerning changes made during construction.

B. Extraneous Data:

1. Where contents of manuals include manufacturer's catalog pages, clearly indicate precise items included in the Project installation and delete, or otherwise clearly indicate, all manufacturer's data with which the Project installation is not concerned.

C. Materials shall be organized in a logical and consistent manner, by specification section number, with separating tabs clearly marked.

2.09 RECORD DRAWINGS

A. General:

1. At time of installation, installed locations of all underground work, including plumbing and electrical, shall be recorded on prints by Contractor, and reviewed with Inspector. Record drawings are to be maintained and adjusted on a daily basis by the Contractor.

2. All information entered on drawings copy shall be neat, legible and emphasized by drawing "clouds" around changed items. Changes shall be made in an

accurate manner by a qualified draftsperson acceptable to Architect. Completed Record Drawings shall be signed by the Contractor.

3. Locate and dimension all work, including stubs for future connections with reference to permanent landmarks or building and indicate approximate depth below finish grade.

4. All symbols and designations used in preparing record drawings shall match those used in the Contract Drawings.

5. Record drawing shall be up-dated monthly, prior to and pursuant to approval of the progress payment application.

6. Record drawing Sign-off:

   a. At such time that the underground work has been completed, all the contractors and sub contractors notes, sketch and miscellaneous drawings documenting installed locations not currently part of the ongoing record drawing set shall be transferred. These updates shall be reviewed for accuracy by the inspector of record and architect. Once all corrections have been completed the inspector shall sign and date the record set coversheet noting it as acceptance of the underground phase of record drawings.

   b. At project completion, the record drawings shall be submitted by the contractor for project inspector and architect review and comment. These will be returned to the contractor for revisions. Once all corrections have been completed the inspector shall sign and date the record set coversheet noting it as acceptance of the completed record drawings. The original record drawings are to be resubmitted to the architect along with a scanned electronic file set in PDF format with file names to matching the drawing titles.

B. Conditions of Payments: Evidence of maintenance of Record Drawings shall be presented to and Owner's Representative and/or Architect monthly before progress payment will be authorized.

2.10 GUARANTEES

A. Standard Guarantee: Provide individual as well as overall guarantees for all work executed under this Contract or any extra work to be absolutely free of all defects of workmanship and materials for a period of two years from the date of filing of Notice of Completion and acceptance by Owner. Repair and make good all such defects and repair any damage to other work caused thereby which may occur during same period at no cost to the Owner.

B. Indicate on Guarantee Form, specific provisions required by individual specification sections. List all special requirements, extended periods, bonding, etc.

C. Additional Guarantees: Provide additional guarantees (in excess) required by Standard Guarantee) where specifically required by pertinent Specification Sections.

D. Index: Provide an Index of Guarantees listing each specification section, specific items covered and length of guarantee for each item.

2.11 EXTRA STOCK

A. Provide all extra stock and materials as described in the individual specification sections, to the Owner at time of final acceptance. Materials shall be inventoried in writing, clearly marked and packaged neatly with quantities as required. Contractor is required to obtain written acceptance of delivery from Owner's representation.

2.12 REQUESTS FOR INFORMATION (RFI)

A. Requests for additional information (RFI's) beyond that set-forth in the Contract Documents will be considered when the request is in writing and fully documented. Requests must state the source and reason for the request; identify specific references within the Contract Documents pertinent to the request; and supply all supporting information to assist the Architect in his/her response. Verbal responses to such requests are to be considered informational; official response will only be given in writing.

1. Submit all RFI's on standard form provided in the Project Manual and numbered consecutively.

2. Allow a minimum of 72-hours for review by the Owner’s Representative and/or Architect. Additional time may be required for more complex issues.

3. Provide suggested solution on standard RFI form where indicated.

4. Provide detailed cost estimate for all RF'Is that are anticipated to exceed $500 in extra costs to the Owner.

B. Because RFI's are used for clarification or Construction Document interpretation purposes, the response will be issued back to the Contractor in the space provided on the standard RFI form. More complex issues requiring Contract Document revisions and/or which may result in a change in cost to the Contract will be handled using an Architect's Supplemental Instruction (ASI). RFI's and ASI's will not be used to address simple or minor coordination or construction issues which can normally be addressed quickly and easily by the Contractor or in conjunction with the Contractor and Architect. RFI's deemed unnecessary or frivolous by the Architect will be returned to the Contractor for reconsideration or will be rejected. RFI's so returned shall be removed from the RFI log and noted as unnecessary.

2.13 ELECTRONIC DATA TRANSFER

A. Requests for Electronic Data will be considered upon receipt of written request by the Contractor accompanied by a signed copy of the Electronic Data Request Form (included with this Project Manual). Request should clearly outline specific drawings desired and the intent of the request.

1. Submit Electronic Data Request Form on standard form.

2. Allow 72 hours minimum for review and consideration by Architect.

B. Electronic data files are not a part of the Contract Documents, but rather a convenience for the Contractor in preparation of his required submittals and layout efforts. Electronic files do not alter the content or meaning of the hard copy documents, which may be a part of the Contract Documents.

C. The electronic data files will remain the property of the Architect, shall not be used for any other purpose than that purpose stated in the Electronic Data Request Form, and shall not be released by the Contractor or any subcontractor to any other party without written consent from the Architect.

D. The electronic data files are distributed for reference only. Transferring such files can alter, delete or change original information. Accuracy of the data cannot be guaranteed as correct or complete and the Contractor accepts full responsibility for any and all inaccuracies, regardless of cause.

E. The hard copy documents, including addenda and subsequent written changes to the documents, represent the complete work of the Contract. All electronic files should be cross-referenced to the Contract Documents by the user and verified from that the information included contains all of the necessary Contract information. It is the Contractor's responsibility to make any changes or revisions to the electronic data files as necessary.

F. Architect may, at his complete discretion and without explanation, approve or deny any and all requests for electronic data.

PART 3 EXECUTION

3.01 SUBMISSION REQUIREMENTS

A. Contractor is responsible for the scheduling of submittals in order to avoid detrimental impact to the construction schedule and to support the timely sequence of the Work. Allow a minimum of 15-working days for submittal review by the Architect. Complex submittals or submittals which are not provided as complete packages may take longer than 15-working days for review. Contractor should allow time for potential rejection and re-submittal of submittals which are being offered as substitution to the specified products.

B. All mechanical and all electrical submittals, excluding underground work, shall each be packaged together so that all products/components for these two major disciplines are transmitted to the Architect as a single submittal package for review.

C. Contractor shall review submittals for completeness, coordination and conflicts between subcontractors and other work in the Contract Documents. Submittals made by Contractor which are not thoroughly reviewed by the Contractor will be returned. Submittals, which vary significantly from the Contract Documents and are not so identified prior to submission, will be returned to the Contractor without review.

D. Make submissions within following number of days from issuance of Notice to Proceed or Start Letter:

1. Items needed in initial stages of Work or requiring long lead-time for ordering: 15 calendar days.

2. All electrical, mechanical and equipment items: 21 calendar days.

3. All other items, including all finish samples, which cannot be reviewed without having all of the samples or submittals together at one time: 30 calendar days.

4. Deferred Approval Items: 21 calendar days.

E. All submittals shall be accompanied by Submittal Transmittal addressed to the Architect. Each submittal transmittal shall:

1. Be consecutively numbered.

2. Re-submittals to have same submittal number as the original submittal with an alphanumeric suffix.

3. Indicate specification section number. (Separate submittals are required for each specification section involved).

4. Include proper number of copies, as required in "Number of Copies Required" below.

5. Contain index of items submitted, properly identified with drawing numbers, etc.

6. Substitutions shall be accompanied by a completed Substitution Request Form (included with the Project Manual).

F. Before submitting a shop drawing or any related material to Architect, Contractor shall: review each such submission for conformance with the means, methods, techniques, sequences, and operations of construction, and safety precautions and programs incidental thereto, all of which are the sole responsibility of the Contractor, approve each such submission before submitting it, and so stamp each such submission before submitting it. Architect shall assume that no shop drawing or related submittal comprises a variation unless the Contractor advises the Architect otherwise via a written instrument, which is acknowledged by the Architect in writing.

G. Architect will check submittals for conformance with design concepts of project. Approval by Architect covers only such conformance. Effort will be made by Architect to discover any errors, but responsibility for accuracy and correctness of all submittals shall be with the Contractor.

H. Approval of submittals will be on a general basis only and shall not relieve the Contractor from their responsibility for proper fitting and construction of the Work, nor from furnishing materials and labor required by the Contract, which may not be indicated on the submittals when approved.

I. No portion of the work requiring submittals shall be commenced until the submittal for that portion of the work has been approved by Architect. All such portions of work shall be in accordance with the approved submittals. Any work performed without

approved submittals will be done so at the Contractor's own risk. Work found not to be in compliance with the approved submittals shall be removed and corrected at the Contractor's own expense.

J. Number of Copies Required - Contractor shall submit following number of copies:

1. Progress Schedule: one electronic copy (PDF)
2. Schedule of Values: one electronic copy (PDF)
3. Certifications: 3 copies
4. Shop Drawings: one electronic copy (pdf) or 3 copies.
5. Product Data/Material lists: one electronic copy (pdf) or 3 copies.
6. Samples: As specifically indicated in pertinent specification section.
7. Samples for Color/Pattern Selection: One set of manufacturer's complete range for initial selection, and three (3) samples as requested of selected color/pattern for inclusion in final color boards. As color selection is dependent on multiple submittals, it is critical that all items requiring color decisions be submitted as early as possible and at the same time. Selections will not be finalized until all color dependent selection submittals are received.
8. Maintenance/Operations Manuals: 1-hard copy, plus 1-electronic copy pdf format acceptable to Owner
9. Record Drawings: 1-hard copy on green bond paper, plus 1-electronic copy pdf format
10. Guarantees: 1-hard copy, plus 1-electronic copy pdf format
11. Deferred Approvals: 3 copies
12. Electronic Data Requests: 1-copy

K. Submittals shall include (where applicable):

1. Date and revision dates.
2. Project title and number.
3. The names of Architect, Contractor, Subcontractor and supplier or manufacturer.
4. Identification of product or material.
5. Relation to adjacent structure or material.
6. Field dimensions, clearly identified as such.
7. Specification section number.

8. A blank space for Architect's stamp.

9. Contractor's stamp on each initialed or signed, certifying that submittal was reviewed, field measurements have been verified and submittal is in compliance with the applicable specification section and the overall Contract Documents.

L. Incomplete, inaccurate or non-complying submittals requiring revisions, re-submittal and additional review time, shall not be considered as a basis for Contract time extension.

3.02 REQUIRED SUBMITTALS

A. Various specification sections specifically state information to be submitted.

B. Submittals are required for all materials even though the submitted material may be exactly as specified in the Project Manual.

END OF SECTION

SECTION 01 41 00 REGULATORY REQUIREMENTS

1.01 REQUIREMENTS INCLUDED

A. Work of this contract is subject to the requirements of Group 1, Chapter 4, Part I, Title 24, CCR as follows:

1. Addenda and construction change documents per Section 4-338, to be approved by the Division of the State Architect.

2. Inspector and continuous inspection of work per Section 4-333(b) and 4-342.

3. Special inspection per Section 4-333(c).

4. Administration of construction per Part I, Title 24, CCR; duties of architect and structural engineer per Section 4-333(a) and 4-341; duties of contractor per section 4-343.

5. A copy of Part I through VI and Part IX of Title 24 to be kept and be available in the field during construction.

6. Division of the State Architect to be notified on start of construction per Section 4-331.

1.02 CODES IN EFFECT

A. The codes that govern this project include but are not necessarily limited to the following:

1. 2022 Building Standards Administrative Code, CCR, Title 24, Part 1

2. 2022 California Building Code (CBC), CR, Title 24, Part 2

3. 2022 California Electrical Code (CEC), CCR, Title 24, Part 3

4. 2022 California Mechanical Code (CMC), CCR, Title 24, Part 4

5. 2022 California Plumbing Code (CPC), CCR, Title 24, Part 5

6. 2022 California Fire Code (CFC), CCR, Title 24. Part 9

7. 2022 California Referenced Standards Code, CCR, Title 24, Part 12

8. 2022 California Energy Code Part 6, Title 24 CCR

9. 2022 California Green Building Standards (CALGreen) Code. Part 11

10. Title 19 CCR, Public Safety, State Fire Marshal Regulations with current amendments.

11. California amended NFPA 72, National Fire Alarm Code 2022 Edition

12. NFPA 13 Automatic Sprinkler Systems 2022 Edition

13. NFPA 14 Standpipe Systems 2019 Edition

14. See U.L. Standard 1971 for "Visual Devices".

END OF SECTION

SECTION 01 42 22 STANDARDS AND ABBREVIATIONS

PART 1 - GENERAL

1.01 STANDARDS

A. References to known Standards mean and include those editions as are adopted by the California Building Standards Code which is effective as of the date of issue of the Project Manual.

1.02 ABBREVIATIONS

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
AGA	American Gas Association
AIA	American Institute of Architects
AIA	American Insurance Association (successor to NBFU)
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standards Committee
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	APA- The Engineered Wood Association
ASTM	American Society for Testing & Materials
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating, & Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BIA	Brick Institute of America
BSI	Building Stone Institute
CBC	California Building Code
CBM	Certified Ballast Manufacturers
CCR	California Code of Regulations
CEC	California Electrical Code
CFC	California Fire Code
CFMG	Cabinet and Fixture Manufacturers Guide
CLFMI	Chain Link Fence Manufacturing Institute
CMC	California Mechanical Code
CPC	California Plumbing Code
CRA	California Redwood Association
CRS	Concrete Reinforcing Steel Institute
CS	Commercial Standard (US Dept. of Commerce)
DSA	Division of the State Architect
DVBE	Disabled Veteran Business Enterprise

ESC	Elevator Safety Code
ETL	Electrical Testing Laboratories
FGMA	Flat Glass Marketing Association
FS	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IGCC	Insulating Glass Certification Council
ILI	Indiana Lime Institute
IPCEA	Insulated Power Cable Engineers Association
ISO	Insurance Services Office
MIA	Marble Institute of America
MLSFA	Metal Lath/Steel Framing Association
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters (See AIA)
NIST	National Institute of Standards and Technology
NCPWB	National Certified Pipe Welding Bureau
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NHLA	National Hardwood Lumber Association
NSF	National Sanitation Foundation
NWWDA	National Wood Window and Door Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard
RETMA	Radio Electronic Television Manufacturers Association
RIS	Redwood Inspection Service
SAMA	Scientific Apparatus Makers Association
SFM	State Fire Marshal
SIGMA	Sealed Insulating Glass Manufacturers Association
SMACNA	Sheet Metal & Air Conditioning Contractors National Assoc.
SPR	Simplified Practice Recommendation (US Dept. of Commerce)
SSPC	Steel Structures Painting Council
SWRI	Sealant, Waterproofing, and Restoration Institute
TCA	Tile Council of America
Title 19	California Code of Regulations - Public Safety
Title 24	California Code of Regulations -Building Standards, 2022 Edition
UL	Underwriters' Laboratories, Inc.
USDA	US Department of Agriculture
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

END OF SECTION

SECTION 01 45 29 TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 RELATED SECTIONS AND DOCUMENTS

A. Geologic Hazards & Soils Report.

B. Section 01 77 01 Contract Closeout.

C. Individual Specification Sections: Inspections and tests required, and standards for testing.

1.03 REFERENCES

A. Title 24, Part 1, CCR.

B. Title 24, Part 2, CCR, California Building Code, 2022 edition.

1.04 SELECTION AND PAYMENT

A. Testing laboratory shall be approved by the Architect.

B. Owner will employ and pay for services of an independent testing laboratory to perform specified inspection and testing. Retesting costs for failed tests will be the Contractors responsibility and will be back-charged against the contract.

C. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.05 LABORATORY REPORTS

A. After each inspection and test, promptly submit two copies of laboratory report to Owner, Architect, and Contractor.

B. Include:

1. Date of issue
2. Name of inspector
3. Date and time of sampling or inspection
4. Identification of product and Specification Section
5. Location in the Project
6. Type of inspection or test
7. Date of test
8. Results of test

9. Conformance with Contract Documents

C. When requested by Architect, provide interpretation of test results.

1.06 LIMITS ON TESTING LABORATORY AUTHORITY

1. Laboratory may not release, revoke, alter or enlarge on requirements of Contract Documents.

2. Laboratory may not approve or accept any portion of the work.

3. Laboratory may not assume any duties of Contractor.

4. Laboratory has no authority to stop the work.

1.07 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used, which require testing, along with proposed mix designs. Allow reasonable time for review and testing.

B. Arrange for, and coordinate with, laboratory for all required testing and inspection. Provide adequate notice, in advance, for proper scheduling and processing of testing.

C. Cooperate with laboratory personnel, and provide access to the work and to manufacturer's facilities.

D. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at the source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

E. Notify Architect, Structural Engineer (when applicable) and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.

END OF SECTION

SECTION 01 50 00: CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 WORK INCLUDED

A. Furnish and install temporary facilities and controls as hereunder specified, plus other unspecified temporary facilities, including labor, materials, services, utilities and equipment, as may be required for proper performance of the Contract, except as otherwise provided. Temporary facilities and controls required for this work include, but are not necessarily limited to:

1. Temporary utilities.
2. Field office.
3. Sanitary facilities.
4. Construction equipment.
5. Enclosures and barricades.
6. Temporary shoring.
7. Dewatering measures
8. Temporary signs (to include USDA signage).
9. Site controls and parking.
10. Winterization.
11. Fire alarm and intrusion alarm.
12. Fire safety during construction and demolition
13. Existing conditions.
14. Meetings.

B. Related Work Specified Elsewhere

1. Permanent utilities: Pertinent Specification sections.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. General: Temporary facilities and controls shall be approved by local, state and federal authorities and regulatory agencies having jurisdiction, including insurance companies, with regard to safety precautions, operation and fire hazard. Contractor shall contact local authorities prior to start of work to coordinate local requirements.

B. Refer to General Conditions

1.04 PRODUCT HANDLING

A. Protection: Use all means necessary to protect and maintain temporary facilities and controls in proper and safe condition throughout progress of work.

B. Replacements: In event of loss or damage, immediately make necessary repairs and replacements, as approved by Architect at no additional cost to Owner.

PART 2 PRODUCTS

2.01 TEMPORARY UTILITIES

A. General: Provide water, electricity, gas, fire protection and other specified utility services required during construction and extend temporary service lines to construction areas to allow use by all trades and subcontractors.

B. Temporary Water:

1. Provide ample supply of potable water for construction purposes from sources off site, and pay all costs for such water.

2. Provide temporary connections to source and sufficient hose or pipe to carry water to every required part of construction.

C. Temporary Electrical Facilities:

1. Electrical Service: Owner will provide such temporary electrical power and facilities as necessary to supply lighting for work operations and power for portable power driven tools and for testing.

2. Payment for Electrical Energy Used: Owner will make application for temporary service from serving utility company and pay for electric service and energy used.

3. Construction Requirements: Constructor will maintain all temporary electrical facilities in accordance with division of Industrial Safety "Electrical Safety Orders" (ESO), Public Utilities Commission "Rules for Overhead Line Construction" (G.O. 95), and requirements of equipment used for these facilities shall be in good and safe condition, but need not be new.

D. Temporary Heat and Ventilation:

1. Provide heat and ventilation as required to protect work and materials and to keep humidity down to extent required to prevent corrosion of metal and to prevent dampness or mildew which is potentially damaging to materials and finishes. In addition, provide heat and ventilation prior to and during specific work operations, as follows:

    a. For 7 days previous to placing of interior finish materials and throughout application of drywall, painting and laying of resilient flooring materials, provide sufficient heat to produce temperature of not less than 65 degrees F.

    b. After finishing trades are completed and until final acceptance or occupancy by Owner, provide sufficient heat to maintain temperature of not less than 60 degrees.

2. Fuel, equipment and method of heating and ventilating shall be approved by Architect.

2.02 FIELD OFFICE

A. Provide field office on site. Office shall be of temporary form of construction with wood floor; water proof; weather-tight, and well lighted and ventilated; or equivalent trailer office; as approved, Office and equipment shall remain property of Contractor and shall be removed by him upon completion of work.

B. Provide electric outlets for lighting and power and make provisions for adequately heating and cooling field office.

2.03 SANITARY FACILITIES

A. Toilet Facilities: Provide sufficient suitably enclosed chemical toilets with urinal for use by all crafts engaged on project. Location shall be approved by Architect

B. Washing Facilities: Provide properly mounted and adequate wash sinks connected to water supply, in location as approved by Architect.

C. Drinking Water Facilities: Provide clean, sanitary and adequate drinking water.

2.04 CONSTRUCTION EQUIPMENT

A. General: Provide and maintain barricades, shoring, pedestrian walkways including attached lights, other lights, and other safety precautions to properly guard against personal injury and property damage as prescribed by authority having jurisdiction; including insurance companies.

B. Attention is directed to Safety Orders issued by State of California, Division of Industrial Safety. Contractor shall obtain copies of such Safety Orders as are applicable to type of work to be performed, shall be governed by requirements thereof in all construction operations, and shall fully inform subcontractors and material suppliers as to the requirements of applicable Safety Orders.

C. Contractor's Corporation Yard: Locate where shown or agreed on with Owner and Architect. Enclose with fence and gates as required for security, and as approved.

D. Maintain Owner furnished 6' high temporary fencing around entire work area to keep unauthorized personnel from equipment, structure, utilities, etc. Protect work in place from damage, including fields, roads, landscaping, etc.

2.05 TEMPORARY SIGNS

A. Signs or advertising are not permitted, except Contractor's name may be placed on his field office and equipment, unless otherwise approved by the Owner.

B. The Contractor will place a project sign at a location designated by the Owner. This sign measuring 4' X 8', will be made of 3/4" exterior grade plywood and adhere to the format and details given on the sheet at the end of this section. If the project sign is to be combined with another agency's required project sign, then USDA approval must be obtained through the Owner. A professional sign painter will prepare the sign. The Temporary Construction Sign for Rural Development Projects specification sheet is provided in the Project Manual.

2.06 SITE CONTROLS AND PARKING

A. Entrance to Work Site: Contractor and his employees shall use certain access roads or entrance ways as indicated on drawings or as agreed to by Owner and Owner's Representative Access shall not interfere with on-going operations (if any). Maintain these roads in satisfactory condition during the contract time, and repair damages attributable to work of this project at intervals as needed. At completion of Contract, roads and entrance ways shall be left in condition at least equal to that existing at start of Contract, except as may be otherwise required by Contract Documents.

B. Temporary access roads are to be provided by and completely removed by the Contractor upon completion of work. Place material such as base rock to provide and maintain safe access to temporary facilities, temporary parking and all areas of work required for continuing operations during winter months so that work may proceed in accordance with project schedule. Contractor is to restore these areas to condition at least equal to that at start of Contract or improve as required in the Contract Documents.

C. Site Storage and Work Areas: Owner's Representative will allocate available on-site storage and work areas to Contractor, subject to change as may be necessary by job progress, such as site development or other intervening work. If necessary, Contractor shall obtain off-site facilities for storage at his expense.

D. Regulations: Observe and comply with rules and regulations in effect at occupied campuses or other facilities, including, but not restricted to, parking and traffic regulations, security restrictions, hours of access, and the like.

E. Use of public Sidewalks and Streets (if applicable): Make arrangements with public authorities for temporary use of streets and sidewalks for offices, shops, storage, etc. Abide by rules, regulations, and ordinances, obtain permits, and pay fees therefore.

F. Debris Control: Keep work and storage areas clean and free of debris. Dispose of debris off premises, as it accumulates, Pay all fees required for use of public dumps. Burning on premises is prohibited.

G. Dust Controls:

1. Indoor Operations: Control dust resulting from indoor construction operations by localizing it to greatest practicable extent using temporary partitions, curtains, or other means which will prevent spread of dust beyond immediate work area Duct openings and other openings communicating with other parts of building shall have effective temporary closures.

2. Outdoor Operations: Use water wagons or spray from hoses to control dust created by outdoor work operations. Comply with all local and state dust control ordinances.

H. Dewatering Facilities: Provide and maintain dewatering and pump facilities to keep site reasonably dry, and to protect materials and installed work from water damage until dewatering is no longer required. Dewatering shall also include dewatering of trenches and footings due to surface run-off or sub-surface drainage facilities encountered, interrupted or damaged. Contractor is responsible for providing proper drainage and conditions at utility trenches, footing excavations or any other excavation as necessary for completing backfilling and compaction operations.

I. Temporary Shoring: Provide all necessary shoring at trenches or other excavations as required to stabilize the trench or excavation walls. Shoring shall be provided in strict accordance with applicable statutes, laws, ordinances, rules, and regulations of authorities having jurisdiction

J. Security: Contractor is responsible for security of areas of his work during entire time of Contract. Make good all damages to the work and loss of materials due to vandalism or theft, within this responsibility. This includes damages due to construction activities caused to existing facilities.

K. Parking: On-site parking after occupancy may be limited or may not be permitted during the school year due to limited existing conditions. Check with Owner's Representative to ascertain parking availability at Yuba College and DO NOT park on-site if not permitted.

2.07 WINTERIZATION

A. Provide winterization preparations as required for the full duration of the project. Necessary efforts shall be taken to ensure that work may proceed on the project during normal, expected weather conditions based on the project schedule.

B. Access onto and around the site shall be maintained during wet conditions by placement of gravel or other material. Such materials shall be removed to allow installation of specified finish material.

C. On-site water shall be collected and controlled until storm drainage and roof drain systems are complete, to prevent damage or delay due to runoff.

D. Contractor shall take other measures necessary, including but not limited to, temporary roofing, protection of openings, interior conditioning, etc.

2.08 FIRE ALARM, INTRUSION ALARM S FIRE SPRINKLER SYSTEMS

A. During construction, the Contractor shall protect and maintain the fire and intrusion alarm systems and the fire sprinkler protection systems of the completed buildings. Failure to provide such protection and maintenance shall result in the Contractor assuming full responsibility for all existing and new unprotected buildings and property - whether a part of the Contract or not.

2.09 FIRE SAFETY DURING CONSTRUCTION & DEMOLITION

A. During demolition and/or construction phases, the Contractor shall provide fire safety precautions as described in and required by the 2007 California Fire Code, Chapter 14 - Fire Safety during Construction and Demolition. Safety measures include but are not limited to maintaining fire department access, cutting and welding precautions and maintaining water supplies for firefighting purposes.

2.10 EXISTING CONDITIONS

A. Contractor shall record existing site conditions, either by photographs or video, to provide a record of pre-construction site condition.

PART 3 EXECUTION

3.01 MAINTENANCE AND REMOVAL

A. Maintain all temporary facilities and controls as long as needed for safe and proper completion of Work; remove all such temporary facilities and controls as rapidly as progress of Work will permit.

B. Non-compliance with requirements within this section may result in payment being withheld and/or deductive change orders for lack of proper facilities and controls. If necessary, the Owner will provide such facilities and controls required and back-charge the Contractor.

END OF SECTION

SECTION 01 60 00: PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section specifies

1. Basic requirements for products used in the Work.

2. Minimum requirements for use of salvaged, refurbished or reused materials.

PART 2 - PRODUCTS

SALVAGED REFURBISHED OR REUSED MATERIALS

A. At least 10 percent, based on cost, of the total value of materials used on the Project.

B. Do not include, in tabulation, work specified in Specification Divisions 3 through 10, 31, 32, and 33.

RECYCLED CONTENT OF MATERIALS

A. Provide building materials with recycled content such that the post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 10 percent of the cost of materials used for the Project.

B. Provide building materials with recycled content such that the post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 20% of the cost of materials used for the Project.

1. Determine the cost of post-consumer recycled content of an item by dividing the weight of post-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.
2. Determine the cost of post-consumer recycled content plus one-half of pre-consumer recycled content of an item by dividing the weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.
3. Do not include mechanical, electrical, and plumbing components in the calculation. Do not include elevators in the calculation.
4. Recycled content of materials shall be defined in accordance with the International Organization of Standards document ISO 14021 - Environmental Labels and Declarations -. Self-Declared Environmental Claims; Type II Environmental Labeling.
5. Recycled content for products containing steel may utilize the industry average for each process available at www.recycle-steel.org.

2.03 REGIONAL MATERIALS

A. Provide 20 percent of building materials, by cost, that are regionally extracted, harvested, or recovered as well as manufactured within 500 miles of the project site.

2.04 MATERIAL VOLITILE ORGANIC COMPOUNDS

A. Unless local air quality management district requirements are more stringent, for interior applications use adhesives, sealants, and sealant primers that comply with South Coast

Air Quality Management District, Rule No. 1168, effective July 1, 2005 and rule amendment date of January 7, 2005. Use aerosol adhesives that meet Green Seal Standard for Commercial Adhesives GS-36, dated October 19, 2000. Meet the following VOC limit in grams per liter less water, when calculated according to 40 CFR 59.

Wood Glues: 30 grams per liter
Metal to Metal Adhesives: 30
Adhesives for Porous Materials, except wood: 50 grams per liter
Subfloor Adhesives; 50 grams per liter
Plastic Foam Adhesives: 50 grams per liter
Carpet and Carpet Pad Adhesives: 50 grams per liter
VCT and Asphalt Adhesives: 50 grams per liter
Resilient Base Adhesives: 50 grams per liter
Gypsum Board and Panel Adhesives: 50 grams per liter
Rubber Floor Adhesives: 60 grams per liter
Ceramic Tile Adhesives: 65 grams per liter
Multipurpose Construction Adhesives: 70 grams per liter
Fiberglass Adhesives: 80 grams per liter
Contact Adhesives: 80 grams per liter
Structural Glazing Adhesives: 100 grams per liter
Wood Flooring Adhesives: 100 grams per liter
Structural Wood Member Adhesives: 140 grams per liter
Plastic Cement Welding Compounds: 250 grams per liter
ABS Welding Compounds: 325 grams per liter
CPVC Welding Compounds: 490 grams per liter
PVC Welding Compounds: 510 grams per liter
Adhesive Primer for Plastic: 550 grams per liter
Architectural Sealants: 250 grams per liter
Sealant Primers for Nonporous Substrates: 250 grams per liter
Sealant Primers for Porous Substrates: 775 grams per liter
Aerosol General Purpose Web Spray: 55 percent VOCs by weight
Aerosol General Purpose Mist Spray: 65 percent VOCs by weight
Special Purpose Aerosol Adhesives: 70 percent VOCs by weight

PART 3 - EXECUTION - Not Used

END OF SECTION

SECTION 01 61 16: VOLATILE ORGANIC COMPOUND (VOC) RESTRICTIONS

PART 1 GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.02 SUMMARY

A. VOC restrictions for product categories listed below under "DEFINITIONS."

1. California Code of Regulations, Title 24, Part 11 California Green Building

2. Standards Code, “CAL-Green”.

3. CHPS - California Collaborative for High Performance Schools.

B. All products of each category that are installed in the project must comply; applicable laws and ordinances do not allow for partial compliance.

C. Listing of a product in these specifications shall not be construed as a solicitation or requirement to use any product or combination of products in violation of the requirements of South Coast Air Quality Management District Rule No.1168, as described in Rule 1168(g).

1. If a listed product does not meet the requirements of this rule, request approval for use of an alternate product by the same or another manufacturer meeting the requirements of this rule.

2. Do not use products which do not meet the requirements of this rule.

1.03 RELATED REQUIREMENTS

A. Divisions 01 through 33 contain related requirements specific to the work of each of these Sections. Requirements may or may not include reference to this section.

1.04 DEFINITIONS

A. VOC-Restricted Products: All Products of each of the following categories when installed or applied on site:

1. Adhesives, including aerosols, sealants, and sealer coatings.

2. Resilient floor coverings, cove base, accessories.

3. Paints and coatings.

4. Insulation.

5. Gypsum board.

6. Wall coverings.

7. Composite wood and agrifiber products and binder resins used either alone or as part of another product.

8. Other products when specifically stated in the specifications.

B. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

C. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint seaters.

D. Interior of Building: Anywhere inside the exterior weather barrier.

1.05 REFERENCES

A. California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green”.

B. Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.

C. CRI (GLCC) - Green Label Testing Program - Approved Product Categories for Carpet Cushion; Carpet and Rug Institute; Current Edition.

D. CRI (GLP) - Green Label Plus Carpet Testing Program - Approved Products; Carpet and Rug Institute; Current Edition.

E. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.

F. GreenSeal GS-36 - Commercial Adhesives; Green Seal, Inc.

G. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

H. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scscertified.com.

1.06 SUBMITTALS

A. See Section 01 33 01, Submittals Procedures.

B. Evidence of Compliance: Submit for each different product in each applicable category.

1. Identify evidence submittals with the words "CAL-Green LEED VOC Compliance Report".

C. Product Data: For each VOC-restricted product used in the project, submit product data showing compliance, except when another type of evidence of compliance is required.

D. Installer Certifications for Accessory Materials: Require each installer of any type of product, (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.

1. Use the form following this section for installer certifications.

1.07 QUALITY ASSURANCE

A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. General.

1. Provide products conforming to local, State and Federal government requirements limiting the amount of volatile organic compounds contained in the product, for its intended application. If specified product exceeds current requirement, provide conforming product at no additional cost.

2. Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168 and less where required by code.

a. These products may be specified in multiple sections throughout these specifications.

B. Adhesives (Other Than Carpet Adhesives): Comply with Title 24, Part 11, Table 5.504.4.1.

1. Evidence of Compliance: Acceptable types of evidence are:

a. Report of laboratory testing performed in accordance with requirements.

b. Published product data showing compliance with requirements.

c. Certification by manufacturer that product complies with requirements.

C. Joint Sealants: Comply with Title 24, Part 11, Table 5.504.4.2.

1. Evidence of Compliance: Acceptable types of evidence are:

a. Report of laboratory testing performed in accordance with requirements.

b. Published product data showing compliance with requirements.

c. Certification by manufacturer that product complies with requirements.

D. Aerosol Adhesives: Comply with Title 24, Part 11, Table 5.504.4.1. and California Code of Regulations Title 17, Section 94507.

1. Evidence of Compliance: Acceptable types of evidence are:

a. Current GreenSeal Certification.

b. Report of laboratory testing performed in accordance with GreenSeal GS-36 requirements.

c. Published product data showing compliance with requirements.

E. Paints and Coatings: Comply with Title 24, Part 11, Table 5.504.4.3; California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008.

1. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

a. Evidence of Compliance: Acceptable types of evidence are:

1) Report of laboratory testing performed in accordance with requirements.

2) Published product data showing compliance with requirements.

3) Certification by manufacturer that product complies with requirements.

2. Provide coatings that comply with the most stringent requirements specified in the following:

a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

b. South Coast Air Quality Management District Rule No.1168.

F. Resilient Flooring Products: All floor area receiving resilient flooring shall have flooring complying with VOC emission limits in CHPS 2009 criteria and listed on the Low Emitting Materials List or Product Registry or certified under the Resilient Floor Covering Institute (RFCI) FloorScore program.

1. Provide documentation verifying that finish materials are certified to meet pollutant limits. Acceptable types of evidence are:

a. Published product data showing compliance with requirements.

b. Inclusion on one of the following lists:

1) www.chps.net/dev/drupal/node/381

2) www.rfci.com/int_FS-ProdCert.htm

3) www.greenguard.org/default.aspx?tabid=135.

c. Other method acceptable to enforcing agency.

G. Composite Wood and Agrifiber Products and Adhesives Used for Laminating Them: Provide products having no added urea-formaldehyde resins.

1. Evidence of Compliance: Acceptable types of evidence are:

a. Current SCS "No Added Urea Formaldehyde" certification; www.scscertified.com.

b. Published product data showing compliance with requirements.

c. Certification by manufacturer that product complies with requirements.

H. Other Product Categories: Comply with limitations specified in related sections.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. All additional costs to restore indoor air quality, including fines by authorities, due to installation of non-compliant products will be borne by Contractor.

3.02 RESTRICTED COMPONENTS

A. Restricted Components:

SECTION 01 61 16: VOLATILE ORGANIC COMPOUND RESTRICTIONS

1. Paints and coatings shall not contain any of the following:

    a. Acrolein.
    b. Acrylonitrile.
    c. Antimony.
    d. Benzene.
    e. Butyl benzyl phthalate.
    f. Cadmium.
    g. Di (2-ethylhexyl) phthalate.
    h. Di-n-butyl phthalate.
    i. Di-n-octyl phthalate.
    j. 1,2-dichlorobenzene.
    k. Diethyl phthalate.
    l. Dimethyl phthalate.
    m. Ethylbenzene.
    n. Formaldehyde.
    o. Hexavalent chromium.
    p. Isophorone.
    q. Lead.
    r. Mercury.
    s. Methyl ethyl ketone.
    t. Methyl isobutyl ketone.
    u. Methylene chloride.
    v. Naphthalene.
    w. Toluene (methylbenzene).
    x. 1,1,1-trichloroethane.
    y. Vinyl chloride.

3.03 ADHESIVES AND SEALANTS

A. The following tables are taken from South Coast Air Quality Management District Rule No.1168. All products used shall comply with these limits.

Table 5.504.4.1 ADHESIVE VOC LIMIT

Architectural Applications	**Current VOC Limit**
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesive	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50
Ceramic Tile Adhesives	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50
Cove Base Adhesives	50
Multipurpose Construction Adhesives	70
Structural Glazing Adhesives	100
Single Ply Roof Membrane Adhesives	250

VOC Limits and Effective Dates**				
Specialty Applications	Current VOC Limit	1-1-05	7-1-05	1-1-07
PVC Welding	510			
CPVC Welding	490			
ABS Welding	400		325	
Plastic Cement Welding	350	250		
Adhesive Primer for Plastic	650		550	
Computer Diskette Manufacturing	350			
Contact Adhesive	80			
Special Purpose Contact Adhesive	250			
Tire Retread	100			
Adhesive Primer for Traffic Marking Tape	150			
Structural Wood Member Adhesive	140			
Sheet Applied Rubber Lining Operations	850			
Top and Trim Adhesive	540			250
** The specified limits remain in effect unless revised limits are listed in subsequent columns.				

For adhesives, adhesive bonding primers, or any other primer not regulated by the above two tables and applied to the following substrates, the following limits shall apply:	
Substrate Specific Applications	Current VOC Limit
Metal to Metal	30
Plastic Foams	50
Porous Material (except wood)	50
Wood	30
Fiberglass 80	

Table 5.504.4.2 SEALANT VOC LIMIT

If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.	
Sealant	Current VOC Limit
Architectural	250
Marine Deck	760
Nonmembrane Roof	300
Roadway	250
Single-Ply Roof Membrane	450
Other	420
Sealant Primers	Current VOC Limit
Architectural Non Porous Porous	 250 775
Modified Bituminous	500
Marine Deck	760
Other	750
For low-solid adhesives or sealants the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(32); for all other adhesives and sealants, VOC limits are expressed as grams of VOC per liter of adhesive or sealant less water and less exempt compounds as determined in paragraph (b)(31).	

3.04 PAINTS AND COATINGS

A. Architectural Paints and Coatings shall comply with VOC limits in Table 1 of ARB Architectural Coatings Suggested Control Measure, California Code of Regulations, Title 24, Part 11 California Green Building Standards Code, “CAL-Green” Table 5.504.4.3. All products used in this category shall comply with these limits, unless more stringent local and regional rules apply.

Table 5.504.4.3 VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS (See Notes 2 & 3 below)

Grams of VOC per Liter of Coating, less water and less exempt compounds	
COATING CATEGORY	Current VOC Limit 1/1/2012
Flat Coatings	50
Nonflat Coatings	100
Nonflat High Gloss Coatings	150
Specialty Coatings	
Aluminum Roof Coatings	400
Basement Specialty Coatings	400
Bituminous Roof Coatings	50
Bituminous Roof Primers	350
Bond Breakers	350
Concrete Curing Compounds	350
Concrete / Masonry Seaters	100
Driveway Seaters	50
Dry Fog Coatings	150
Faux Finishing Coatings	350
Fire Resistive Coatings	350
Floor Coatings	100
Form-Release Compounds	250
Graphic Arts Coatings (Sign Paints)	500
High-Temperature Coatings	420
Industrial Maintenance Coatings	250
Low Solids Coatings (See Note 1 below)	120
Magnesite Cement Coatings	450
Mastic Texture Coatings	100
Metallic Pigmented Coatings	500
Multicolor Coatings	250
Pretreatment Wash Primers	420
Primers, Seaters and Undercoaters	100
Reactive Penetrating Seaters	350
Recycled Coatings	250
Roof Coatings	50
Rust Preventative Coatings	250
Shellacs, Clear Shellacs, Opaque	730 550
Specialty Primers, Seaters and Undercoaters	100
Stains	250
Stone Consolidants	450
Swimming Pool Coatings	340
Traffic Marking Coatings	100
Waterproofing Membranes	250
Wood Coatings	275
Wood Preservatives	350

Zinc Rich Primers	340
Note 1: Grams of VOC per liter of coating including water and including exempt compounds	
Note 2: Not Applicable	
Note 3: Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.	

END OF SECTION

Installer Certification Form Follows

SECTION 01 61 16: VOLATILE ORGANIC COMPOUND RESTRICTIONS

ACCESSORY MATERIAL VOC CONTENT CERTIFICATION FORM IDENTIFICATION:

1. Project Name:_____
2. Project No.:_____
3. Architect:_____

USE OF THIS FORM:

1. Because installers are allowed and directed to choose accessory materials suitable for the applicable installation, there is a possibility that such accessory materials might contain VOC content in excess of that permitted, especially where such materials have not been explicitly specified.
2. Contractor is required to obtain and submit this form from each installer of work on this project.
3. For each product category listed, circle the correct words in brackets: either [HAS] or [HAS NOT].
4. If any of these accessory materials has been used, attach to this form product data and MSDS sheet for each such product.

VOC content restrictions are specified in Section 01 6116.

PRODUCT CERTIFICATION: I certify that the installation work of my firm on this project:

1. [HAS] [HAS NOT] required the use of any ADHESIVES.
2. [HAS] [HAS NOT] required the use of any JOINT SEALANTS.
3. [HAS] [HAS NOT] required the use of any PAINTS OR COATINGS.
4. [HAS] [HAS NOT] required the use of any COMPOSITE WOOD or AGRIFIBER PRODUCTS.

Product data and MSDS sheets are attached. CERTIFIED BY (Installer/Manufacturer/Supplier Firm):

Firm Name: _____

Print Name: _____

Signature: _____

Title: _____ (officer of company)

Date: _____

SECTION 01 62 00 PRODUCT OPTIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Design is based on first named product.

B. No cost to be incurred by Owner for the use of second named product or accepted equal.

C. Do not substitute materials or equipment unless specifically accepted by Architect.

1.02 SUBSTITUTIONS

A. Substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to no fault of Contractor.

1. Identify the benefits to Owner either from a reduction of the Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.

2. List proposed benefits to Owner in request for substitution.

B. Whenever a material, process or article is indicated or specified by patent or proprietary name and/or by name of manufacturer and is followed by the words "or accepted equal" such name is used for purpose of facilitating description of material and process desired.

1. Contractor may offer any material, process or article which in his opinion is equal in every respect to that specified.

2. If material, process or article offered by Contractor is not, in opinion of Architect, equal in every respect to that specified, then Contractor must furnish material, process or article specified.

3. Only one request for substitution for each material, process or article will be reviewed.

4. Architect may charge Owner, who will backcharge Contractor, for services rendered in the review of substitutions.

C. Submit requests for substitution with completely filled-out Substitution Request Form, included at end of this Section.

1. Provide product identification, manufacturer's name and address, manufacturer's literature including product description, performance and test data and reference standards, samples and name and address of similar projects on which the product was used, including the date of installation.

2. Submit side by side, item by item comparison of all characteristics of the specified product and the proposed product.

3. Provide statement of effect of substitution on construction schedule.

D. Substitutions indicated or implied on shop drawings or product data submittals will not be

considered if they are without a formal substitution request.

1. Such substitutions will be considered null and void and specified item shall be installed.

E. Acceptance of substitution does not relieve Contractor from responsibility for compliance with requirements of Contract Documents.

F. Contractor is responsible, at his own expense, for changes in the work and re-approvals by authorities having jurisdiction, which are caused by substitution.

G. Substitutions are to be submitted as change orders.

END OF SECTION

SUBSTITUTION REQUEST

TO: *Eagle Architects*

PROJECT: _____

SPECIFIED ITEM: _____

Section No.: _____ Page No. _____ Paragraph No.: _____

Reason for Request: _____

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____

_____

Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of request; applicable portions of data are clearly identified. Attached data also includes a description of changes to Contract Documents which proposed substitution will require for its proper installation. The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:

1. The proposed substitution does not affect dimensions shown on drawings and does not require design changes in the Contract Documents.
2. The undersigned will pay for Architect services and Consultant services involved in the review of and construction costs caused by the request substitution.
3. The proposed substitution will have no adverse affect on the work, the schedule, or specified warranty requirements.
4. Maintenance and service parts will be readily available for the proposed substitution.

The undersigned further states that the function, appearance and quality of the proposed substitution are equivalent or superior to the specified item.

Owner's Benefit [ ] Cost Credit of $_____ [ ] Time Credit of _____ days

[ ] Specified item is no longer available due to no fault of Contractor

The information provided is accurate and true.

Submitted by:

Signature: _____

Contractor: _____

Address: _____

_____

Date: _____ Phone: _____

Attachments: _____

_____

_____

For use by Architect:

[ ] Accepted.

[ ] Not accepted.

[ ] Accepted as noted.

By: _____

Date: _____

Remarks: _____

_____

_____

_____

SECTION 01 65 50 DELIVERY, STORAGE, AND HANDLING

PART 1 - GENERAL

1.01 SUMMARY

A. Protect materials by means including, but not necessarily limited to, those described in this Section.

B. Additional requirements may be specified in specific sections of Divisions 2 through 33.

1.02 MANUFACTURER'S RECOMMENDATIONS

A. Comply with manufacturer's recommendations on product handling, storage, and protection.

1.03 DELIVERY

A. Deliver materials at such time so as not to impede progress of work.

B. Deliver in manufacturer's original containers, with labels intact and legible.

1.04 PACKAGING

A. Maintain packaged materials with seals unbroken and labels intact until time of use.

B. Promptly remove damaged material and unsuitable items from job site, and promptly replace with material meeting the specified requirements.

C. Architect may reject as non-complying such material and products that do not bear identification complying with specifications as to manufacturer, grade, quality, and other pertinent information.

1.05 PROTECTION

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.

B. Protect finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by Owner.

1.06 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Architect.

B. Additional time required to secure replacements and to make repairs will not justify an extension in the Contract Time.

END OF SECTION

SECTION 01 73 29 CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY

A. Perform Gutting, fitting and patching, and excavation and backfill required to complete the Work and to:

1. Provide for installation of ill-timed work.

2. Remove and replace defective work and work not conforming to requirements of Contract Documents.

3. Remove samples of installed work as specified for testing.

4. Provide routine penetrations of non-structural surfaces.

5. Install specified work in existing Construction.

1.02 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affects:

1. Structural elements or systems.
   a. Submit drawings and applicable calculations of proposed modifications.
   b. Make changes required by Architect prior to Architect obtaining County approval.
   c. Make changes required by County prior to proceeding.

2. Weather-exposed elements or systems.

3. Weather-proofing elements or systems.

4. Moisture-resistant elements or systems.

5. Efficiency, operational life, maintenance and safety of operational elements.

6. Visual qualities of exposed elements.

7. Work of Owner or separate contractor.

B. Include in Request:

1. Project Name and location.

2. Location and description of affected work.

3. Necessity for operation.

4. Description of proposed work and products to be used.

5. Alternatives to operation

6. Effect on work of Owner or separate contractor.

7. Written permission of Owner or separate contractor.

8. Proposed date and time work will be executed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Primary Products: Those required for original installation.

B. Product Substitution: Submit request for substitution.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine existing conditions prior to commencing work.

B. Beginning operation is acceptance of existing conditions as they exist.

3.02 PREPARATION

A. Provide temporary supports to ensure structural integrity of Work. Protect other portions of Work from damage.

B. Provide protection from elements for portions of Work exposed by operation.

C. Maintain excavations free from water.

3.03 CUTTING

A. Do not cut structural elements or systems without Architect and Division of the State Architect approval.

B. Employ appropriate installer or fabricator with current experience in the type of material involved.

C. Cut rigid materials using masonry saw or core drill. Obtain approval for use of pneumatic tools.

3.04 PATCHING

A. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

B. At penetrations of fire rated assemblies seal voids with approved fire rated material to full depth of penetrated element.

C. Repair work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.

D. Refinish surfaces to provide even finish to match adjacent finishes.

1. Refinish continuous surfaces to nearest intersection or change in material.

2. Refinish entire unit of damaged assemblies.

END OF SECTION

SECTION 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 – GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Recycling nonhazardous demolition and construction waste.

2. Disposing of nonhazardous demolition and construction waste.

1.02 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement material resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the work.

1.03 SUBMITTALS

A. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

B. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.04 QUALITY ASSURANCE

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

B. Waste Management Conference: Conduct conference at project site.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the work occurring at the project site.

1. Distribute waste management plan to everyone concern within three (3) days of submittal return.

2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated and sold.

2. Comply with Division 01 Section “Temporary Facilities and Controls” for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

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

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

1. Provide appropriately-marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

3.03 DISPOSAL OF WASTE

A. Disposal: Transport waste materials off Owner’s property and legally dispose of them.

END OF SECTION

SECTION 01 76 00: PROTECTINGINSTALLED CONSTRUCTION

PART 1 – GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Recycling nonhazardous demolition and construction waste.
2. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. See Section 02 41 17 “Selective Non-Structure Demolition” for disposition of waste resulting from partial demolition of buildings.

1.02 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement material resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the work.

1.03 SUBMITTALS

A. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

B. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.04 QUALITY ASSURANCE

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

B. Waste Management Conference: Conduct conference at project site.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the work occurring at the project site.

1. Distribute waste management plan to everyone concern within three (3) days of submittal return.

2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated and sold.

2. Comply with Division 01 Section “Temporary Facilities and Controls” for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

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

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

1. Provide appropriately-marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

3.03 DISPOSAL OF WASTE

A. Disposal: Transport waste materials off Owner’s property and legally dispose of them.

END OF SECTION

SECTION 01 77 01: CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

A. Perform operations necessary for closing out the Contract and assisting in Project acceptance.

1.02 FINAL CLEANING

A. At completion of work, remove marks, stains, fingerprints, dust, dirt, and paint drippings.

B. Wash tile, plumbing and other fixtures clean.

C. Clean and polish hardware and other unpainted metals.

D. Remove temporary labels, tags and paper covering.

E. Employ professional window cleaners to clean plastic and glass surfaces and mirrors without scratching or injuring plastic and glass. Leave work bright, clean and polished.

F. Use low-VOC cleaning materials complying with the California, South Coast Air Quality Management District standards.

G. Use vacuum cleaners with High-efficiency particulate air filtration, capable of removing at least 99.97 percent of all airborne particles by particle count at a size of 0.3 microns.

1.03 REQUIREMENTS PREPARATORY TO PROJECT ACCEPTANCE

A. Perform the following prior to scheduling Architect's final Acceptance Tour.

1. Submit certification that no new materials containing asbestos have been included in the work.

2. Remove temporary facilities.

3. Clean building and site.

4. Submit the following documents. A copy of these documents is provided immediately following this section

   a. Fire System Test Certification Form

   b. Megger Grounding Test Certification form

5. Post Instructions for equipment operation and maintenance.

6. Submit Record Drawings.

7. Submit Operation and Maintenance Manuals.

8. Submit Guarantees.

9. Prepare list of items to be completed; review with Inspector; submit with Contractor's and Inspector's signatures.

1.04 ACCEPTANCE TOUR

A. After requirements preparatory to project acceptance have been completed notify

Architect with at least three day's notice to perform acceptance tour.

B. If, in Architect's opinion, too many deficiencies exist, the tour will be terminated.

1. Complete corrective measures and arrange another tour.

2. Owner will compensate Architect for additional acceptance tour and deduct amount paid from Contractor's retention.

C. Contractor or his principal superintendent, authorized to act in behalf of Contractor, to accompany Architect and Inspector on acceptance tour, as well as any principal subcontractors that Architect may request to be present.

D. If work has been completed in accordance with Contract Documents, and no further corrective measures are required, Architect will recommend that Owner accept Project and file Notice of Completion.

E. If work is substantially completed in accordance with Contract Documents, and only minor corrective measures are required, Architect will recommend that Owner conditionally accept Project and file Notice of Completion based upon Contractor's assurance that corrective measures will be completed within shortest practicable time period.

F. If work is not substantially completed in accordance with Contract Documents, and several or many corrective measures are still required, Architect will recommend that Owner not accept project, nor file Notice of Completion.

1. Based on information gathered from acceptance tour, Contractor will be required to complete corrective measures and then call for another project acceptance tour following procedure outlined above.

2. Owner will compensate Architect for additional acceptance tour and deduct amount paid from Contractor's retention.

G. Upon acceptance of Project by Owner submit request for final payment, less retention.

H. Retention payment will be made within sixty (60) days after the date of completion of the work of improvement, the retention withheld by the public entity shall be released, and will not be made until Contractor has filed the required Verified Report (Form 6) with DSA with copy to the Architect.

1. Should corrective measures remain incomplete at time retention is due, provide Owner with security in the form of Cashier's Check or Money Order in exchange for retention.

2. Security to be in an amount twice the agreed estimated cost to accomplish the corrective measures.

3. Owner will retain security until corrective measures are completed.

END OF SECTION

SECTION 01 78 36: WARRANTIES

PART 1 – GENERAL

1.01 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.

C. The Warranty shall commence at the date of substantial completion, unless otherwise written in the Contract for the work.

D. Related Requirements:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Section, apply to this Section.

1.02 DEFINITIONS

A. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

B. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.03 FORM OF SUBMITTAL

A. Provide duplicate copies, notarized or on Contractor and Manufacturer's letterhead.

1. Assemble documents executed by subcontractor, 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 disc (CD) 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.

E. Size: 8½ by 11" for three-ring binder; fold larger sheets to fit.

1.04 WARRANTIES

A. Warranties are intended to protect Owner against failure of work and against deficient, defective and fault y materials and workmanship, regardless of sources.

B. Effective Dates: The Warranty shall commence on the Date of Substantial Completion and expire two (2) years later, except as indicated in other specification sections in the Project Manual.

C. 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.

D. 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.

E. 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.

F. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

G. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse interpretations of Contract Documents.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 78 40 RECORD DRAWINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Maintain Record Drawings at site.

B. Record installed locations of underground, drainage, plumbing, landscape irrigation, and electrical work, including storm drain grate and invert elevations, and stubs for future connections.

C. Locate items with reference to permanent landmarks or buildings and indicate depth below finish grade.

1.02 REVIEW BY INSPECTOR

A. Inspector will verify that Record Drawings accurately show work completed to date before approval of pay requests.

B. Inspector will not approve pay request if Record Drawings are not up-to-date.

1.03 DRAWINGS:

A. Architect will furnish electronic files in AutoCAD 2010 to Contractor when underground work has been completed.

B. Transfer Record Drawing information to electronic files.

C. Emphasize changed items by drawing "clouds" around them.

D. Use same symbols and designations as shown on Contract Drawings.

E. Submit Record Drawings to Architect.

1. Provide one (1) copy of electronic files on compact disc

2. Provide one (1) bond copy signed by Contractor and Inspector.

F. Architect will review Record Drawings for completeness and legibility.

END OF SECTION

SECTION 02 41 17 SELECTIVE NON-STRUCTURE DEMOLITION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of the structure to install the new work.

B. Related Sections:

1. 01 73 29 Cutting and Patching
2. 01 74 19 Construction Waste Management and Disposal
3. 01 76 00 Protecting Installed Construction

1.02 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them.

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

C. Existing to Remain: Existing items of construction that are not to be removed.

1.03 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be salvaged, reinstalled or otherwise indicated to remain the Owner's property, demolished materials shall become the Contactor's property and shall be removed from the site with further disposition at Contractor's option.

1.04 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition work, with starting and ending dates for each activity, and for each Phase indicated on the drawings.
2. Interruption of utility services.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Coordination of Owner's continuing competency of portions of existing building and of Owner's partial occupancy of completed work.

1.05 PROJECT CONDITIONS

A. Owner will occupy portions of the site immediate adjacent to selective demolition area.

1. Conduct selective demolition so Owner operations will not be disrupted.
2. Provide the Architect with not less than 72 hours' notice prior to activities that will affect Owner operations.

B. Maintain access to existing walkways, corridors and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Owner assumes no responsibility for buildings and structures to be demolished.

1. Before building demolition relocate or cover existing the following items

a. Educational delivery tools; e.g. textbooks, notebooks, computers, maps/diagrams or bulletin boards.

b. Furniture; e.g. student and staff desks or book cases.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

E. Fire Protection: Maintain fire protection services during selective demolition operations.

PART 2 – PRODUCTS

2.01 REPAIR MATERIALS

A. Where available and appropriate for use, provide repair materials that are identical to existing materials.

B. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

C. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 – EXECUTION

3.01 EXAMINATION

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

B. Survey the condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.

3.02 EXISTING ROOFTOP MECHANICAL AND ELECTRICAL EQUIPMENT

A. Remove and reinstall existing mechanical and electrical equipment and components that are in the area of the work that interfere with the completion of the work.

3.03 UTILITY SERVICES

A. Notify Owner's Representative five (5) days in advance of disconnecting utility services which will permanently or temporarily disrupt normal operations.

B. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

C. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by the Owner.

1. Provide temporary services during interruptions to existing utilities, as acceptable to the Owner.

D. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving areas to be selectively demolished.

E. Where utility services are required to be removed, relocated or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.

F. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pip or conduit after bypassing.

G. Do not start selective demolition work until utility disconnection and sealing have been completed and verified.

3.04 PREPARATION

A. Dangerous Materials: Drain, purge or otherwise remove, collect and dispose of chemicals, gases, explosives, acids, flammables or other dangerous materials before proceeding with selective demolition operations.

B. Temporary Enclosures: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

3.05 POLLUTION CONTROLS

A. Dust Control: Use temporary enclosures and other suitable methods complying with governing environmental protection regulations to limit the spread of dust and dirt.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding or pollution.

2. Wet mop floors to eliminate trackable dirt, and wipe down walls and doors of demolition enclosure.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.

C. Cleaning: Clean adjacent structures and site improvements of dust, dirt and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

3.06 SELECTIVE DEMOLITION

A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete selective demolition within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically. Conduct work in an order that avoids transporting removed items and debris through areas with completed selective demolition work, and that allows for removal of items before supports for those items are removed in another area.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage adjoining construction to remain. Use hand or small power tools designed for sawing or grinding, not for hammering and chopping, to minimize disturbance of adjunct surfaces. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before staring flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations, and maintain adequate ventilation when using cutting torches.

5. Lower removed structural framing members to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

6. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors or framing.

7. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.

B. Existing Facilities: Comply with the Owner's regulations for using and protecting stairs, walkways, loading docks, building entries and other building facilities during selective demolition operations.

3.07 PATCHING AND REPAIRS

A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.

B. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to the manufacturer's written recommendations.

C. Finishes: Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

3.08 DISPOSAL OF DEMOLISHED MATERIALS

A. Disposal: Transport demolished materials off Owner property and legally dispose of them.

END OF SECTION

SECTION 06 10 00: ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Miscellaneous wood blocking, nailers, and supports.

B. Preservative treated wood materials.

1.02 RELATED REQUIREMENTS

A. General Requirements: Drawings and general provisions of the Contract Documents including General, Supplemental and other Conditions and Division 01, "General Requirements" Sections, apply to the work specified in this Section.

1.03 REFERENCE STANDARDS

A. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016.

B. ASTM D 2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2022.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.

D. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2020.

E. ICC-ES AC308 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2015.

F. PS 1 - Structural Plywood; 2009.

G. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2010.

H. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2017.

1 .04 SUBMITTALS

A. See Section 01 33 01 - Submittal Procedures.

B. Product Data:
   1. Include data for wood-fire retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials

comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

2. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.05 QUALITY ASSURANCE

A. Grading Rules
   1. Lumber (Softwoods):
      a. For lumber sizing, conform to U.S. Product Standard PS 20-05.
      b. Conform to Western Wood Products Association "Standard Grading Rules for Western Lumber", effective March 1, 1998, hereinafter called "WWPA".
   2. Plywood: Conform to "U.S. Department of Commerce Product Standard PS 1-09 "Construction & Industrial Plywood" hereinafter called "PS 1-09".

A. Grade Marks: Show applicable association grade mark and trade mark on each piece of material, or furnish certificate of inspection with each shipment, attesting conformance to specified grades.

B. Standard Specifications For Preservative Treatment: Conform to the standard specifications listed hereinafter as published by the American Wood Preservers Association, hereinafter called "AWPA".

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant and Preservative Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 ROUGH CARPENTRY MATERIALS

A. Lumber Grades - Non-Load Bearing: Furnish the following lumber species and grades for the work specified below, of nominal sizes shown or specified:
   1. Blocking, Backing, Shims and Nailers: Hem-fir "Standard & Btr.", S4S, for 2 x 4 inch nominal size and smaller; Hem-fir "No.3", S4S, for 2 x 6 nominal size and larger.
   2. Sizes and thicknesses as shown on drawings or otherwise specified herein.

B. Grades Of Sanded Softwood Plywood, General Use
   1. Unless otherwise specified, provide conforming to PS 1-09, Group I Douglas Fir Grade "A" Int. APA rotary cut veneer on exposed face and/or

faces with Grade "B" on concealed face veneers; minimum 5-ply for 3/4 inch thickness.
2. Sizes and thicknesses as shown on Drawings or otherwise specified herein.

C. Nails, Screws & Bolts:
1. Furnish carbon steel bolts, square head, ASME B18.2.1 furnished with square nuts, unless noted otherwise on Structural Drawings.
2. Furnish lag bolts ASME B18.2.1, gimlet point, square head, unless noted otherwise on Structural Drawings.
3. Furnish wood screws, ASME B18.6.1, Type 17 point, Flat head, unless noted otherwise on the drawings. Provide stainless steel screws where specified on the drawings.
4. Furnish nails, ASTM F1667, Common, as specified and as approved, unless noted otherwise on Structural Drawings.
5. Provide all necessary nails, spikes, screws and bolts with nuts and washers required for proper installation of rough carpentry and carpenter's steel items.
6. Hot-dip galvanize hardware for exterior work or exposed to moisture.

D. Lumber: Douglas Fir-Larch unless otherwise noted. Lumber designated as Douglas Fir South is not acceptable. All lumber shall be graded under the American Softwood Lumber Standard DOC PS 20-15 and one of the following:

1. Standard Grading Rules, West Coast Lumber Inspection Bureau (WCLIB) or Western Lumber Grading Rules, Western Wood Products Association (WWPA).

2. Standard Specifications for Grades of California Redwood Lumber, current edition - RIS.

E. All lumber shall be new with no re-use except as permitted Architect. Lumber 6x or thicker will be free of heart center without any pitch enclosed within the piece or showing on any surface. Maximum moisture content 19%.

1. Lumber Grades: All lumber grades and plywood shall comply with the following minimum requirements for species and grades unless specifically noted otherwise on the Drawings.

a. General: Douglas Fir Larch as follows:
i. 2x4 No. 1 Vis. Graded
ii. 2x6 No. 1 Vis. Graded
iii. 2x8-2x14 No. 1 Vis. Graded
iv. 3x4-3x14No. 1 Vis. Graded
v. 4x4-4x10 No. 1 Vis. Graded
vi. 4x12-4x16 No.1 Vis. Graded

vii. 6x6-larger Select Structural Vis. Graded

2. Sills: Douglas Fir No. 1; pressure treated with approved preservative, marked or branded by an American Lumber Standards Committee (ALSC) approved inspection agency. Foundation grade Redwood sills may be used only for non-structural stud walls.

3. Blocking, bridging, furring, stripping and nailers - No. 1.

2.02 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative Treated Wood shall bear the quality mark up an inspection agency that maintains continuing supervision, testing and inspection over the quality of the preservative-treated wood. Such inspection agencies shall be listed by an accreditation body which complies with the requirements of the American Lumber Standards Treated Wood Program, or equivalent. The mark shall be stamped on, or a label affixed to the preservative-treated wood, and shall comply with CBC 2303.1.9.1.

PART 3 EXECUTION

3.01 PREPARATION

A. Preparation For Pressure Preservative Treatment
   1. Incising Materials: All lumber and timber members specified herein to be treated shall be incised by a machine having power driven rolls designed to incise to a uniform depth and continuity of predetermined pattern. Timber or lumber less than 3 inches in the least dimension shall be incised on the wide faces only.

B. Drying Of Treated Material: After treatment, dry lumber to a moisture content of 19 or less.

3.02 ROUGH CARPENTRY INSTALLATION - GENERAL

A. Rough Carpentry - General:
   1. Select material sizes to minimize waste.
   2. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
   3. Discard units of material with defects which might impair the quality of the work and units which are too small to fabricate the work with minimum joints or the optimum joint arrangement.
   4. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.

5. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.
6. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
7. All bolts and screws shall be tightened immediately before being covered or closed in.

END OF SECTION

SECTION 06 20 00: FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section specifies interior miscellaneous wood trim.

B. Related requirements specified elsewhere include:
   1. Documents affecting work of this Section include, but are not limited to, Conditions of the Contract and Sections in Division 01 of these Specifications.
   2. Section 09 91 10 - Painting.

1.02 SUBMITTALS

A. Shop drawings of fabricated items and trim including all details of anchorage.

B. Samples of materials for making stain and transparent finish samples. Samples of putty for clear finished woods.

C. Mill grade certificate. if material cannot be marked on a concealed surface.

D. Manufacture's storage, handling and installation instructions.

1.03 QUALITY ASSURANCE

A. Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency identification; except omit marking from surfaces to receive transparent finish.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Wood: Store indoors, in well ventilated area in conditions as described in Chapter 1 of the referenced Manual of Millwork.

B. Stack lumber so that no pieces cantilever. Support wood lumber at maximum of 30-inches on centers. Support wood polymer lumber at maximum 24-inch centers.

PART 2 - PRODUCTS

2.01 MATERIAL

A. Wood - General: Selected for exposed surfaces to meet requirements for WI "Custom Grade" work, Manual of Millwork Table 3-4, unless otherwise indicated.
   1. Interior wood: Dry; with moisture content between 6 and 12 percent, unless otherwise indicated. Milled solid stock; finger joints not permitted.
   2. Finger jointed wood: Not permitted.

B. Wood Trim:
   1. For trim designated to be painted, provide of Hemlock or Ponderosa Pine of nominal sizes shown, S4S.
   2. Construct and form trim to various sizes and shapes as noted and detailed on Drawings.

2.02 FABRICATION

A. General
   1. Mill and fabricate in as long pieces as practical.
   2. Machine all surfaces and ease exposed edges unless otherwise noted.
   3. Finish and assemble at shop to greatest extent possible.
   4. WI manual Sections 10 and 11, "Custom Grade" for transparent finish, unless otherwise indicated.

2.03 ANCILLARY MATERIALS

A. Hardware: Provide self-tapping, flathead drywall screws for securely attaching finish carpentry work to metal stud wall framing and furring. Screws shall be long enough to penetrate structure per the California Building Code regulations.

B. Putty: As proposed by Contractor and approved by Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Before beginning the work specified in this section, carefully inspect the substrate to which the work specified in this section will be applied. Execution of the work specified in this section shall constitute a certification by the Contractor that the substrate is in proper condition to receive subsequent work.

3.02 PREPARATION

A. Separate wood product bundles and condition wood materials for a minimum of 72 hours. Allow wood to achieve prevailing humidity conditions in installation areas prior to installing.

3.03 INSTALLATION

A. Wood Trim: Install with minimum number of joints possible. Use full-length pieces from maximum lengths available. Exposed surfaces free from tool marks, torn grain, cross sanding, and workmanship defects that cannot be concealed by specified finish.
   1. Install level, plumb and true, with members neatly and accurately scribed in place.
   2. Stagger joints in adjacent and related members.
   3. Cope at returns; miter exterior angles, cope interior angles. Produce tight fitting joints with full surface contact throughout length of joint.
   4. Joints: End-to-end scarfed
   5. Set screw heads 1/16 inch for puttying. Clean up trim after installation by sand papering and remove sharp external corners.

3.04 CONSTRUCTION

A. Tolerances
   1. Install the work plumb, level, true and straight with no distortions. Conceal shims.

a. 1/16-inch maximum offset in flush adjoining surfaces.
b. 1/8-inch maximum offset in revealed adjoining surfaces.

2. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

3.05 ADJUSTMENT AND FINISHING

A. Ease salient corners and edges and sand all exposed surfaces of smooth finish wood.

B. Repair damaged and defective finish carpentry work and eliminate functional and visual defects. Chipped or split members are considered a defect.

C. Replace where repair is not possible.

D. Adjust joinery for uniform appearance.

END OF SECTION

SECTION 07 62 00: SHEET METAL FLASHING & TRIM

PART 1 - GENERAL

1.01 SUMMARY

A. Section specifies sheet metal flashings, copings, downspouts and other miscellaneous shop fabricated sheet metal items.
B. Related Work In Other Sections
   1. Documents affecting work of this Section include, but are not limited to, Conditions of the Contract and Sections in Division 01 of these Specifications.
   2. Sealing - Section 07 90 10, Joint Sealing.
   3. Section 09 91 10, Painting.

1.02 QUALITY ASSURANCE

A. Standard Construction Manual: Conform to the construction and recommendation set forth in the "Architectural Sheet Metal Manual of the Sheet Metal & Air Conditioning Contractors National Association, Inc., September 2003 Edition, hereinafter in this Section called "Standard Manual".
B. Performance Requirements: Install work weather-tight and watertight, without waves, warps, buckles, and distortions resulting from fastening or expansion and contraction stresses. Sheet metal and roofing shall make watertight assembly.
C. Design Requirements
   1. In accordance with standards described in the SMACNA "Architectural Sheet Metal Manual," unless otherwise specified.
   2. Allow for expansion and contraction over an ambient temperature range of 60 degrees Fahrenheit.

1.03 SUBMITTALS

A. Samples & Shop Drawings
   1. Submit shop drawings showing the manner of forming, jointing and securing the metal to form flashings and trim. Show expansion joint details and waterproof connections to adjoining work and at obstructions and penetrations.
   2. Submit, for approval, 6 inch length minimum samples, full size, of each different item of formed sheet metal work specified and detailed.

1.04 JOB CONDITIONS

A. Coordination: Coordinate metal flashing and trim work with interfacing of the installation of roofing and other adjoining substrate work for proper sequencing of each installation.
B. Electrolytic Protection: Wherever metals of different galvanic range are to be in contacts provide industry-approved separation by bituminous paint coats, bitumen saturated felts, or tinning, as applicable and approved.

1.05 WARRANTY

A. Warranty
   1. Furnish prepainted sheet metal manufacturer's standard 20-year minimum warranty covering color fade, chalk, and film integrity of factory prepainted sheet metal finish.
   2. Warranty all roof flashings and sheet metal assemblies specified herein watertight and weather-tight for two (2) years from date of substantial completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Stainless Steel Sheets: Type 304, ASTM A167, with AISI #2D finish, dead soft, fully annealed; 22 gauge unless otherwise shown or specified.

B. Unpainted Flashing Sheets: Unless otherwise specified herein or indicated on details, furnish 22-gauge minimum hot-dipped galvanized steel sheet complying with ASTM A924, Grade C, G90 zinc coating designation, or AZ50 zinc-aluminum coated steel, as approved.

C. Solder: Furnish conforming to Fed. Spec. 00-S-571 D, Type AC, Composition Sn50 unless otherwise specified.

D. Soldering Flux: Furnish conforming to Fed. Spec. O-F-506C Type AC or of type recommended by the industry for type of metal being soldered.

E. Fastening & Miscellaneous Materials
   1. Metal, - General: Stainless steel.
   2. Screws and Washers:
      a. Unless otherwise noted or shown, furnish of slotted panhead thread forming ASA Type A, of material specified hereinabove, as applicable; use screws for exposed applications.
      b. Where thread-cutting screws are required, use ASA Type B, of material specified hereinabove, as applicable.
      c. For exterior exposed screws, use dished type plain periphery washers of same material as specified hereinabove, as applicable, plus approved neoprene washer under each metal washer.
      d. Lengths and gauges as required and approved for secure and permanent fastening.
   3. Bolts, Nuts and Washers:
      a. Except as otherwise noted or shown, furnish standard hexagon head or square head bolts, of sizes shown and required for secure and permanent fastening of the work, of material specified hereinabove, as applicable, complete with flat washers and nuts of same material.
      b. On exterior exposed work, include dished type plain periphery metal washers, of same material as bolt, plus approved neoprene washer under each metal washer.

4. Nails: Furnish large headed annularly grooved nails of materials specified hereinabove, as applicable; use nails generally only for concealed application. Where absolutely necessary to expose nail heads, provide approved neoprene washer under head.
5. Rivets: Except as otherwise noted, furnish pop type rivets closed end type, or approved, of materials specified hereinabove, as applicable.
6. Cleats: Same metal and gauge as sheet being anchored, continuous, punched for anchors spaced 12 inches o.c.
7. Flashing Cement: Furnish conforming to Fed Spec. SS-C-153, Type I, asphalt base with asbestos fibers added.
8. Sealant: Furnish Pro-Seal (800/349-7325) "Pro-Seal 34" single component, non-sag, elastoplastic, M34 polycarbon/polycarbonate sealant; no substitutes. Color shall be clear.
9. Silicone Seal System: For spanning gap joints between parapet wall cap flashings, furnish Dow Corning's "123 Silicone Seal" preformed silicone extrusion strip seal system using Dow Corning Dow "791" or Dow "795" silicone sealant. Seal strip color as selected by Architect from manufacturer's standard colors.
10. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance.

2.02 FABRICATION - GENERAL

A. Metal Fabrications - General
   1. General:
      a. Comply with details shown, and with applicable requirements of the SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Comply also with material manufacturer instructions and recommendations.
      b. Shop-fabricate work to greatest extent possible. Neatly form all work to size, shape and dimensions shown or required to fit substrates; make all angles and lines in true alignment. Verify all dimensions at the building.
      c. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work.
      d. Unless otherwise specified, fabricate items in 10 feet maximum sheet lengths, as approved, and hold number of JOINTS?? to a minimum. Shop form, lap, rivet and solder corners and angles into one piece 18 to 24 inches each way from corner or angle.
      e. Form exposed sheet metal work without excessive Oil-canning, buckling and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems; hem all drip legs of copings and flashings at 45 degrees.
   2. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
   3. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.

4. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

2.03 FABRICATED ITEMS

A. Miscellaneous Flashings

1. Furnish all other miscellaneous flashings shown on the drawings but not specifically specified above, constructed of 24 gauge prepainted steel, of configurations and sizes as shown; color as selected in each case.
2. Fabricate miscellaneous formed flashing units with formed joint covers of same material as flashings, for installation behind main members where possible.

PART 3 - EXECUTION

3.01 PREPARATION

A. General: Examine all surfaces to be covered with sheet metal; report any improper of defective previous work and do not proceed with work under this Section until previous defective work is corrected.

3.02 INSTALLATION

A. Sheet Metal Workmanship
1. Except as otherwise shown or specified, comply with the recommendations and instructions of the manufacturer of the sheet metal being installed, and with SMACNA "Architectural Sheet Metal Manual".
2. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves and avoidable tool marks, considering the temper and reflectivity of the metal. Provide uniform, neat seams with minimum exposure of solder, welds and sealant. Except as otherwise shown, fold back the sheet metal to form a hem on the concealed side of exposed edges.
3. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners and expansion provisions wherever possible in exposed work, and locate so as to minimize the possibility of leakage. Cover and seal work as required for a watertight installation.
4. Provide cleat-type anchorages for metal flashing and trim wherever practical, arranged to relieve stresses from building movement and thermal expansion. Erect all work straight, sharp, plumb and level in true plane free of bulges and waves.
5. Install work with laps, joints and seams which will be permanently watertight and weatherproof; make all lap joints with opening away from prevailing winds; laps 3 inches minimum. Install sealant as shown as work proceeds.

B. Miscellaneous Flashings: Install all other miscellaneous flashings shown on the Drawings, securely anchored to adjacent construction.

END OF SECTION

SECTION 07 90 10: JOINT SEALING

PART 1 - GENERAL

1.01 SUMMARY

A. Section specifies joint sealing complete for the following applications:
   1. Interior joints where indicated and wherever there is an exposed joint between materials, which do not fit tightly together.
   2. Sealant where indicated and where required to make building watertight.

1.02 SYSTEM DESCRIPTION

A. Design Requirements: Conform to recommendations of ASTM C 1193
   1. Sealing building envelope
      a. Seal typical building joints with non-sag type sealant.
      b. Seal indicated floor joints with self-leveling type sealant.

B. Performance Requirements
   1. Building envelope
      a. Make watertight and weather-tight.
      b. Exterior work that does not remain watertight and all work which does not retain all properties inherent in the product as stipulated by the manufacturer will be considered faulty.

1.03 SUBMITTALS

A. Manufacturer's product literature and installation instructions for type and grade of product. Indicate sealant chemical characteristics, substrate preparation, limitations and color availability.

B. Sample beads for color selection by Architect.

C. Certification of compatibility by sealant manufacturer of accessory components.

D. Schedule of proposed sealant for each and every type of joint to be filled.

E. Submit SWRI certificate of validation verifying Manufacturer's published specification data.

1.04 QUALITY ASSURANCE

A. Manufacturer of sealant and caulking material to certify that cleaners, joint filler or bond breakers, and primers, for a particular application, are compatible with sealant.

B. Manufacturer certifications: Certify that sealant has been tested for cohesion and adhesion to surfaces onto which the sealant is placed.

1.05 QUALITY CONTROL

A. Mock up: Test sealant for adhesion and cohesion to surfaces in accordance with ASTM C 1521; and for foam sealants, test for expansion onto which the sealant is placed.

1.06 PROJECT CONDITIONS

A. Environmental Requirements
   1. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
   2. Do not apply materials when temperature is below 40 degrees Fahrenheit, or under extreme temperature conditions when joint openings are at maximum or minimum width.

1.07 WARRANTY

A. Provide five year warranty. Include coverage for installed sealants and accessories which fail to achieve watertight seal exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. ChemRex Corporation, Sonneborn, or approved equal.

2.02 MATERIALS

A. General: Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Products of, or certified as compatible by, the approved manufacturer of the sealant or caulking material.

C. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24);
   1. Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

D. Sealants and caulking compounds
   1. Interior caulking compound and acoustical sealant for non-moving joints in dry areas. Siliconized acrylic latex, conforming to ASTM C 834; VOC Content: maximum 42 grams/liter; colors as selected from manufacturer's standard colors.
   2. Interior wet area walls: One-part mildew-resistant silicone rubber conforming to ASTM C920, Type S, Class 25, Grade NS; Dow-Corning 786, GE SDS1702, or equal.
   3. Exterior wall sealant - general purpose: Non-priming, non-sag, one-part polyurethane. Conform to ASTM C 920, Type S, Class 25, Grade NS, Use NT, M, T, A, I, a and Federal Specification TT-S-00230C, Type II, Class A. VOC content Maximum 45 grams/liter; Colors as selected from manufacturer's standard colors.
   4. Floor and pavement sealant: Pourable, self-leveling, two-part polyurethane; ASTM C 920, Type M, Grade P, Class 25, Use T, zero VOC; colors as selected

from manufacturer's standard colors. Minimum Shore hardness of 35.

5. Butyl Sealant: Meeting Federal Specification TT-S-001657, Type I and ASTM C 1311.
6. Sealer Tape for concealed joints between two assembled rigid surfaces in compression: Presstite No. 579.6 as manufactured by Inmont Corporation, Presstite Products Division or "Tacky Tape - SM 5227" as manufactured by Schnee-Moorehead, Inc.; medium density as manufactured by Norton Performance Plastics Corporation, Granville, NY.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Indoor Air Quality:
   1. Temporary ventilation: Provide temporary ventilation during work of this Section.
      a. Coordinate interior application of joint sealants with interior finishes schedule.

A. Before beginning the work specified in this section, carefully inspect the substrate to which the work specified in this section will be applied. Execution of the work specified in this section shall constitute a certification by the Contractor that the substrate is in proper condition to receive subsequent work.
B. Ensure that newly placed surfaces that are to be sealed have fully cured.

3.02 PREPARATION

A. In accordance with manufacturers' instructions
   1. Mask adjacent surfaces where necessary to maintain neat edge.
   2. Joints and spaces to be sealed: Make clean, dry and free of dust, loose mortar and other foreign materials.
   3. Verify that environmental requirements are within tolerance range as recommended by the manufacturer of the sealant.

3.03 APPLICATION

A. In accordance with manufacturers' instructions and ASTM C 1193.

B. Measure joint dimensions and size materials to achieve required width/depth ratios.

C. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Fill joint space completely from back to top, without voids, and tool slightly concave; finish uniformly smooth without laps, sags, or depressions.

3.04 FIELD QUALITY CONTROL

A. Testing: Perform non-destructive test for adhesion and cohesion in accordance with ASTM C1521.

3.05 ADJUSTING

A. Finishing: For work that is exposed to view, tool to a uniform surface with neat, straight edges and no excess material on adjacent surface.

3.06 WASTE MANAGEMENT

A. Separate waste in accordance with the Waste Management Plan

B. Close and seal tightly all partly used sealant containers and store protected in well-ventilated, fire-safe area at moderate temperature.

C. Place used sealant tubes and containers in areas designated for hazardous materials.

END OF SECTION

SECTION 09 91 10: PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section specifies both interior and exterior field painting for all exposed and semi-exposed surfaces.

B. Related requirements specified elsewhere:
   1. Documents affecting work of this Section include, but are not limited to, Conditions of the Contract and Sections in Division 01 of these Specifications.

1.02 DEFINITIONS

A. In accordance with ASTM D16, except that the term "Paint" shall be defined as opaque, transparent, or semi-transparent coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

1.03 DESIGN REQUIREMENTS

A. Design Intent
   1. General
      a. Paint all Work that is normally painted in a building of this type and quality, whether or not the item or surface is specifically identified within the Contract Documents.
      b. Where painting is required, paint all exposed and semi-exposed surfaces.
      c. Non-scheduled items: Provide manufacturer's approved and recommended system as set forth in Manufacturer's "Specifications Architectural Finishes ".
      d. The number of coats specified is the minimum to be applied. The Design Intent is that paint finishes be of even, uniform color, free from cloudy or mottled surfaces. Provide one additional coat required where "deep colors" are required.
      e. Provide split finishes for painted doors and interior windows where different connected room colors are selected.
      f. Touch-up factory paint finishes where damaged.
   2. Specific surfaces to be painted: The listing which follows is intended to provide additional guidance to the Design Intent but it is not intended to be definitive to each and every portion of the Work to be painted.
      a. Paint panelboards and exposed conduits, ductwork and plumbing piping, unless otherwise specified not to be painted.
      b. Paint all exposed and semi-exposed galvanized metal, including projections through and on roofs.
      c. Paint air grilles and other exposed and semi-exposed mechanical and electrical equipment.
      d. Paint reveal moldings, exterior expansion joints, screeds, and interior handrails.
      e. Paint miscellaneous connections, unless otherwise specified not to be painted.
      f. Paint exterior equipment and galvanized metal flashings.
   3. The following items are specifically excluded from painting.
      a. Do not paint bright metal, including but not limited to chromium, copper, nickel, brass, bronze or stainless steel.
      b. Do not paint glass or integral colored materials.
      c. Do not paint surfaces indicated on the Drawings as not to be painted.

d. Do not paint over code-required labels, or any equipment identification, performance rating, name, or nomenclature plates.
e. Exterior concrete flatwork and concrete slab surfaces.
f. Existing areas not affected by work of this project, unless specifically noted otherwise.

1.04 SUBMITTALS

A. Product Data
1. Listing of all materials proposed for use. Identify manufacturer, catalog number and proposed locations and surfaces on which it is to be used.
2. Manufacturer's color wheel identifying of the manufacture's standard and custom colors.
3. Color chip samples from manufacturer for each color selected from the Manufacturer's color wheel.
4. Manufacturers' technical information and application instructions for each material proposed for use.
5. For non-specified but acceptable manufacturers submit side by side comparison showing specified product number and the equivalent manufacturer's product number.

B. Submit 6 samples of each color, sheen, and texture on 8-1/2 by 10-inch hardboard. Label and identify each as to location and application.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements
1. Environmental
a. Verify that formulation of product conforms with local, State and Federal government requirements limiting the amount of volatile organic compounds contained in the product, for its intended application.
b. Conform to Air Pollution Control Rules in the District in which they are applied.
2. Fire Safety: California State Fire Marshal Registration No. C-4.16 for flame and smoke retardant coating on finished wood surfaces.
B. Field Samples: Final acceptance of colors will be from samples applied to actual surfaces on the job. Coat approximately 100 square foot area for each field color. Adjacent to field area coat approximately 10 linear feet of each trim.
C. Pre-Installation Meeting: Prior to the commencement of painting work conduct a pre-installation meeting to discuss the preparation of surfaces to be painted.

1.06 DELIVERY AND STORAGE

A. Store in accordance with manufacturer's printed instructions. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

B. Take all precautions and ensure that workmen and work areas are protected from fire hazards and health hazards resulting from handling, mixing and application of paint materials.

1.07 PROJECT CONDITIONS

A. Do not apply exterior materials during fog, rain or mist. Do not paint exterior materials when inclement weather is expected within the full drying time specified by the manufacturer.
B. Do not paint until surfaces are thoroughly dry and cured.
C. Environmental Requirements
    1. Do not apply paint in rain, fog or mist, or when relative humidity exceeds 85 percent or to damp surfaces, or when temperature is below 55 degrees F or above 90 degrees F unless otherwise expressly approved in writing by paint manufacturer.
    2. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated and dry within temperature and humidity limits specified by paint manufacturer during application and drying periods.

1.08 SCHEDULING

A. Schedule work to avoid painting surfaces when surfaces are exposed to direct sunlight.

1.09 WARRANTY

A. Warrant for 2 years that the painted surface colors will be substantially unchanged and finishes will maintain their specified appearance without blisters, flaking, peeling, scaling, staining or evidence of other forms of defects as defined by the Master Painters Institute, "Maintenance Repainting Catalog of Defects and Failures".

1.10 EXTRA MATERIALS

A. Furnish 1 gallon for each type of finish coat of paint in each color used on the project. Trim colors; 1 gal. Label and correspond to any paint out submittals.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Dunn Edwards Corp., Los Angeles, CA, Sherwin-Williams Company, ICI Paints, Frazee Paint Company, Kelly-Moore, or as indicated on finish schedule, or equal.

2.02 MATERIALS

A. Indoor Air Quality: Provide low or no voc paints and primer systems.

B. Recycled Content: No recycled content paints and primers will be allowed.

C. General
    1. Furnish paints ready-mixed, except for field catalyzed coatings.
        a. Pigments to be fully ground maintaining soft paste consistency, capable of being readily and uniformly dispersed to complete homogeneous mixture.
        b. Paints to have good flowing and brushing properties and be capable of drying or curing free of streaks and sags.
    2. Furnish and use thinners and additives approved by paint manufacturer.
    3. Systems: Furnish primers and other undercoat paint produced by same manufacturer as finished coats.
    4. Cleaners, as recommended by the paint manufacturer:
        a. Dirt: Tri-sodium phosphate

b. Stains on cementitious surfaces: Sodium metasilicate

D. Paint types: Where product is listed by Master Painters Institute product categories provide listed voc compliant product. Where no voc compliant product is listed under the MPI product number, propose and submit product that is equal to those listed and which is voc compliant.
   1. Exterior Paints
      a. Primers/Undercoaters
         1) Surface Tolerant Metal Primer: Rust-Oleum CV740 Alkyd Metal Primer
         2) Epoxy Anti-Corrosive Metal Primer: Rust-Oleum 9100.
         3) Exterior Latex-Based Solid Hide Stain: Kelly Moore KM 1200 Premium Professional Acrylic Exterior Flat
         4) Etching Cleaner: Consult Paint Manufacturer for Recommendation
      b. Secondary and finish opaque coats
         1) Exterior Latex, Gloss: Rust-Oleum 5200 System
         2) Exterior Latex, Semi-Gloss: Kelly Moore Premium Professional Acrylic Exterior
         3) Exterior Latex Flat: Kelly Moore KM 1200 Premium Professional Acrylic Exterior Flat
   2. Interior Paints
      A. Primers/Undercoats
         1. Interior enamel undercoat: Not permitted.
         2. Surface tolerant primer: Rust-Oleum C740 Alkyd Metal Primer
         3. Galvanized primer: Kelly Moore KM 5725 DTM Acrylic Metal Primer
         4. Epoxy anti-corrosive metal primer: Rust-Oleum 9100.
         5. Interior alkyd primer sealer: Not permitted.
         6. Interior latex primer sealer: Kelly Moore KM 971 Acryplex Low VOC Interior PVA Primer
         7. Alkali resistant primer: Kelly Moore KM 247 Acryshield 100% Acrylic Masonry Primer
         8. Etching cleaner: Consult paint manufacturer for recommendation.
      B. Secondary and finish opaque coats
         1. Institutional Low Odor/VOC Interior Latex eggshell: Kelly Moore KM 1010 Premium Professional Interior Eggshell Enamel
         2. Institutional Low Odor/VOC Interior Latex, semi-gloss: Kelly Moore KM 1050 Premium Professional Interior Semi-Gloss
         3. Institutional Low Odor/VOC Interior Latex, gloss: Kelly Moore KM 1680 Dura-Poxy Acrylic Interior Gloss Enamel
         4. Epoxy Cold Cured Gloss: N/A
      C. Stains and clear finishes
         1. Wood Filler Paste: Old Masters Wood Filler
         2. Interior Wood Stain, Semi-Transparent; Old Masters Penetrating Stain

2. 2.03 FINISHES

A. Fabricate paints and stains in accordance with the Color Schedule which will include both standard colors and special, non-standard colors.

B. Deep and ultra colors
   1. If not available in a specified product, propose substitute formula for approval.
   2. Factory mix deep and ultra deep colors.

C. Tint undercoats slightly to approximate finish coat color.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Before beginning the work specified in this section, carefully inspect the substrate to which the work specified in this section will be applied. Execution of the work specified in this section shall constitute a certification by the Contractor that the substrate is in proper condition to receive subsequent work.

B. Inspect and test to ensure that no painting occurs over surfaces where moisture content or alkalinity exceeds that permitted in manufacturer's printed directions.

C. Identify dirt, rust, scale, grease, moisture, scuffed surfaces, and other conditions detrimental to formation of a durable paint film.

3.02 PREPARATION

A. Indoor Air Quality

1. Provide temporary ventilation as specified in Indoor Air Quality (IAQ) Management.
2. Wear protective clothing and respirators when applying oil-based paints or using spray equipment with any paints.
3. Maximize ventilation during application and drying.
4. Isolate area of application from rest of building.
5. Vacate space for as long as possible after application. Wait a minimum of 48 hours before occupying freshly painted rooms.

B. General: In accordance with Referenced Standards for each particular substrate condition.

1. Protect work and surrounding areas from damage.
   a. Mask hardware, accessories, fixtures, before surface preparation or painting.
   b. Remove hardware, accessories and fixtures, if necessary, to complete painting of these items and adjacent surfaces.
   c. Reinstall removed items immediately following completion of painting of each space or area.
2. Make surfaces to be painted clean and dry. Remove bond breakers and curing agents.
3. Provide barrier coats over incompatible primers, or remove and re-prime.
4. Spot prime shop primed materials in field as required and ensure that all surfaces are primed before finished coats are applied.

C. Metal

1. Un-coated and primed ferrous
   a. Scrape and sand as required to remove loose primer, rust, and mill scale. Sand out scratches.
   b. Clean with solvent.
   c. Prime within 3 hours after preparation.
2. Coated ferrous and zinc
   a. Solvent clean with lacquer thinner:
   b. Etch with solution which is approved by the paint manufacture and which will not damage coating or zinc.
   c. Perform cleaning, etching and priming of each segment of galvanized and cadmium coated metal on same day.
   d. Prepare hot-dipped galvanized surfaces for repair in accordance with ASTM A 780.

3.03 APPLICATION

A. In accordance with the coating manufacturers; and in accordance with Master Painters Institute recommendations where MPI recommendations do not conflict with recommendations of the coating manufacturer.

B. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until:
   1. Paint has dried to where it feels firm.
   2. Paint does not deform or feel sticky under moderate thumb pressure.
   3. Application of another coat of paint will not cause lifting or loss of adhesion of the undercoat.

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. Lightly sand and dust first and intermediate coats before succeeding coats are applied. Tint each coat different from preceding coat to approved finish color.

E. Make work uniform without sags, runs, skips or brush marks. Make all edges sharp including interior intersections and transitions between split finishes.

F. Exterior metal primers to be re-coated within the time limits as recommended by the paint manufacturer.

3.04 FIELD QUALITY CONTROL

A. Owner's Representative will review each coat of paint, stain or varnish separately before next coat is applied. Give notice to Owner's Representative when work is ready for review.

B. Furnish Owner's Representative with Tooke Dry Mil Coating Inspection Gage manufactured by Micro Metrics Company.

3.05 CLEANING

A. Clean-up
   1. During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.
   2. Upon completion of work, clean window glass and other paint-spattered surfaces.
   3. Remove oily rags and waste daily.

B. Touch-up
   1. Remove spatters, spots, runs, sags, blemishes and other defects without marring adjacent unpainted surfaces.
   2. Repaint defective surfaces.

3.06 WASTE MANAGEMENT

A. Separate waste in accordance with the Waste Management Plan. Set aside extra paint for future color matches, or reuse by Owner. Where local options exist for leftover paint

recycling, collect all waste paint by type and provide for delivery to recycling or collection facility.

B. Close and tightly seal all partly used paint and finish containers and store protected in well-ventilated, fire safe area at moderate temperature.

C. Place empty containers of solvent based paints in areas designated for hazardous materials.

D. Do not dispose of paints or solvents by pouring on the ground. Place in designated containers for proper disposal.

E. Coordinate with manufacturer for take-back program. Set aside scrap to be returned to manufacturer for recycling into new product. Close and seal all partially used containers of paint to maintain quality as necessary for reuse.

3.07 PROTECTION

A. Provide "Wet Paint" signs as required to protect newly-painted finishes.
B. Do not allow material to enter the storm drain system, sewer system, or the soil.

3.08 PAINT SCHEDULE

A. Exterior systems
   1. Mechanical and electrical equipment, panels, conduits and piping
      a. 1 Coat Kelly Moore KM 5725 DTM Acrylic Primer/Finish (Water Based Option)
      b. 2 Coats Kelly Moore KM 1999 Epic Water Urethane Modified Alkyd Gloss Finish (Water Based Option)
   2. Galvanized steel
      a. 1 Coat Etching Cleaner
      b. 1 Coat KM 5725 DTM Acrylic Primer/Finish
      c. 2 Coats KM 1999 Epic Water Based Urethane Modified Alkyl Gloss Finish
   3. Existing Wood Trim
      a. 1 Coat EZPR00-E2 Prime Premium
      b. 2 Coats KM Premium Professional Acrylic Exterior – Semi-Gloss

3.09 COLOR SCHEDULE

A. Exterior Colors
   1. Color P-1: Exterior Wood Trim, Plywood and framing colors to match adjacent campus colors.
   2. Color P-2: Exterior metal flashing-Colors to match adjacent campus colors.
   3. Color P-3: Exterior Electrical Panel, Misc. Metal, Conduits - Color to match adjacent color.

END OF SECTION

SECTION 10 14 00: SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

A. Section specifies building and site signage of types and contents.
B. Related requirements specified elsewhere:
   1. Documents affecting work of this Section include, but are not limited to, Conditions of the Contract and Sections in Division 01 of these Specifications.

1.02 SUBMITTALS

A. Schedule of identifying devices showing locations, type and copy.
B. Drawings for shop fabricated items with attachment details and instructions.
C. Samples of each type of building mounted sign with mounting accessories for each type of sign.
D. Listing of completed project. Photographic and physical samples as required by the Architect to demonstrate fabricator's qualifications.
E. Submit manufacturer or fabricator certification that exterior grade photopolymer signs will not swell.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements for accessibility signage: California Code of Regulations, 2022 California Building Code, Title 24, Part 2, Chapter 11.
   1. Color and Symbols:
      a. International symbol of accessibility; White figure on blue background, unless otherwise specified or indicated on the Drawings.
      b. Color blue equal to Color number 15090, Federal Standard 595C or otherwise as designated with characters and symbols which contrast from their background.
   2. Braille symbols: Below text.
      a. Contracted Grade 2.
      b. Braille shall be California Contracted (Grade 2) Braille. Dots shall be 0.10- inch on centers in each cell and 0.30-inch on center between corresponding dots in adjacent cells. Dots shall be raised a minimum of 0.025-inch and a maximum of 0.035-inch above the background.
      c. Raise dots a minimum of .025-inch per CBC 11B-703.3.1, above background, as approved by Architect.
   3. Proportions: As indicated on the Drawings or otherwise approved by the Architect.
      a. Width-to-height ratio of between 3:5 and 1: 1.1. Width of the uppercase letter “O” is 60% minimum and 110% maximum of the height of the uppercase letter “I”. (Raised Characters 11B-703.2.4 and Visual Characters 11B-703.5.4.)
      b. Stroke width to height ratio between 1:5 and 1:10 (is from Visual Characters 11B-703.5.7).
      c. Stroke thickness for the uppercase letter “I” shall be 15% maximum of the height of the character (Raised Characters 11B-703.2.6).
   4. Raised letters and numbers:
      a. Raised 1/32-inch; Sans-serif uppercase characters.
      b. Height: As indicated on the Drawings or specified elsewhere; minimum

5/8" high and 2" maximum based on the height of the uppercase letter "I". (Raised characters 11B-703.2.4 and visual characters 11B-703.5.4.)

5. Pictorial Symbol Signs: Minimum 6-inches high with verbal description directly below.
6. Signs and identification devices shall be field inspected after installation and approved by the enforcing agency prior to the issuance of a final certificate of occupancy (11B-703.1.1.2).
7. Characters, pictograms, symbols of accessibility and their background shall have a non-glare finish (11B-703.5.1, 11B-703.6.2 and 11B-703.7.1).

1.04 WARRANTY

A. Guaranty in full, that exterior grade photopolymer sign will not swell, delaminate and keep all specified properties of gloss and color for a period of 3 years.

PART 2 - PRODUCTS

2.01 FABRICATORS

A. Qualifications: Fabricators shall have a minimum of 5 completed projects in the manufacturer of the specific fabrication technique specified for the signage they will furnish for the project.

2.02 SIGNAGE TYPES:

A. Plaque Signage - General: Fabricate the following signs by the specified tactile fabrication process, with eased edges, rounded corners, 1/32 inch raised copy, braille where indicated. Plate: 1/8 inch thick, unless otherwise indicated.
   1. Sign Type S-1 – Accessible Entrance sign: International symbol of accessibility as indicated on drawings.
   2. Sign Type S-2 – Tactile Exit sign: Text and Braille with raised rule line as indicate on drawings.
   3. Sign Type S-3 – Assistive Listening System Available sign: Graphics, text and Braille as shown on drawings.

2.03 FABRICATION

A. Tactile signs
   1. Tactile inscription: 1/32-inch raised inscription, either PYA acrylic or nylon photopolymer resin.
   2. Backing plate: Cast phenolic or polyethylene. Furnish permanently and fully fusion bonded to photopolymer. 1/8 inch thickness unless otherwise indicated. Fabricate with eased edges, rounded corners.
   3. Exterior grade signage: Minimum durometer hardness rating of 90 Shore D, with a manufacturer or fabricator certified 0 percent swell rate in moisture-saturated environments.
      a. Manufactured signs scheduled for mounting at exterior locations or interior locations subject to moisture, high humidity, or sunlight; from a exterior grade photopolymer and backing assembly that has either:

1) Been permanently adhered and then fused by a baking process; or
2) Been permanently laminated with a clear exterior grade adhesive to a .017-inch aluminum alloy. Furnish un-framed; color as selected by Architect from manufacturer's standards.

b. Tested in accordance with ASTM G154, after 300 hours, shall show not peel, fade, or crack.
c. Provide a positive angle of 25-30 degrees, for the shoulder of inscription to backing.

1. After inscribing, coat plaque with baked-on acrylic polyurethane paint. Two (2) colors as selected by Architect, from manufacturer's choice at least 20 standard contrasting colors.
2. Inscription symbols, text and size: As noted on the Drawings.

B. Non-tactile signs: Lettering and pictograms "subsurface" processed.
1. Plates:
a. 0.063-inch matte acrylic face plate laminated to a .12S-inch acrylic back plate.
b. Furnish with a premium colored, 7 year durability rated; vinyl film interlayer as manufactured by 3M Company, or approved equal.
c. Furnish in 2 standard lengths depending upon text. One standard length for text up to 6 characters and one additional length for characters 7 or more characters in length.
d. Provide hole in each corner for mounting hardware
2. Letters and numbers:
a. Contrasting color to face plate.
b. Letters .035 x 1-inch and permanently adhered to either face or backing plate.
3. Edges: Beveled .032-inch.; painted to match film color.
4. Corners: Square
5. Colors: As selected by Architect from [standard] [and premium] film, acrylic and vinyl colors available.
6. Inscription symbols and text: As noted on the Drawings.
7. Non-tactile signs shall comply with 11B-703.5.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Before beginning the work specified in this section, carefully inspect the substrate to which the work specified in this section will be applied. Execution of the work specified in this section shall constitute a certification by the Contractor that the substrate is in proper condition to receive subsequent work.

3.02 INSTALLATION

A. Install sign units level, plumb and free from distortion or other defects in appearance.

B. Install signage in accordance with manufacturers' recommended installation instructions and approved methods as noted on the shop drawings, unless otherwise indicated in the Drawings or Specifications.

1. General: Non-tamper 1/4-inch screw fasteners. Provide fasteners at sign corners and elsewhere along edges at 8-inches on centers.
   a. Substrates
      1) Signs having gypsum board or tackable surface substrate: Round head wood screws long enough to penetrate 3/4 inch into blocking or studs.
      2) Signs having concrete substrate: 3/4-inch long expansion anchors.
      3) Signs having masonry substrate: 3/4-inch long expansion anchors installed into block or brick unit pieces.
   b. Plaques: Specified manufacturer's standard concealed plaque mounting as selected by Architect.

C. Mounting locations
   1. Room identifications signs:
      a. On wall adjacent to strike side of doors at height of 60 inches above finish floor to centerline of sign.
      b. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where a tactile sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door. Where there is no wall space at the latch side of a single door or at the right side of the double doors, signs shall be located on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45° open position. Where provided, signs identifying permanent rooms and spaces shall be located at the entrance to, and outside of the room or space. Where provided, signs identifying exits shall be located at the exit door when approached in the direction of egress travel.
   2. Accessible entrance signs (ISA): Lower bottom corner closest to entrance, of closest adjacent window.
   3. Informational and directional signs:
      a. Scheduled with door: Mounted centered on head of door frame.
      b. Wall mounted: Height of 60-inches to center from finish floor.
   4. Mounting in accordance with code requirements and as indicated and detailed on the Drawings.

END OF SECTION

SECTION 22 00 00: PLUMBING

PART 1 - GENERAL

1.1 RESPONSIBILITY

A. Use only qualified persons experienced in the particular work described herein. Use only new material of the best quality. Install all work in a neat and orderly manner. Coordinate this work with other portions of the project to result in complete operable systems.

1.2 ALTERNATIVE MATERIALS AND METHODS

A. These plans and specifications describe the general scope of the plumbing systems. These plans and specifications do not preclude the submittal of alternative methods or materials. Manufacturer's names and catalog numbers are stated to identify the type and quality of the equipment or materials required for the project.

B. The contractor may submit shop drawings and/or technical information on alternative equipment, materials or installation details to accomplish the intent of the plans and specifications. Approval of the alternative equipment, materials or installation details shall not relieve the contractor of any responsibility for complying with the intent of the plans and specifications. Submit the manufacturers' technical information, shop drawings, and/or written description of alternative methods for each item described by manufacturer's name and catalog number and for each component, equipment, material, or installation detail required.

1.3 WORK INCLUDED IN DIVISION 22:

A. Plumbing systems.

1.4 DIVISION OF WORK BETWEEN DIVISIONS 22 AND 26

A. Close coordination between the electrical and plumbing trades is a part of the work that is required by this contract. No allowance will be made for omissions based on incorrectly assuming another trade will be performing your work. Confirm your scope of work with the general contractor.

B. This section applies only to Divisions 22 and 26. The division of responsibilities between trades supplying equipment in other Divisions may be different. For instance, Division 26 contractor may be required to supply disconnect switches and starters for non-HVAC mechanical equipment supplied under other Divisions.

1. Division 22 Responsibilities:

    a. Assume responsibility for the proper functioning of the plumbing systems in their entirety.
    b. Furnish and install all conductors and conduit required for control of plumbing equipment.
    c. Make all terminations with the exception of power conductors.
    d. Furnish and install all control panels and devices to provide a complete and functional controls system, including all controls transformers.
    e. Furnish and install motor starters for all equipment specified in Division 22.
    f. All electrical work performed under Division 22 shall conform to the requirements of Division 26.

2. Division 26 Responsibilities

    a. Furnish and install all raceways, conduit, disconnect switches, and conductors necessary for electrical power supply.
    b. Make all power supply terminations to motors, starters, disconnect switches, control transformers, and other Division 22 devices.
    c. Coordinate all work with Division 22 contractors.

1.5 WORK NOT DESCRIBED:

A. Include all minor items not typically shown or specified as required to produce complete, operational plumbing systems.

1.6 RULES AND REGULATIONS

A. All work and materials shall comply with the 2022 rules and regulations of:

1. California Building Standards Code (California Code of Regulations, Title-24) as applicable, including the California Building, Electrical, Mechanical, Plumbing, Energy, Fire, and Green Building Standards (CalGreen) Codes.
2. NFPA Standards.
3. Other standards as referenced in individual specification sections.
4. The State Fire Marshal.

1.7 SITE EXAMINATION

A. Thoroughly examine the site and verify the actual work conditions. No extra compensation will be allowed for expenses due to failure to discover site conditions which affect the work.

1.8 PLAN AND SPECIFICATION ACCURACY

A. The plans and specifications are diagrammatic in nature and do not represent exact locations or distances, except where specifically noted. Include all required offsets, bends, and other special fittings. Coordinate with the other building trades and make all modifications required at no extra cost.
B. The plans showing existing plumbing systems show the systems as illustrated on the best available as-built documents and on limited field inspection of the site by the Engineer. Inspect and field-verify actual existing conditions. The plans reflect the desired new configuration. Include all required modifications to implement the new configuration at no extra cost.
C. Plans showing existing buried piping systems reflect information available on existing plans and surface examination at the site. Actual pipe locations, materials, depths, and grades have not been determined. Call the Underground Utility Service Alert hot line 1-800-642-2444 before digging to have existing buried utilities labeled.

1.9 SUBSTITUTIONS AND SUBMITTALS

A. Provide submittals of all data as required in each section of these Division 22 specifications. Submittal data to be sufficient to verify complete compliance with the plans and specifications. Provide complete data even if using materials specified. Conform to the submittal requirements of the General Conditions. Submit in as few packages as possible to expedite the review process.
B. Submit proposed deviations from the plans or specifications in material type, size, configuration, quantity, or routing for Engineer's review. Contractor to pay for all required redesign costs.

Unless otherwise agreed, Contractor shall pay for all additional costs incurred for approved alterations.

1.10 AS-BUILT DRAWINGS

A. Provide and keep up-to-date a complete set of prints which shows every change from the original contract drawings, including change orders. Deliver an as-built set to the Engineer upon project completion and acceptance. Include dimensions, exact locations, and invert elevations of all exterior underground piping.

1.11 SEISMIC CONSTRUCTION

A. Anchor all devices and system components with seismic restraint systems and devices meeting California Building Code requirements, sized to match component weights and installed at intervals as pre-approved by anchorage manufacturer. If required by the local inspector, provide structural calculations.

PART 2 - PRODUCTS

2.1 QUALITY

A. Install only new materials. No used, "seconds", or "blemished" materials may be installed. Do not install materials received in a damaged condition or damaged at job-site. Return all damaged components. Repair of minor and incidental damage, if first approved by Engineer and manufacturer, is acceptable.

2.2 SAFETY

A. Install all equipment with required safety devices, such as belt or coupling guards, heat shields, electrical disconnects, etc.

2.3 EQUIPMENT SUPPORTS, SLEEVES, CHASES, INSERTS, AND OPENINGS

A. Install all sleeves, inserts, anchorages, etc. required for this Division and which are embedded in work of other trades.

PART 3 - EXECUTION

3.1 TESTS

A. When complete, performance test all plumbing systems at one time to the Engineer's satisfaction. No system will be accepted until it proves satisfactory in every detail. Provide Engineer 48 hours notice before testing.

3.2 FOUNDATIONS AND SUPPORTS

A. Install equipment on concrete foundation pads anchored to the slab floor, if shown on the Plans, listed in the Specifications, or recommended by the manufacturer. Anchor equipment to the pad to meet normal load and seismic requirements.

B. Securely attach all equipment, piping, etc. to the building as detailed in the related construction code or as described in these plans and specifications. Allow for expansion and contraction, if applicable.
C. Install vibration isolators under rotating machinery without internal isolation, or other devices capable of producing significant or objectionable vibration.

3.3 CUTTING AND PATCHING

A. Make all cuts and patches required to install the work according to good construction practice. Coordinate all required structural modifications or structural member cutting with the other trades, and only after Engineer's approval.
B. Do not cover concealed piping or other systems installed under this Division until inspected and approved by the Engineer and all other required construction inspectors. If systems are covered up before inspection and approval, Contractor will remove covering and replace after inspection at no extra cost.

3.4 EQUIPMENT IDENTIFICATION

A. All plumbing equipment labeled in the equipment schedule on the plans shall be identified at their location with two (2-ply) laminated layers of permanently bonded ABS/acrylic plastic equipment labels.

3.5 TRAINING, OPERATION, AND MAINTENANCE

A. After all plumbing systems have been tested and accepted, provide at least 4 hours training to the Owner's maintenance crew. Cover operating and maintenance procedures for all plumbing systems and components installed.
B. Submit two (2) bound sets of Operations and Maintenance Manuals (O&M Manuals) to the Owner. Submit a draft copy to the Engineer for approval prior to issuing the final copies. The O&M Manuals shall include, at a minimum:

1. All available manufacturers' O&M literature, parts lists, etc.
2. Wiring diagrams.
3. Controls diagrams of all pneumatic, electric, and electronic control systems.
4. Written sequence of operations of all controls.
5. Any unusual or unique system O&M procedures not covered by manufacturers' literature.
6. Summary maintenance schedule showing maintenance intervals as recommended by the manufacturers. (lubrication, filter changes, etc.)

C. The Contractor is obligated to meet the guaranty requirements of the General Conditions.

END OF SECTION

SECTION 22 10 00: PLUMBING PIPING AND PUMPS

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Provide and install the following:

1. Domestic cold water from site domestic water utility to building stub.
2. Waste connections from site sanitary waste utility to building stub.

1.2 CODES AND STANDARDS

A. Furnish and install all materials and equipment in conformance with the 2022 rules and regulations of the following:

1. California Building Code (CBC)
2. California Plumbing Code (CPC)

1.3 TESTING

A. Perform pressure tests on all plumbing systems in conformance with the CPC.
B. Repair any nonconforming sections and re-test until the test criteria are satisfied.
C. Conduct tests conducted before piping is concealed in walls, floor, ceiling, or buried.
D. Construction inspector to witness all tests.
E. After pressure testing, provide an operational test on all systems.

1.4 WARRANTY

A. Provide one-year unconditional warranty on all plumbing equipment and systems, as described in the General Conditions.

1.5 SUBMITTALS REQUIRED FOR THIS SECTION

A. All equipment shown in schedules in plans.
B. Clean outs, Hydrants, and valves.
C. Piping and equipment insulation.
D. Shop drawings for all contractor-proposed piping layouts varying significantly from plans.
E. Proposed pipe hanger, seismic restraint, and roof pipe support systems.
F. Operation and maintenance manual.

PART 2 - PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. Domestic Cold and Hot Water Piping

1. Inside and outside building, above floor, copper option

a. Type "L" hard copper tubing.
b. Conforming to ASTM B-88.

c. Wrought copper fittings and 95/5 solder joints.
d. Viega Pro-Press or equivalent press fittings may be substituted for solder joint fittings.
e. Grooved copper fittings and mechanical couplings may be used provided fittings are not flared.
f. Type "M" may be used for unpressurized drain piping.

2. Inside building, below-floor slab and grade

a. Type “K” soft or hard temper copper tubing.
b. Conforming to ASTM B-88.
c. Wrought copper fittings and 95/5 solder joints above grade only.
d. Minimize joints below slabs.
e. Using wrought copper fittings and brazed joints below slab only where unavoidable.

3. Outside building, below-grade

a. Schedule 40 PVC pipe.
b. Conforming to ASTM D1785
c. PVC socket fittings and solvent joints.

B. Sanitary Soil, Waste and Vent Piping:

1. Inside building, above-grade

a. Schedule 40 PVC-DWV
b. ASTM F 1866
c. PVC socket fittings & solvent joints.

2. Inside building, below-floor and grade

a. Schedule 40 PVC-DWV
b. ASTM F 1866
c. PVC socket fittings & solvent joints.

3. Outside building, above-grade

a. Cast iron.
b. No-hub joints.
c. Stainless steel clamps.

4. Outside building, below-grade

a. Unless otherwise noted, shall be SDR-35 PVC Pipe.
b. ASTM D3034.

C. Rainwater and Storm Drain Piping:

1. Inside building, above-grade

a. Cast iron.
b. No-hub joints.
c. Stainless steel clamps.

2. Inside building, below-floor and grade

    a. Schedule 40 PVC-DWV
    b. ASTM F 1866
    c. PVC socket fittings & solvent joints.

3. Outside building, above-grade

    a. Cast iron.
    b. No-hub joints.
    c. Stainless steel clamps.

4. Outside building, below-grade

    a. Unless otherwise noted, shall be SDR-35 PVC Pipe.
    b. ASTM D3034.

D. Indirect Waste Piping:

1. Cooling Coil Condensate Drain

    a. Type “M” hard copper tubing conforming to ASTM B-88.
    b. Wrought copper fittings and soldered (95/5 solder) joints.
    c. Use DWV fittings for pipe 1 ¼” or larger.

2.2 VALVES, COCKS, AND FAUCETS

A. Valve Connections

1. Use full pipe size valves.
2. Use threaded valves and fittings for pipe sizes 2” and smaller.
3. Use flanged valves and fittings for pipe sizes 2½” and larger sizes.
4. Use solder joint valves or screw to solder adapters for copper tubing.

B. Gate Valves

1. Threaded or solder joint

    a. Bronze.
    b. Non-rising stem.
    c. Inside screw
    d. Double wedge or disc.

2. Flanged

    a. Iron body.
    b. Bronze trim.
    c. Rising stem.
    d. O.S.& Y.
    e. Solid wedge.

C. Ball Valves

1. Bronze body and trim.
2. Solder or screwed ends.

D. Hose Bibb

1. Exterior

a. Rough brass finish.
b. Hose thread spout.
c. Vacuum breaker.
d. Wall flange.
e. Loose key.
f. Woodford model 24.

E. Pressure Ratings

1. Unless otherwise indicated, rate at 200 psig WSP and 250°F.

F. Valve Boxes

1. One-piece pre-cast concrete with cast iron cover labeled "Water", "Sewer", "Gas", or other label as appropriate.
2. Install valve box and cover with H20 traffic loading in traffic areas.

2.3 CLEANOUTS

A. Outside or Grade

1. Adjustable round double extra heavy-duty flanged cleanout with cast iron body and frame.
2. Lead seal and bronze plug.
3. Provide non-skid bronze top.
4. J.R. Smith model 4251.
5. Install with 12" square by 6" deep concrete case.

B. Other Walls

1. Extra heavy-duty wall cleanout tee with cast iron body.
2. Lead seal and bronze plug.
3. Provide round stainless steel shall face-of-wall access cover.
4. J.R. Smith model 4521.

2.4 PIPE INSULATION

A. Cold Water Supply

1. Insulate all cold water piping in uninsulated attics exterior walls, and other areas of potential freezing.

a. Pre-formed seal-sealing flexible closed-cell elastomeric pipe insulation.
b. Zero water vapor transmission permeability.
c. Smoke/flame rating of 50/25 or less in accordance to ASTM E84 or UL 723.
d. Armacell AP ArmaFlex or equivalent.

e. Insulation thermal conductivity and thickness based on maximum operating water temperature and pipe size per table below:

Fluid Temp. Range (°F)	Thermal Conductivity Range (Btu·in/ hr·ft²·°F)	Insulation Mean Rating Temp. (°F)	Nominal Pipe Size				
			< 1”	1” - 1¼”	1½” - 3½”	4” - 6”	
			Insulation Thickness (in) (R-Value)				
40 -104	0.21-0.27	75	0.75” (R-6)	0.75” (R-5)	1” (R-7)	1” (R-6)	

PART 3 - PART 3 EXECUTION

3.1 PIPE INSTALLATION

A. Make screwed joints with full cut standard taper pipe threads with teflon tape or teflon-based pipe dope applied to male threads only.
B. Steel to PVC connections may be made with service saddles, or screwed fittings.
C. Use unions at all equipment connections.
D. Use di-electric unions at all copper to steel connections.
E. Bury outside water and drainage pipe minimum 2 feet.
F. Extend vents six inches above roof, ten feet minimum from outside air openings.
G. Backfill drain lines under slab with sand, compacted to 95% in 6" lifts maximum. Provide copper tracer wire over all exterior non-metallic piping.
H. See structural plans for penetrations through or under foundations and details under slabs.
I. Install buried copper tubing in red (hot water) or blue (cold water) plastic sleeves.
J. Provide pipe sleeves around pipe penetrations through floor slabs as required in the structural plans.

3.2 PIPE ROUTE AND GRADES

A. Install to conserve headroom and interfere as little as possible with use of space.
B. Run exposed piping parallel to walls.
C. Group piping whenever practical at common elevations.
D. Install concealed pipes close to building structure to keep furring to minimum.
E. Slope water piping 1 inch in 40 feet and install drain valves and hose nipples at low points.
F. Grade horizontal sanitary sewer drainage and vent piping ¼” per foot minimum. For ultra-low flush water closets, slope waste ½” per foot to the building main.
G. Offset waste lines as required to avoid encroaching the restricted areas adjacent to foundation footings parallel to the waste lines. See structural plans for restricted areas.
H. Grade all horizontal rainwater drainage piping ¼” per foot minimum.
I. Install piping to allow for expansion and contraction without stressing pipe or equipment connected.
J. Provide clearance for installing pipe insulation and for access to valves, air vents, drains and unions. Install 12" x 12" access doors for all concealed valves.
K. Install same type piping material specified for inside building to 8 feet outside of building.

3.3 SUPPORTS, ANCHORS AND SLEEVES

A. Pipe Hangers and Supports

1. Provide seismic pipe support as detailed on the plans.

2. Provide copper plated or plasticized hangers for copper piping, or wrap pipe with 20 mil PVC wrap.
3. Use insulation shields and rigid calcium silicate insulation inserts at least 6" long for insulated piping to prevent insulation crushing.
4. Use steel threaded hanger rods.
5. For single pipes, use adjustable wrought steel clevis hangers.
6. Use "U"-shaped pipe clamps and channel struts where piping is routed tight to walls, ceilings, or exposed structure. Use lag screws to attach strut to structure.
7. Where copper piping passes through wood or steel studs, use plastic pipe guide bushings.
8. Provide metal support plates at pipe terminations at fixtures.
9. Use PVC pipe supports with integral pitch pockets on pipe runs over flat roofs.
10. Support horizontal steel and copper piping as follows:

Nominal Pipe Size (in)	Support Spacing (ft)	Hanger Rod Diameter (in)
1/2	5	3/8
3/4 to 1	6	3/8
1-1/4 to 2	8	3/8
2-1/2 to 3	10	1/2
4 to 5	12	5/8
6	14	3/4
Note: Use one size larger hanger rod if pipe hanger is seismically braced.		

11. Install hangers to provide minimum 1/2 inch clear space between finished covering and adjacent work.
12. Place a hanger within one foot of each horizontal elbow.
13. Use hangers which are vertically adjustable 1-1/2 inch minimum after piping is erected.
14. Support horizontal soil pipe near each hub, with 5 feet maximum spacing between hangers.
15. Support vertical piping at every floor. Support vertical soil pipe at each floor at hub.
16. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
17. Where practical, support riser piping independently of connected horizontal piping.

3.4 FLASHING

A. 26 gauge galvanized steel, installation to architectural roofing specifications.

3.5 SLEEVES

A. Install 18 gauge galvanized steel sleeves through all pipe penetrations through footings, foundation walls, and other concrete work.
B. Set sleeves in position in advance of concrete work.
C. Provide suitable reinforcing around sleeves.
D. Extend sleeves through potentially wet floors one inch above finished floor level.
E. Caulk sleeves full depth and provide floor plate.

F. Where piping passes through floor, ceiling or wall close off space between pipe or duct and construction with a UL-listed sealant rated at the penetration's fire rating.
G. Provide tight fitting metal caps on both sides and caulk.
H. Install chrome plated escutcheons where piping passes through finished surfaces.

3.6 VALVE INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.
B. Install gate or ball valves for shut-off and isolating service, to isolate equipment, part of systems or vertical risers.
C. Use unions at or near valves to facilitate servicing.
D. Install backflow prevention valves at the service fill connection of each piping system or component requiring a water service connection.

3.7 CLEANOUT INSTALLATION

A. Lubricate cleanout plugs with mixture of graphite and linseed oil.
B. Prior to building turnover, remove cleanout plugs, re-lubricate and reinstall using only enough force to ensure permanent leakproof joint.

3.8 PIPE INSULATION INSTALLATION

A. Follow manufacturer's recommendations.
B. Use the proper sealing tool.
C. Insulate elbows, tees, and other fittings with unfaced insulation and pre-molded PVC fitting covers. Insulate the first five feet of cold water supply piping connections to water heaters.
D. Stuff insulation in wall, floor, or ceiling penetrations, except where noted to apply fire-rated sealants or gasketing.
E. Apply weatherproof aluminum jacketing and banding over all exterior insulated piping.

3.9 PAINTING

A. Prime coat and finish paint to match building all exposed pipe, steel hangers, and supports.
B. Hangers and supports, located in crawl spaces, pipes shafts and suspended ceiling spaces are not considered exposed.

3.10 PIPE CLEANING AND STERILIZATION

A. Flush lines to remove all chips, burrs, and debris from pipe interior after system rough-in, but before final fixture connection.
B. Use compressed air for gas lines and water for water lines.
C. Clean all strainers after flushing. Sterilize all potable water lines to AWWA standards, and then flush out lines to remove all residual hyper-chlorinated water.

END OF SECTION

ELECTRICAL GENERAL PROVISIONS: SECTION 26 05 00

PART 1 - GENERAL

1.01 GENERAL

A. COMMUNICATIONS:

1. Communications and instruction from the Owner to the Contractor are to be through the Construction Manager.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-specification sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

A. The work included under this Section consists of providing all labor, materials, supervision, and construction procedures necessary for the installation of the complete electrical systems required by these specifications and/or shown on the drawings of the contract.

B. The Contract Drawings are shown in part diagrammatic intended to convey the scope of work, indicating the intended general arrangement of equipment, conduit, and outlets. Follow the drawings in laying out the work and verify spaces for the installation of the materials and equipment based on the dimensions of actual equipment furnished. Whenever a question exists as to the exact intended location of outlets or equipment, obtain instructions from the Architect/Engineer before proceeding with the work.

1.03 QUALITY ASSURANCE

A. Installers shall have at least 2 years of successful installation experience on projects with electrical installation work similar to that required by the project. All equipment and materials shall be installed in a neat and workmanlike manner and shall be aligned, leveled, and adjusted for satisfactory operation.

1.04 REFERENCES

A. The design, manufacture, testing, and method of installation of all equipment and materials furnished under the requirements of this specification shall conform to all codes, standards and regulations, etc. found in the front end of specifications.

B. The latest adopted edition by the local and state inspection authorities of all standards and specifications listed in front end shall apply.

C. Furthermore, the electrical work shall be in accordance with all applicable National and State Standards, and Local Codes and Building Ordinances. The electrical work shall merit the approval of the enforcing authorities having jurisdiction.

1.05 MATERIALS AND EQUIPMENT

A. Electrical materials and equipment for the entire project shall meet the requirements specified under the Supplementary Conditions Section of this specification.

B. Equipment and fixtures shall be connected to provide circuit continuity in accordance with applicable Codes whether or not each piece of conductor, conduit, or protective device is shown between such items of equipment or fixtures and the point of circuit origin.

C. The electrical work includes the installation or connection of certain materials and equipment furnished by others. Verify all connection details.

D. All equipment over 50 pounds shall be provided with adequate lifting means.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 ACCESS TO EQUIPMENT

A. Starters, switches, receptacles, pull boxes, etc. shall be located to provide easy access for operation, repair and maintenance. If the devices listed above are concealed, access doors shall be provided

3.02 SUBMITTALS

A. Operation and Maintenance Manuals: Operation and Maintenance Manuals shall be provided according to Division 1 requirements. In general, during the time of the contract, and before substantial completion of the electrical installation, submit to the Architect/Engineer three (3) copies of descriptive literature, maintenance recommendations (from the equipment manufacturer), data on initial operation, wiring diagrams, performance curves, engineering data and tests, operating procedures, routine maintenance procedures, and parts lists for each item of electrical equipment installed under this contract and submit all manufacturer's guarantees and warranties.

B. Shop Drawings: The Contractor shall furnish shop drawing portfolios and proper transmittal forms for all materials, equipment, and lighting fixtures to be incorporated in the work in accordance with the General Conditions, Supplementary Conditions, and all other applicable Conditions.

1. Shop drawings on component items forming a system or that are interrelated shall be submitted at one time as a single submittal in order to demonstrate that the items have been properly coordinated and will function properly as a system. A notation shall be made on each shop drawing submitted as to the item's specific use, either by a particular type number referenced on the drawings or in the specifications, by a reference to the applicable paragraph of the specifications, or by a description of its specific location. The shop drawings shall be organized and bound into sets with each set collated.

2. The Architect/Engineer shall have the final authority as to whether the equipment or material submitted is equal to the specified item. Proposed substitutions may be rejected for aesthetic reasons if felt necessary or desirable. In the event the proposed substitutions are rejected, the Contractor shall furnish the specified item.

3.03 EXISTING UTILITIES

A. The Contractor shall verify the location of all existing utilities with the Owner and Utility Companies prior to commencing excavation work. The drawings and survey data of the contract documents indicate the available information on the existing power and communication services, and on new services to be provided to the project by utility companies. Accuracy of this information is not assured.

3.04 SMOKE AND SMOKE/FIRE DAMPERS

A. Provide all necessary connections, including power supply circuits (fed from the nearest panelboard of the appropriate voltage) to smoke dampers and smoke/fire dampers so that upon fire alarm conditions or integral smoke detector activation, the dampers close. Coordinate damper and control locations with the mechanical and controls contractors. Refer to the mechanical drawings for damper schedule and locations. Connect to emergency backup power.

3.05 ELECTRICAL-MECHANICAL EXTENT OF WORK

A. The responsibility of work specified under Division 26 is clarified under, Section, 260000. Said Sections are incorporated herein by reference.

3.06 ELECTRICAL-PRODUCT COORDINATION

A. Refer to Division 2 through Division 32 and the electrical drawings for the power characteristics required and available for the operation of each power-consuming item of equipment. Coordinate purchases to ensure uniform interface with every item requiring electrical power

3.07 CUTTING AND PATCHING

A. The Electrical Contractor shall be responsible for all cutting and patching of holes in building construction which are required for the passage of electrical work. Cutting and patching shall conform to the requirements of Division 1 and, if applicable, Division 2 of these specifications.

B. Cutting of structural framing, walls, floors, decks and other members intended to withstand stress is not permitted.

3.08 PAINTING AND FINISHING

A. Painting of electrical work exposed in occupied spaces, except mechanical and electrical machine rooms and maintenance/service spaces; and work exposed on the exterior of the facility is specified and performed under other divisions of these specifications.

B. Factory finishes, shop priming, and special protective coatings are specified in the individual equipment specification sections.

C. Where factory finishes are provided on equipment and no additional field painting is specified, all marred or damaged surfaces shall be touched up or refinished so as to leave a smooth, uniform finish at the time of final inspection.

3.09 EXCAVATION AND BACKFILING

A. Contractor shall perform all excavation and backfilling necessary to install the required electrical work. Coordinate the work with other excavating and backfilling work in the same area. Except as indicated otherwise, comply with the applicable

sections in Division 31 of these specifications, excavation filling and backfilling (for structures) to 5' outside the building line, and exterior utilities sections for beyond 5' from the building line.

B. Landscape work, pavement, flooring and similar exposed finish work that is disturbed or damaged by excavation shall be repaired and restored to their original condition by the Contractor.

3.10 CONDUITS AND SUPPORT, GENERALLY

A. Conduits, except electrical conduits run in floor construction, shall be run parallel with or perpendicular to lines of the building unless otherwise noted on the drawings. Electrical conduits shall not be hung on hangers with any other service, unless specifically approved by the Engineer. Electrical conduits shall be hung above all other service pipes. Hangers on different service lines running close to and parallel with each other shall be in line with each other and parallel with, or perpendicular to, the lines of the building. Exact location of electric outlets, piping, ducts, and the like shall be coordinated to avoid interferences between lighting fixtures, piping, ducts, and similar items.

3.11 ACCESS PANELS

A. Furnish and install panels for access to junction boxes and similar items where no other means of access, such as a readily removable, sectional ceiling is shown or specified.

B. Panels shall not be less than 12-inches by 16-inches in size. Larger panels shall be furnished where required. Panels in tile or other similar patterned ceilings shall have dimensions corresponding to the tile or pattern module.

C. Access panels shall be flush type and of all steel construction, with a No. 16 gauge wall or ceiling frame for masonry or plaster and a No. 14 gauge panel door. Doors shall be secured with concealed hinges and flush locks of either the cylinder type or approved, positive acting, screwdriver operated type. Doors for wall panels may be secured with suitable clips and countersunk screws. Panels shall be painted with a rust-inhibitive primer at the factory. Panels in rated wall shall also be rated.

3.12 INSTALLATION OF EQUIPMENT

A. Install and connect all appliances and equipment as specified and indicated for this project, in accordance with the manufacturers' instructions and recommendations. Furnish and install complete electric connections and devices as recommended by the manufacturer or required for proper operation.

3.13 COORDINATION

A. Coordinate the electrical work with work of the different trades so that:

1. Interferences between mechanical, electrical, architectural, and structural work, including existing services, will be avoided.
2. Within the limits indicated on the drawings, the maximum practicable space for operation, repair, removal and testing of electrical and other equipment will be provided.
3. Pipe, conduits, ducts, and similar items, shall be kept as close as possible to ceiling,

walls, and columns, to take up a minimum amount of space. Pipes, conduits, ducts, and similar items shall be located so that they will not interfere with the intended use of other equipment.

B. Furnish and install, without additional expense to the Owner, all offsets, fittings and similar items necessary in order to accomplish the requirements of coordination.

C. Before any sleeves or inserts are set, or any electrical equipment or foundations are installed, prepare and submit for approval composite coordination drawings for all equipment rooms, and other areas in which work of two or more trades or subcontractors is to be installed and in which the probability of interference exists. Drawings shall show the work of all trades covered, shall be drawn to a scale not smaller than 1/2" = 1'-0", and shall show clearly in both plan and elevation that all work can be installed without interference.

D. Any work installed prior to approval of coordination drawings shall be at the Contractor's risk. Subsequent relocations required to avoid interferences shall be made without additional expense to the Owner.

3.14 SINGULAR NUMBER

A. Where any device or part of equipment is herein referred to in the singular number (such as "the switch"), such reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

3.15 WARRANTY

A. Refer to the General Conditions section of this Specification for warranty requirements and information.

3.16 CLOSE OUT AND OPERATION INSTRUCTIONS

A. Sequence operations properly so that all work of this project will not be damaged or endangered. Operate each item of equipment and each system in a test run of appropriate duration to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance.

B. Conduct a full-day walk-through instruction seminar for the Owner's personnel to be involved in the continued operation and maintenance of electrical equipment and systems. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, security, safety, efficiency and similar features of the systems.

C. At the time of substantial project completion, turn over the prime responsibility for operation of the electrical equipment and systems to the Owner's operating personnel. Until the time of final acceptance, provide full time operating personnel, who are completely familiar with the work, to consult with and continue training the Owner's personnel.

3.17 SUBSTITUTIONS

A. All proposals shall be based on providing and installing the materials or items of equipment which are hereinafter specified by name and/or manufacturer. Substitutions, for materials or items of equipment specified, will not be allowed, unless approved by Engineer prior to (14 days before) bid date.

B. Refer to Instructions to Bidders for complete requirements for substitutions.

3.18 AS-BUILT DRAWINGS

A. Contractor shall provide the Owner with as-built drawings for all electrical systems as described in these specifications and/or shown on the Drawings

END OF SECTION 26 05 00

ELECTRICAL BASIC MATERIALS AND METHODS SECTION 26 05 01

PART 1 - GENERAL

1.01 GENERAL

A. COMMUNICATIONS:

1. Communications and instruction from the Owner to the Contractor are to be through the Construction Manager.

1.02 DESCRIPTION OF WORK

A. The extent of Basic Materials and Methods is indicated by the drawings and specifications. Basic materials are defined but not limited to cable and conduit seals, outlet boxes, pull boxes, conduit fittings, safety switches, lockout pushbuttons and fuses.

1.03 QUALITY ASSURANCE

A. Manufacturers: All materials shall be new, unused, and un-weathered, and of the quality specified. Materials shall be standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design.

B. Installer: All equipment and materials shall be installed in a neat and workmanlike manner, shall be complete in both effectiveness and appearance, whether finally concealed or exposed and shall be executed by experienced mechanics.

1.04 REFERENCES

A. The electrical work shall conform to all applicable sections of standards, codes and specifications promulgated by organizations listed below.

1. Occupational Safety and Health Standard, National Consensus Standards and Established Federal Standards

2. California Electrical Code (CEC) 2022

3. National Electric Manufacturer's Association (NEMA)

4. American Society for Testing of Materials (ASTM)

5. Underwriters Laboratories, Inc. Standards (UL)

6. Factory Mutual Engineering Corporation or other Recognized National Laboratories

PART 2 – PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. Equipment and Materials Furnished by Others: Certain materials and equipment for this project will be furnished under other divisions. These materials and equipment, which are shown or noted on the plans, will be installed and/or connected under this Division. It shall be incumbent upon this Contractor to become familiar with all of the

materials and equipment that will be furnished under other Divisions, but which will be installed and/or connected under this Division.

B. Cable and Conduit Seals: Seals shall be provided around all conduits and cables which penetrate smoke walls, fire walls, and floors. Nelson Flameseal System shall be used to seal penetrations of electrical cables and conduits.

C. Materials used shall be flameseal putty, ceramic fiber insulation and where rigid support on large oversized openings is required, ceramic fiber board. Board shall be rigid and able to withstand temperatures in excess of 2000 degrees F.

2.02 OUTLET BOXES

A. Outlet Boxes, Pull Boxes and Conduit Fittings: Furnish and install outlet boxes, pull boxes, and conduit fittings as described below. Catalog numbers shown are Appleton Electric Company; Steel City, O.Z. Gedney, and Raco, are equally acceptable.

1.	Lighting Boxes (concealed)	No 40-3/4
2.	Lighting Boxes (concrete)	OCR Series
3.	Lighting Boxes (exposed)	4S-3/4 or 40-3/4
4.	Flush Switches, Receptacles, Telephone and Flush Junction Boxes	No. 4S-3/4 with separate extension plaster rin, M*-250 in masonry construction (*refers to number of devices in the box)
5.	Weatherproof type Switch, Receptacle and Telephone Boxes (exposed)	FS Series w/FS cover and neoprene gasket.
6.	Switch Receptacle and Telephone Boxes (exposed)	$S-3/4 with 8360 or 8370 series raised surface cover

B. Extension and plaster rings shall be installed as required by the CEC.

C. Outlet boxes shall comply with the California Electrical Code in regard to the allowable fill.

2.03 PULL BOXES

A. Pull boxes shall be fabricated of code gauge galvanized sheet metal and shall be sized in accordance with the California Electrical Code requirements or as shown on the drawings. Provide removable cover on the largest access side of the box. In-line conduit pull boxes may be O.Z., Type PBW, or equal. Provide pull boxes at all code required locations, and as needed to aid in cable pulling.

2.04 SAFETY SWITCHES

A. Furnish and install heavy duty type safety switches, having the electrical characteristics, ratings and modifications shown on the drawings. All switches shall have:

1. NEMA 1 general purpose enclosures unless otherwise noted for all interior applications;

2. NEMA 3R rainproof enclosures unless otherwise noted for all exterior applications;

3. Metal nameplates, front cover mounted that contain a permanent record of switch type, catalog number and H.P. ratings with both standard and time delay fuses;

4. Handle that is pad-lockable in "OFF" position;

5. Non-teasible, positive quick-make, quick-break mechanism;

6. UL approval and shall bear the UL label;

7. All fusible switches shall have Class R Fuse rejection clips.

B. Safety switches, as manufactured by the following, will be equally acceptable, but all safety switches furnished by this Contractor shall be the product of one manufacturer.

1. Square D Company

2. General Electric

3. Cutler Hammer

4. Siemens

2.05 FUSES

A. Fuses shall be furnished and installed in each fused switch, and shall be rated as shown on the drawings.

B. Provide fuses according to the following and in accordance with recommendations of manufacturers whose equipment is being protected:

1. Provide UL Class L current limiting time-delay fuses rated 600-volts, 60 Hz, 601 to 6000 amps, with 200,000A RMS symmetrical interrupting current rating for protecting transformers, motors and circuit breakers. (Similar to Buss Low-Peak fuses.)

2. Provide UL Class L current limiting fast-acting fuses rated 600-volts, 60 Hz, 601 to 6000 amps, with 200,000A RMS symmetrical interrupting current rating for protecting service entrances and main feeder circuit breakers. (Similar to Buss Limitron fuses.)

3. Provide UL Class RK1 current limiting, dual-element, time-delay fuses rated 600-volts, 60 Hz, 1/10 to 600 amps, with 200,000A RMS symmetrical interrupting current rating for protecting motors and circuit breakers. (Similar to Buss Low-Peak fuses.)

4. Provide UL Class RK1 current-limiting fuses rated 250-volts, 60 Hz, 1/10 to 600 amps, with 200,000A RMS symmetrical interrupting current for protecting motors and circuit breakers. (Similar to Buss Low-Peak fuses.)

5. Provide UL Class J current-limiting fuses rated 600-volts, 60 Hz, 1 to 600 amps, with 200,000A RMS symmetrical interrupting current rating for protecting circuits with no heavy inrush current where reduced dimension devices are required.

6. Provide UL Class H fuses rated 600-volts, 60 Hz, 1/10 to 600 amps, with 10,000A RMS symmetrical interrupting current rating for protecting general purpose light duty feeders

7. Provide UL Class T fuses rated 600-volts, 60 Hz, 1 to 1,200 amps, with 200,00A RMS symmetrical interrupting current rating for protection of non-motor loads where reduced dimension devices are required.

C. Three spare fuses shall be furnished for each size and type used. Each fused switch shall be provided with a mastic backed label clearly identifying the type and size of fuse required.

PART 3 – EXECUTION

3.01 PRODUCT INSTALLATION GENERAL

A. Except where more stringent requirements are indicated, comply with product manufacturer's installation instructions and recommendations, including handling, anchorage, assembly, connections, cleaning and testing.

3.02 MOUNTING HEIGHT

A. Mounting heights to the center of the box above finished floor for the items listed below shall be as follows, unless otherwise shown. All other device mounting heights shall be as shown on the drawings. All devices shall be mounted in accordance with ADA (Americans with Disabilities Act) requirements.

1.	Flush tumbler switches	48"
2.	Switches in concrete block	46"
3.	Switches over wainscot	6" above 48" wainscot
4.	Convenience outlets	18" mounted vertically with ground prong slot at bottom
5.	Safety switches	54"
6.	Motor controllers	54"
7.	Panelboards to top	72"
8.	Telephone Outlets	18"
9.	Telephone outlets (pay and wall type)	54" for non-ADA type, 44" for ADA type
10.	Bracket lights (120 volt)	84"
11.	Bracket lights (277 volt)	96"
12	Clock outlets 8' ceiling Clock outlets 9' ceiling	84" 96"
13.	Receptacles above counters	6" above counters mounted (horizontally)-(vertically)
14.	Convenience outlets in mechanical, electrical, janitor and elevator machine rooms.	48"
15.	Telephone panels	72" to top
16.	Exterior W.P. convenience outlets	24" above grade mounted (horizontally) - (vertically)
17.	Capacitors furnished by Mech	36" minimum
18.	Lock-out push button	36" minimum
19.	Fire alarm pull station	48"
20.	Fire alarm horn, bell chime or light	80"
21.	Intercom System Pushbutton Stations	48"

B. Contractor shall check all equipment layouts and verify exact mounting heights.

3.03 CUTTING AND PATCHING FLOORS, WALLS OR CEILINGS

A. Cutting, patching, repairing, and finishing of carpentry work, metal work, or concrete work, etc., which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required, it shall be done in such a manner as not to weaken walls, partitions, or floors. Holes required to be cut in floors must be drilled without breaking out around the holes. Cutting, patching, and painting shall conform to the requirements of the General Conditions section of this Specification.

B. Cutting of structural framing, walls, floors, decks, or other members intended to withstand stress is not permitted

C. Sleeves through floors or walls shall be black iron pipe and shall be flush with finished faces of floors, walls or ceilings. Sleeves shall be sized to accommodate raceways indicated.

D. Use care in piercing water proofing. After the part piercing the waterproofing has been set in place, seal openings, and make absolutely watertight

3.04 SLEEVES

A. Sleeves shall be used to accommodate conduit or tubing where conduit or tubing pass through newly poured concrete walls or slabs.
.

B. All sleeves through floors and walls shall be black iron pipe, flush with walls or finished floors; and of sizes to accommodate the raceways shown. Sleeves through outside walls above grade shall be caulked with approved caulking compound. Sleeves shall not be required through on grade slabs.

C. For raceways which enter buildings below grade, install manufactured floor and thruwall seals, similar to Type "FSK" or "WSK" as manufactured by O.Z. Electric Manufacturing Co.

3.05 INSTALLATION METHODS

A. Conductors shall be installed in concealed raceways except as shown otherwise on the drawings or specified to be otherwise in these specifications. Exposed conduits and wires shall be installed parallel or perpendicular to building surfaces. Conduits and wires in the space above ceilings shall be supported adequately and shall not be laid on the top of ceiling systems. Conduits and wires installed above ceilings shall be considered exposed.

B. Electrical conduits shall not be hung on hangers with any other service foreign to the electrical systems, nor shall they be attached to other foreign services.

C. The lighting and power branch circuit conductors shall be installed in separate raceway systems unless specifically shown or noted otherwise.

D. Equipment Bases. Provide concrete equipment bases for all floor mounted equipment furnished under this contract. Concrete bases shall be 3-1/2"-inches high unless noted otherwise and shall extend 3-inches beyond all sides of the unit. Trowel all edges at a 45 degree angle. This work shall be done in accordance with Division 3 of the specifications by the Division 16 Contractor. Bases shall be provided for switchboards, motor control centers, transformers and all other floor mounted equipment.

E. Outlet Box Locations. Outlet boxes shall be located so they are not placed back-to-back in the same wall, and in metal stud walls, are separated by at least one stud space in order to limit sound transmission from room to room. Outlet boxes installed on opposite sides of fire rated walls shall be spaced at least 24" apart.

3.06 WIRING – NUMBER OF WIRES REQUIRED

A. The number of wires for lighting and receptacle branch circuits are not shown on the drawings. The number of wires in any circuit is determined in accordance with the California Electrical Code, and wiring is provided to perform all functions of the devices being installed. Additionally, wires shall be provided as required by the contract documents, i.e. equipment grounds, etc. Provide the number of wires required for a complete and workable system.

3.07 PROTECTION FROM WEATHER

A. Raceway stub ups shall be capped or otherwise protected from moisture and debris until such time that the conductors are pulled. Conductors shall not be installed in raceways until the building is protected from the weather, all concrete and plastering is completed, and raceways in which moisture has collected have been swabbed or blown out.

3.08 ELECTRICAL ROOM COORDINATION

A. Where a number of electrical panels and/or related electrical items are shown, the Electrical Contractor shall coordinate the physical sizes with his equipment suppliers to ensure that there is adequate space for the items shown to be installed in those areas and that all Code required clearances are maintained.

B. The Contractor shall rearrange the equipment layout to achieve full use of the available space prior to installing conduit stub ups. Where a conflict or rearrangement exists, the Contractor shall submit a proposed revised layout of the area to the Architect.

3.09 NAMEPLATES

A. Nameplates shall be provided for all items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards and motor control centers, control devices and other significant equipment.

B. Nameplates shall be 1"x 2-1/2" laminated black phenolic resin with a white core with engraved lettering, a minimum of 3/16-inch high. Manufacturers factory installed nameplates shall be acceptable provided all information is furnished.

C. Nameplates shall identify the equipment item that the device is serving and also from where the device is being fed from. Nameplates shall also identify the system voltage of the item of equipment.

3.10 RACEWAY SUPPORTS

A. Raceways shall be securely supported and fastened in place with pipe straps, wall brackets, caddy clips, hangers or trapeze hangers at intervals specified in Section 260533 "RACEWAYS" or:

1. As shown on the drawings.

2. As may be required by special adverse field conditions.

B. Fastenings shall be by wood screws or screw-type nails to wood; by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws or welded threaded studs on steel work. Nail-type nylon anchors or threaded studs driven in by a powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts or machine wood screws. Threaded C-clamps shall not be used. Raceways or pipe straps shall not be welded to steel structures. Holes cut in reinforced concrete beams or in concrete joists shall avoid cutting the main reinforcing bars. Holes not used shall be filled. In partitions of light steel construction, sheet-metal screws may be used, and bar hangers may be attached with saddle ties of not less than No. 16 AWG double strand zinc-coated steel wire. No raceway shall be attached to the suspended ceiling construction. Conduits shall be fastened to all sheet-metal boxes and cabinets with two locknuts and insulating bushings.

3.11 BOX SUPPORTS

A. Boxes and supports shall be fastened to wood with wood screws or screw-type nails of equal holding strength, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel work. Plastic expansion shields shall not be used. Threaded studs driven in by powder charge and provided with lockwashers and nuts may be used in lieu of wood screws, expansion shields, or machine screws. In open overhead spaces, cast metal boxes threaded to raceways need not be separately supported except where used for fixture support; cast metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers. Raceways shall be supported with an approved type fastener not more than 24-inches from the box. Penetration into reinforced concrete beams and into reinforced-concrete joists shall avoid cutting any main reinforcing steel.

END OF SECTION 26 05 01

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work in this Section.

B. Division 26 "Basic Materials and Methods" sections apply to work of this Section, and is part of each Division 16 section making reference to conductors.

1.02 DESCRIPTION OF WORK

A. Extent of electrical wire and electrical cable work is indicated by drawings and schedules. Types of wire, cable and connectors in this Section include the following:

1. Copper conductors
2. Power-limited circuit cable
3. Service entrance cable
4. Aluminum conductors

1.03 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in the manufacture of electric wire and cable products of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer: Qualified with at least 3 years of successful installation experience on projects with electrical wiring work similar to that required for this project.

1.04 REFERENCES

A. CEC Compliance: Comply with CEC as applicable to construction and installation of electrical wire, cable and connectors.

B. UL Compliance: Comply with UL standards pertaining to electrical wire cable and connectors.

C. UL Labels: Provide electrical wires, cables and connectors which have been UL-listed and labeled.

D. NEMA/ICEA Compliance: Comply with applicable portions of NEMA/Insulated Cable Engineers Association Standards pertaining to materials, construction and testing of electrical wire and cable.

E. ANSI/ASTM: Comply with applicable portions of ANSI/ASTM standards pertaining to construction of electrical wire and cable.

F. IEEE Compliance: Comply with applicable portions of IEEE standards pertaining to electrical wire and cable.

G. NECA Compliance: Comply with NECA's "Standard of Installation."

1.05 SUBMITTALS

A. Submit manufacturer's data on electric wire and cable.

PART 2 – PRODUCTS

2.01 MANUFACTURERS --Subject to compliance with requirements, provide products of one of the following (for each type of wire, cable and connector):

A. WIRE AND CABLE
   1. Advance Wire and Cable, Inc.
   2. Cerro Wire and Cable, Co.
   3. Electrical Conductors, Inc.
   4. General Cable Corp.
   5. Hitemp Wires, Inc.
   6. Rome Cable Corp.
   7. Southwire Company
   8. The Okonite Company

B. CONNECTORS
   1. Amp, Inc.
   2. Burndy Corp.
   3. Eagle Electric Mfg. Co., Inc.
   4. Gould, Inc.
   5. Ideal Industries, Inc.
   6. Josylyn Mfg. and Supply Co.
   7. O-Z/Gedney Co.
   8. Pyle National Co.
   9. Thomas and Betts Co.

2.02 WIRE, CABLE, AND CONNECTORS

A. General: Except as otherwise indicated, provide wire, cable and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer, and as required for the installation.

B. WIRE:

1. Conductors shall be 600-volt and shall be copper with insulation of the following types, unless otherwise noted on the drawings or in these specifications. 600-volt aluminum conductors will be considered for conductors feeding switchboards, switchgear, panel boards, motor control centers, and load centers rated above 225 amps. If aluminum is desired a waiver shall be requested from the UNL Project Manager on a project by project basis. Aluminum conductors shall be AA-8000 series, terminated on crimped terminals, and shall meet or exceed Southwire SIMpull product performance:
2. For dry locations, provide Type THHN conductors. Conduit sizes are based on type THHN wire.
3. For damp or wet locations, provide Type THWN conductors.
4. Provide Type THWN conductors for service entrance cabling or feeders direct buried, or installed in underground raceways. Provide Type THWN conductors for branch circuit conductors installed in underground raceways.
5. No wire shall be smaller than No. 12 AWG, except that wiring for signal and pilot control circuits may be No. 14 AWG, and pre-manufactured fixture whips for light fixtures may be No. 14 AWG.
   a. Use preinsulated connectors 3M Company "Scotchlok," or Ideal Industries, Inc. "super nut," for splices and taps in conductors No. 10 AWG and smaller.

All other twist-on connectors must be reviewed by the Architect prior to installation. Use this type of connector for factory-made splices in fixtures or equipment.

b. Pressure indent type connectors must be submitted to the Architect for review.
c. Tape all splices and joints with vinyl plastic tape manufactured by Minnesota Mining and Manufacturing Company. Use sufficient tape to secure insulation strength equal to that of the conductors joined.
d. Keep splices in underground junction boxes to an absolute minimum. Where splices are necessary, use resin pressure splices and resin splicing kits manufactured by the 3M Company, St. Paul, Minnesota, or equal to totally encapsulate the splice. Arrange the splicing kit to minimize the effects of moisture.

6. Connect wire No. 6 AWG and larger to panels and apparatus by means of approved lugs or connectors.
7. Wire No. 12 AWG and No. 10 AWG is allowed to be stranded or solid. All wire No. 8 AWG and larger shall be stranded.
8. Connectors of the porcelain cup type with or without metal inserts shall not be used, including all splices in fixtures which are made in advance by the fixture manufacturer. Splices in wire No. 8 AWG and larger shall be made with approved solderless lugs. If any type of pressure indent type connector is proposed for use on any size conductor, it shall be specifically submitted for approval prior to use.
9. Wire sizes shown are minimum based on code requirements, voltage drop and/or other considerations. Larger sizes may be installed at the Contractor's option to utilize stock size, provided conduit sizes are increased where necessary to conform to the California Electrical Code. Sizes of wires and cables indicated or specified are American Wire Gage (Brown and Sharpe).
10. All feeder and branch circuit wiring shall be color-coded as follows:

PHASE	120/208 VOLT	277/480 VOLT
A	Black	Brown
B	Red	Orange
C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green

It is acceptable to provide continuously-colored conductors in lieu of black jacketed conductors with colored tape at terminals.

PART 3 – EXECUTION

3.01 INSTALLATION

A. General: Install electric cables, wires and connectors as indicated in compliance with manufacturer's written instructions, applicable requirements of the CEC and NECA's "Standard of Installation", and in accordance with recognized industry practices.

B. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.

C. Conductors shall be continuous from outlet to outlet and no splices shall be made except within outlet or junction boxes. Junction boxes may be utilized wherever required.

D. Splicing: No splicing or joints will be permitted in either feeder or branch circuits except at outlet or accessible junction boxes.

E. Wire shall not be installed in raceways until the concrete work and plastering is completed and all conduits in which moisture has collected have been swabbed out. Insulation resistance to ground shall not be less than that approved by CEC. Eliminate splices wherever possible.

F. Use pulling compound or lubricant where necessary. Compound must not deteriorate conductor insulation.

G. Prior to energization, check cable and wire for continuity of circuitry, and for short circuits. Correct malfunctions when detected.

H. Bury a continuous, pre-printed, bright colored plastic ribbon cable marker with each underground cable, regardless of whether conductors are in conduit. Locate each directly over cables 12" below finished grade.

I. Conductor Installation: Install all conductors in a single raceway at one time, insuring that conductors do not cross one another while being pulled into raceway. Leave sufficient cable at all fittings or boxes and prevent conductor kinks. Keep all conductors within the allowable tension and exceeding the minimum bending radius.

J. Conductor Support: Provide conductor supports as required by the code and recommended by the cable manufacturer. Where required, provide cable supports in vertical conduits similar to OZ Type C.M.T., and provide the lower end of conduit with OZ Type KVF ventilators.

K. Conductor Termination: Provide all power and control conductors that terminate on equipment or terminal strips, with solderless lugs or fork and flanged tongue terminals. Provide T and B "sta-kon" tongue terminal. This type conductor termination is not required when the equipment is provided with solderless connectors.

L. Many circuits are shown on the drawings to be provided with dedicated neutral and ground conductors. Carefully review circuiting and the electrical abbreviations and symbols legend and provide the number of conductors indicated.

END OF SECTION 26 05 19

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this Section.

B. Division 26 "Basic Materials and Methods" sections apply to work of this Section.

1.02 DESCRIPTION OF WORK

A. Extent of grounding work is indicated by the drawings and is specified herein.

B. Applications of grounding work in this Section include the following:
   1. Underground Metal Piping
   2. Underground Metal Water Piping
   3. Metal Building Frames
   4. Ground Rods
   5. Separately Derived Systems
   6. Service Equipment
   7. Enclosures
   8. Equipment

C. Requirements of this Section apply to electrical grounding work specified elsewhere in these specifications.

1.03 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of electrical connectors, terminals and fittings, of types and ratings required, and ancillary grounding materials, including stranded cable, copper braid and bus, ground rods and plate electrodes, whose products have been of satisfactory use in similar service for not less than three years.

B. Installer: Qualified with at least three (3) years' experience on projects with electrical grounding work similar to that required for this project.

1.04 REFERENCES

A. California Electrical Code (CEC) 2022: Comply with CEC requirements as applicable to materials and installation of electrical grounding systems, associated equipment and wiring. Provide grounding products which are UL listed and labeled.

B. UL Compliance: Comply with applicable requirements of UL Standard Nos. 467 and 869 pertaining to electrical grounding and bonding.

C. IEEE Compliance: Comply with applicable requirements of IEEE Standard 142 and 241 pertaining to electrical grounding.

D. Utility: Grounding shall be done so as to comply with all applicable grounding requirements and rules of the serving utility.

E. National Electric Manufacturer's Association (NEMA)

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's data on grounding systems and accessories.

B. Shop Drawings: Submit layout drawings of grounding systems and accessories including, but not limited to, ground wiring, copper braid and bus, and ground rods.

PART 2 – PRODUCTS

2.01 Acceptable Manufacturers: Subject to compliance with the requirements, provide grounding products of one of the following:

A. B-Line Systems

B. Burndy Corporation

C. Crouse Hinds

D. Electrical Components Div.; Gould Inc.

E. General Electric Supply Co.

F. Ideal Industries, Inc.

G. Thomas and Betts Corp.

H. Western Electric Co.

2.02 Grounding Systems: Except as otherwise indicated, provide electrical grounding systems indicated; with assembly of materials, including but not limited to cables/wires, connectors, terminals, ground rods/electrodes, bonding jumper braid, and additional accessories needed for a complete installation. Where more than one type unit meets indicated requirements, selection is installer's option. Where materials or components are not indicated, provide products complying with CEC, UL, IEEE and established industry standards for applications indicated.

2.03 Conductors: Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to CEC requirements.

2.04 Bonding Jumper Braid: Provide copper braid tape, constructed of 30 gage bare copper wires and properly sized for indicated applications.

2.05 Flexible Jumper Strap: Provide flexible flat conductor, 480 strands of 30 gage bare copper wire; 3/4" wide, 9-1/2" long; 48,250 cmil. Protect braid with copper bolt hole ends with hole sized for 3/8" dia. bolts.

2.06 Bonding Plates, Connectors, Terminals and Clamps: Provide electrical bonding plates, connectors, terminals, lugs and clamps as recommended by bonding plate, connector, terminal and clamp manufacturers for indicated applications.

2.07 Ground Rods: Provide steel ground rods with copper welded exterior, 3/4" dia. x 10'.

2.08 Electrical Grounding Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing, welding materials, and bonding straps as recommended by accessories manufacturers for types of service indicated.

PART 3 – EXECUTION

3.01 GENERAL

A. Inspection: Installer must examine areas and conditions under which electrical grounding connections are to be made and notify the Architect/Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

B. General: Install electrical ground systems where shown, in accordance with applicable portions of the CEC, with NEMA, and in accordance with recognized industry practices to ensure that products comply with requirements and serve intended functions.

C. Coordinate with other electrical work as necessary to interface installation of electrical grounding systems with other work.

D. Grounding and bonding of electrical installations and specific requirements for systems, circuits and equipment required to be grounded shall be accomplished for temporary and permanent construction.

E. Provide a separate green equipment ground conductor in all electrical raceways to effectively ground all fixtures, panels, receptacles, controls, motors, disconnect switches, exterior lighting standards and noncurrent carrying metal enclosures. The ground wires shall be connected to the building system ground. CEC Table 250-95 shall be used to size the ground conductor if the size is not shown on the drawings.

F. To satisfy the "effective grounding" requirements of the CEC the path to ground from circuits, equipment, and conductor enclosures shall be permanent and continuous and shall have ample carrying capacity to conduct safely any currents liable to be imposed on it, and shall have impedance sufficiently low to limit the potential above ground and to facilitate the operation of the overcurrent devices in the circuit.

G. At the service entrance equipment, bond the utility neutral, building neutral and building ground conductor to a common ground bus (or ground lug). Connect the ground bus to the building domestic cold water pipe with a grounding conductor and an approved clamp and connector. Install the grounding conductor in exposed PVC conduit and make connections readily accessible for inspection. The point of connection to the water service shall be as near the building entrance as possible. Provide a copper wire shunt of the same size as the ground conductor around the water meter and clamp to the water pipe with bronze fittings. Bond the water pipe to the structural steel system of the building and reinforcing bars in footings when such building construction occurs.

H. In addition to the requirements for service entrance grounding listed above, provide a supplemental grounding electrode consisting of driven ground rods (three 10 foot x 3/4 inch copper-clad steel ground rods).

I. Clean the contact surfaces of all ground connections.

J. Where separately derived systems occur, ground the system to a grounding electrode acceptable to the code.

K. Install metallic raceways mechanically and electrically secure at all joints and at all boxes, cabinets, fittings and equipment. At the point of electrical service entrance,

bond all metallic raceways together, with a ground conductor, and connect to the system ground bus. Bond all boxes as specified for equipment.

L. Receptacles: Permanently connect the ground terminal on each receptacle to the green ground conductor.

M. Motors: Connect the ground conductor to the conduit with an approved grounding bushing, and to the metal frame with a bolted, solderless lug.

N. Provide a flexible ground strap (No. 6 AWG) at each flexible duct connection to air handlers, exhaust fans, and supply fans. Install straps to preclude vibration.

O. Provide necessary ground connections to telephone service entrance equipment. Verify requirements with the local telephone company.

P. Provide UFER ground or ground to rebar in existing structural wall or pipes.

END OF SECTION 26 05 26

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this Section.

B. Division 26 "Basic Materials and Methods" sections apply to work of this Section.

1.02 DESCRIPTION OF WORK

A. Extent of raceways is indicated by drawings and schedules.

B. Types of raceways in this Section include the following:
1. Electrical metallic tubing.
2. Flexible metal conduit.
3. Intermediate metal conduit.
4. Liquid-tight flexible metal conduit.
5. Rigid metal conduit.
6. Rigid nonmetallic conduit.
7. Surface metal raceways.

1.03 REFERENCES

A. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.

B. UL Compliance and Labeling: Comply with provisions of UL safety standards pertaining to electrical raceway systems; and provide products and components which have been UL-listed and labeled. Each length of raceway shall bear the Underwriters Laboratories label.

C. CEC Compliance: Comply with CEC requirements which are applicable to the construction and installation of raceway systems.

D. NECA Compliance: Comply with NECA's "Standard of Installation".

E. ANSI Compliance: Comply with ANSI Standards pertaining to Conduit.

F. ETL Verification: Comply with ETL PVC-001 for adhesion performance.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's data including specifications, installation instructions and general recommendations, for each type of raceway required.

PART 2 – PRODUCTS

2.01 STEEL CONDUIT

A. Steel Conduit: Rigid steel conduit, intermediate metal conduit and steel electrical metallic tubing shall be hot-dipped, galvanized or sherardized as manufactured by Youngstown Sheet and Tube Company, National Electric, General Electric, or equal.

B. Joints: Rain tight non-insulated throat type steel compression fittings (connectors and

couplings) shall be provided for electrical metallic tubing systems. All fittings shall be of the steel type with steel locknuts equal to Appleton 95 Series. In dry locations steel set screw connectors/couplings are acceptable.

C. Expansion Joints: Provide expansion fittings, O.Z. Type AX with bonding jumper for rigid conduit and O.Z. Type TX with bonding jumper for electrical metallic tubing. Where embedded raceways cross building expansion joints, provide combination deflection/expansion fittings, O.Z. Type AXDX, or equal.

2.02 ALUMINUM CONDUIT

A. Aluminum Conduit: Rigid aluminum conduit and elbows shall be extruded from primary 6063 aluminum alloy to a T42 temper. The maximum copper content shall not exceed one-tenth of one percent. A petroleum base lubricant containing powered zinc shall be factory applied to the threads at both ends of the conduit. The interior surfaces of conduit and elbows shall be coated at the factory with silicone or an equally effective lubricant to facilitate fishing and wire pulling. Couplings shall be forged from primary 6063 aluminum alloy, threaded, and chamfered. Rigid aluminum conduit, elbows, and couplings shall be Kaiser KINGFISHER as manufactured by Kaiser Aluminum & Chemical Corporation, Aflex Corporation, Reynolds Metals Company, or equal. Unless otherwise noted or specified, aluminum conduit may only be used for raceways 2 inches in diameter, or larger.

2.03 RIGID NON-METALLIC (PVC) CONDUIT

A. PVC (polyvinyl chloride) Conduit: Heavy wall rigid PVC conduit shall be composed of high impact PVC and shall conform to industry NEMA Standards and to Federal Specification WC-1094. Conduits shall be Carlon Schedule 40 type, or approved equal.

2.04 PVC (polyvinyl chloride) COATED GALVANIZED RIGID CONDUIT

A. PVC Coated Galvanized Rigid Conduit shall conform to UL6, NEMA-RN1, ANSI-C80-1 and ETL PVC-001 with fittings from same manufacturer. Ferrous fittings for general service locations must be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating must be UL listed. All conduit and fittings must be new, unused material.

2.05 FLEXIBLE METAL CONDUIT

A. Flexible metal conduit shall conform to UL1. It shall be formed from continuous length of spirally-wound, interlocked zinc-coated strip steel.

2.06 LIQUID-TIGHT, FLEXIBLE METAL CONDUIT

A. Liquid-tight flexible metal conduit shall be constructed of a single strip, flexible, continuous, interlocked, and double-wrapped steel; galvanized inside and outside; and coated with an oil-resistant, liquid-tight thermoplastic jacket.

2.07 WIREWAYS

A. General: Provide electrical wireways of types, grades, sizes, weights (wall thicknesses), and number of channels for each type service indicated. Provide complete assembly of wireways including, but not necessarily limited to couplings, offsets, elbows, expansion joints, adapters, hold down straps, end caps, and other components and accessories as needed for a complete system. Where types and

grades are not indicated, provide proper selection as determined by the Installer to fulfill wiring requirements and comply with applicable provisions of CEC for electrical raceways.

B. Surface Metal Raceways: Provide surface metal raceways of sizes and channels indicated; in compliance with FS W-C-582. Construct of galvanized steel with snap-on covers, with 1/8" mounting screw knockouts in base approximately 8" o.c. Provide fittings indicated which match and mate with raceway. Finish with manufacturer's standard prime coating suitable for painting. Provide all necessary devices as shown on the drawings for a complete installation.

C. Manufacturers: Subject to compliance with requirements, provide surface metal raceways of one of the following:
1. B-Line Systems, Inc.
2. Midland-Ross Corporation
3. Power-Strut Division; Youngstown Sheet and Tube Company
4. Johnson Plastic Division; Johnson Rubber Company
5. Square D Company
6. Versa-Tech Corporation
7. Walker/Parkersburg Division; Textron, Inc.
8. Wiremold Company

PART 3 – EXECUTION

3.01 GENERAL

A. Install electric raceways where indicated; in accordance with manufacturer's written instructions, applicable requirements of the CEC and NECA's "Standard of Installation" and complying with recognized industry practices.

B. Raceways embedded in concrete or in earth below floor slabs shall be PVC coated rigid metal or schedule 40 PVC conduit. PVC conduit shall be provided with PVC coated rigid metal elbows when the raceway system exits the concrete topping or earth.

C. Electrical metallic tubing shall not be embedded in concrete or installed in earth.

D. Aluminum conduit shall not be embedded in concrete, or installed in earth.

E. Rigid heavy wall Schedule 40 PVC conduit shall be installed in earth and concrete only.

F. PVC coated rigid metal conduit can be installed in earth, concrete and wherever there is a requirement for extra corrosion protection.

G. Raceways in outside walls or in refrigerated areas shall be rigid steel conduit, or intermediate metal conduit.

H. Provide rigid steel conduit or intermediate metal conduit for exposed raceways from floor to eight feet above the floor in mechanical rooms and in areas designated on the plans.

I. Rigid galvanized steel conduit or galvanized intermediate metal conduit shall be used where conduit is exposed to weather.

J. Conduits in hazardous locations shall conform to the California Electrical Code. Rigid galvanized steel conduit or intermediate metal conduit shall be used in hazardous locations. PVC conduit shall not be used in hazardous areas.

K. Rigid metal, intermediate metal, electric metallic tubing or PVC conduit where allowed in other section 3.1 paragraphs shall be used for feeders and branch circuits.

L. Installers of the PVC-coated galvanized rigid conduit system must be certified by the manufacturer and be able to present a valid, unexpired certified installer card prior to starting installation. All clamping, cutting, threading, bending, and assembly instructions given during the manufacturer's certified installation training should be vigorously followed.

M. Flexible metal conduit may be used to connect light fixtures in accordance with CEC requirements. Provide flexible metal conduit for connections to motors, transformers, generators, and other equipment subject to vibration. Length of flexible conduit shall be a minimum of one foot for conduit diameters up to 1-1/2". A minimum of 3" of flexible conduit shall be added for every 1/2" increase in conduit diameter. Flexible metal conduit installation shall be kept to a minimum in connecting electrical equipment. In no case is flexible metal conduit allowed to be longer than six feet in length without prior UNL project manager approval. Sealtight, flexible conduit shall be used where the flexible conduit may be subject to moist or humid atmosphere, corrosive atmosphere, subject to water spray and subject to dripping oil, grease or water. In no case is sealtight, flexible conduit allowed to be longer than six feet in length without prior UNL project manager approval.

N. Conduits shall be 3/4" diameter, minimum. This minimum applies to all conduit, including conduit to light switch box locations, and other 'last leg' type situations. Raceway sizes shown on the drawing are based on type THHN/THWN conductors.

O. Type Material: Except as noted otherwise all conduit shall be steel.

3.02 INSTALLATION

A. All raceways shall be installed concealed except where shown or noted otherwise.

B. At the Contractor's option, concealed raceways may be embedded in concrete, except as noted otherwise, or installed in furred spaces above ceilings or behind walls.

C. Continuity: Provide metallic raceways continuous from outlet to outlet, and from outlets to cabinets, junction or pull boxes. Enter and secure conduit to all boxes to provide electrical continuity from the point of service to outlets. Provide double locknut and bushing on terminals of metallic conduits.

D. In duct banks a 1/4" diameter nylon rope shall be installed in all empty conduits to facilitate future installation of cabling.

E. Provide accessible "seal-off" fittings for all raceways entering or leaving hazardous areas, entering or leaving refrigerated areas and as otherwise required by the California Electrical Code.

F. Where conduits penetrate the roof seal, they shall be installed in curbs provided for mechanical equipment. When this is not possible, suitable pitch pockets, lead flashing, or approved fittings shall be provided. Details for special conduit installations shall be as shown on the drawings.

G. Reinforced Concrete: No reinforcing steel shall be displaced to accommodate the installation of raceways and outlet boxes. Outlet boxes shall not be installed in beams or joists. In general, all embedded conduits shall be located in the physical center of the particular section of concrete. Unless otherwise indicated, raceways embedded in reinforced concrete shall conform to the following usual types of conditions. Particular attention is called to the fact that there are many extenuating conditions where the Contractor may be instructed in writing during the course of the project not to place embedded conduits in certain areas, generally due to the possibility of unsightly cracking or for structural reasons. This instruction shall not entitle the Contractor to extra compensation. Any condition not covered by the following usual conditions shall require special clarification.

	Location	Maximum Allowance
1.	Columns	Displacement of 4 percent of plan area of column.
2.	Beams and Joists	Displacement of 1/3 of least dimension, spaced not less than three diameters on center.

H. Furred Spaces: Raceways installed in furred spaces shall be installed in accordance with the requirements of the California Electrical Code. Do not anchor or strap conduits to the ceiling furring channels or attach to furred ceiling hanger wires.

I. Above Suspended Ceilings: Raceways may be attached to an independent suspension system (wire hangers) above drop ceilings if installed in such a manner that the ceiling panels may be removed without interference with the raceway. The independent wire hangers supporting the raceway shall be sized to carry the raceway load, support only the raceway, and shall be secured both above and below the raceway connection point (at both ends). In all cases, raceways shall be securely fastened in place such that both vertical support and horizontal support is provided.

J. Stub Ups: Extend conduit stubs at least one foot above slab or fill, before connection is made to electrical metallic tubing.

K. Exterior Conduits: Install raceways a minimum of 42” below finished grade. Encase service conductors and medium voltage duct banks in concrete. All ducts installed in concrete shall be 4” diameter unless otherwise noted.

L. Provide marking of conduit and junction boxes to indicate which distribution system they are serving. The markings could be colored tape on conduit at or near junction boxes with different colored tapes indicating different distribution systems. Concealed junction boxes shall be legibly marked with a magic marker to indicate the panel and circuit number that junction box serves.
   1. The distribution systems shall be color coded as follows:
      a. 120/208 Volt - Green
      b. 277/480 Volt - Orange

M. Steel Conduit (galvanized rigid steel, IMC or EMT):
   1. Cutting: Cutting shall be done with hand or power hacksaws. All cut ends shall be reamed to remove burrs and sharp edges.
   2. All threaded joints shall be made up wrench-tight and all compression joints shall be made up mechanically secure and snug so as to make continuous current-carrying electrical contact.

3. All metallic conduits buried or otherwise in contact with earth shall be painted using one heavy continuous coat of asphalt varnish after assembly of conduit and fittings.
4. Expansion joints shall be installed in steel conduit systems in structures as follows expansion joints are specified elsewhere in the specification):
   a. Where conduit run crosses a building expansion joint in unconditioned space(s) or where conditioned spaces fluctuate by more than 40 degrees.
   b. Where shown on the drawings.

N. Threads: Clean all threads of rigid or intermediate metal conduit. Coat all male threads of all steel conduit installed in concrete with red or white lead immediately before being coupled together.

O. Running Threads: Use "Erickson" type couplings in lieu of running threads.

P. Aluminum Conduits:

1. Cutting: Cutting shall be done with hand or power hacksaws. All cut ends shall be reamed to remove burrs and sharp edges.
2. Joints: All joints shall be made up wrench-tight so as to make continuous current-carrying contact. Lubricate all joints before assembly. Use a standard aluminum lubricant recommended by the raceway manufacturer.
3. Wire Pulling: Wire pulling shall be accomplished with round metal tapes, polyethylene ropes or nylon manila ropes.
4. Expansion Joints: Expansion joints shall be installed in structures as follows:

   a. Where conduit run crosses a building expansion joint.
   b. In any conduit run exceeding 75 feet in length.
   c. Where shown on the drawings.

5. Bending: Use hydraulic benders for all sizes of aluminum conduit.
6. Support Spacing: Support conduit, size 2 through 4 inches, a maximum of 7 feet, 6 inches on center. Support conduits 5 inches and larger not less than 5 feet on center.

Q. PVC Conduit:

1. Joints: Conduits shall be joined by using couplings and solvent cement furnished or recommended by the raceway manufacturer. Finished joints shall be secure and watertight.
2. Cutting: Cutting shall be done with hacksaws and ends shall be reamed to remove burrs and sharp edges.
3. Expansion Joints: Expansion joints shall be installed:

   a. Where conduit run crosses a building expansion joint.
   b. As recommended by the manufacturer or as shown on the drawings.

4. Bends for PVC conduit sizes 2" and smaller may be made "hot" in the field. Inside dimension shall be thereby undistorted. For PVC sizes larger than 2", provide only factory bends.

R. PVC Coated Rigid Conduit:

1. Coating: Coating shall not be damaged during the installation of the product.
2. Cutting: Cutting shall be done with hand or power hacksaws. All cut ends shall be reamed to remove burrs and sharp edges.

3. Threading: Conduit shall be threaded by utilizing proper tools recommended by the manufacturer.
4. Joints: All joints shall be made up wrench-tight with the proper tools so as to make continuous current-carrying contact. Lubricate all joints before assembly. Use a lubricant recommended by the manufacturer.
5. Wire Pulling: Wire pulling shall be accomplished with round metal tapes, polyethylene ropes or nylon manila ropes.
6. Bending: Use hydraulic benders for all sizes of conduit with proper shoes for PVC Coated conduit.
7. Touch-Up: Use touch-up compound in accordance with manufacturer's instructions. For added protection, touch-up compound is to be used around all sleeves in wet locations.

END OF SECTION 26 05 33

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this Section.

B. Division 26 "Basic Materials and Methods" sections apply to work of this Section.

1.02 DESCRIPTION OF WORK

A. The extent of wiring device work is indicated by drawings and schedules. Wiring devices are defined as single discrete units of electrical distribution systems which are intended to carry, but not utilize electrical energy.

B. Types of electrical wiring devices in this Section include the following:
   1. Receptacles
   2. Switches
   3. Wall Plates
   4. Dimmer Controls
   5. Floor Outlets
   6. Underfloor Duct and Fittings

1.03 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of wiring devices of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 3 years.

B. Installer: Qualified with at least 2 years of successful installation experience on projects with electrical installation work similar to that required for this project.

1.04 REFERENCES

A. CEC Compliance: Comply with CEC as applicable to construction and installation of electrical wiring devices.

B. UL Compliance and Labeling: Provide electrical wiring devices which have been UL listed and labeled.

C. NEMA Compliance: Comply with NEMA standards for general and specific purpose wiring devices.

D. NECA Compliance: Comply with NECA's "Standard of Installation."

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical wiring devices.

PART 2 – PRODUCTS

2.01 Manufacturers: Subject to compliance with requirements, provide products of one of the following:

A. Pass and Seymour Corporation

B. Cooper

C. Hubbell, Inc.

D. Leviton, Inc.

E. Crouse Hinds

F. Wiremold

G. Walker Duct

H. Cellco

I. Lutron

2.02 WIRING DEVICES

A. General: Where shown on the drawings, furnish and install wiring devices indicated by the appropriate symbols. Wiring devices shall be products of Pass and Seymour Corporation, or equal. Catalog numbers shown below are P & S hard use specification grade. Similar devices manufactured by Hubbell or Leviton shall be equally acceptable.

B. Switches: Branch circuit switches shall be flush tumbler (rocker) type as follows:
1. Single Pole 20AC1 Series - Gray
2. Two Pole 20AC2 Series - Gray
3. Three-Way 20AC3 Series - Gray
4. Four-Way 20AC4 Series - Gray
5. Single Pole SW With Pilot 20-AC1-RPL Series
6. Switches for emergency systems shall be as shown above, but red in color.
7. Wall Mounted Line Voltage PIR type Occupancy Sensing Switches: Watt Stopper type WA-200 – 120/277 – Ivory with time delay set at 15 minutes
8. Ceiling Mounted Line Voltage Ultrasonic Occupancy Sensing Switches: Watt Stopper type WT-1105 – Ivory with time delay set at 15 minutes with a Watt Stopper B120E-P power pack. Mount power pack above accessible ceiling. Provide all necessary wiring between power pack and occupancy sensor.
9. Wall Mounted Line Voltage Dual Technology Occupancy Sensing Switches: Watt Stopper type DT-200 – Ivory with time delay set at 15 minutes with a Watt Stopper B120E-P power pack. Mount power pack above the accessible ceiling. Provide all necessary wiring between power pack and occupancy sensor.

2.02 RECEPTACLES

A. All receptacles shall be side and back wired, self-grounding of the type indicated on the drawings, or as follows. Catalog numbers shown below are Pass & Seymour specification grade unless otherwise indicated. Similar devices manufactured by Hubbell or Leviton shall be equally acceptable:

1. Duplex Convenience Receptacles 20A-125V (Grounding Type)	5362 Series-Gray
2. Weatherproof Duplex Receptacles 20A-125V (Grounding Type)	5362 WP Series-Gray with Weatherproof F.S. Plate
3. Duplex GFI Receptacle 20A-125V	2091 Gray
4. Weatherproof Duplex GFI Receptacle 20A-125V	2091 with 4511 (horizontal) or 4512 (vertical) Weatherproof Wall Plate
5. Clock Hanger Outlet	S3733-SS
6. Hospital Grade Receptacle 20A-125V	8300 Gray for Normal Power and 8300 Red for Emergency Power
7. Hospital Grade GFI Receptacle 20A-125V	2091-HG Gray for Normal Power and 2091-HG Red for Emergency Power
8. Safety Receptacle	SG-62H Gray for Normal and SG-62H Red for Emergency
9. Emergency Duplex Receptacle 20A-125V	8300 Red
10. Isolated Ground Receptacles 20A-125V, Ground Wire shall be routed back to main switchboard ground or separately derived system ground in accordance with CEC requirements	IG6300 with Orange Cover Plate

B. Receptacles on emergency power shall be red in color. Coverplates for emergency outlets in these areas shall be engraved with panel and circuit no. designation per CEC. Engraving shall be 1/8" high, block style letters, with red filler on front side of coverplates.

2.03 PLATES

A. Furnish and install wall plates for all wiring devices. Plates for flush devices shall be Pass and Seymour "RP" Series high impact thermoplastic, and shall be gray in color. Oversize plates are not acceptable. Weatherproof switch plates shall be Crouse Hinds DS185 type. Where switches and/or receptacles are shown adjacent to each other, provide a common cover plate for each group of devices.

B. Furnish and install wall plates for all wiring devices. Plates shall be Pass and Seymour Type 302 stainless steel. Oversize plates are not acceptable. Weatherproof switch plates shall be Crouse Hinds DS185 type. Where switches and or receptacles are shown adjacent to each other, provide common plate for each group of devices.

2.04 MULTI-OUTLET SURFACE ASSEMBLIES

A. Provide two piece surface metal raceway assemblies manufactured by the Wiremold Company or Walker Parkersburg Products, complete including fittings, devices, end closures, conduit entrance fittings, elbows, and boxes. Except where specified otherwise on the drawings, provide Wiremold G-4000 Series base cover and divider and provide accessory devices as noted on the drawings.

2.05 FLOOR OUTLETS

A. Flush Mounted Floor Boxes and Floor Outlets: Provide Steel City No. 664 box, No. 664-CST cover, one 20A, 125V duplex receptacle, one 664RP receptacle faceplate, and one 664BP blank faceplate for each flush mounted floor convenience outlet. When carpet is indicated on the finish schedule, supply each floor box or outlet with

an appropriate carpet flange.

Poke-Thru Service Fittings: Provide Steel City poke-thru service fittings or approved equal complete with a FPT-400 series fire rated insert suitable for the distribution of power, communications, and data wiring. Provide FPT-400 series service fitting heads with faceplate types as noted on the drawings, or as required to meet specified project needs.

2.06 UNDERFLOOR DUCT AND FITTINGS

A. This Contractor shall furnish and install an underfloor duct system as shown on the plans, complete with all junction boxes, end caps, elbows, conduit adapters, supports, anchors, covers, flanges and other necessary components for a complete and workable installation.

B. The system shall consist of No. 2 power duct and No. 4 communications duct with inserts 24" on center. Duct shall be manufactured by Walker/Parkersburg, Cellco or approved equal.

C. Power duct and comm./computer duct shall be aligned with 1-inch spacing between parallel duct runs using duct supports spaced at 5 foot intervals and as recommended by the manufacturer. Top of inserts shall be made watertight with sealing compound.

D. Provide service fittings where shown on the plans. Prior to installation verify service fitting locations with the Owner.

E. Devices and cover plates shall be similar to those specified for floor outlets.

2.07 Where devices are installed on exposed fittings or boxes, the plates shall be galvanized and of a type designed to fit the box. Blank covers shall be installed on all boxes without devices or fixtures, of same type as installed on devices in the room or area.

2.08 Test wiring devices to ensure electrical continuity of grounding connections and proper polarity.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install wiring devices as indicated in compliance with manufacturer's written instructions, applicable requirements of the CEC and NECA's "Standard of Installation," and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other work including painting, electrical boxes and wiring work, as necessary to interface installation of wiring devices and other work.

C. Testing: Test wiring devices for electrical continuity and proper polarity of connections. Test wiring devices to demonstrate compliance with requirements.

D. All outlets shall be located as shown on the drawings, except that where practicable, outlets shall be located in center of panels or trim or otherwise symmetrically located to conform with existing structural layout. Outlets incorrectly installed shall be corrected. Damaged items or damaged finishes shall be repaired or replaced at no expense to the Owner.

E. Outlets shall be set plumb or horizontal and shall extend to the finished surface of the walls, ceiling or floor, as the case may be, without projecting beyond the same.

F. Receptacles, switches, etc., shown on wood trim, cases or other fixtures shall be installed symmetrically; and, where necessary, shall be set with the long dimensions of the plate horizontal, or ganged in tandem.

G. Where dimmer switches are shown adjacent to standard switches, both shall be installed in separate back boxes with adequate space between so that neither cover plate requires cutting.

H. Where devices are shown near wall openings, coordinate location if corner guards are to be installed so that cover plates do not require cutting.

I. Where devices are shown mounted adjacent to one another on the drawings, provide multi-gang faceplates to cover all devices.

END OF SECTION 26 27 26

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior luminaires.
2. Lamps.
3. Poles and accessories.
4. Luminaire accessories.

1.2 REFERENCE STANDARDS

A. American Society for Testing and Materials

1. ASTM A641/A641M – Standard Specification for Zinc-Coated (Galvanized Carbon Steel Wire.

B. California Building Standards Code (California Code Regulations, Title 24):

1. CAL TITLE 24 P3 – California Electrical Code (NFAP 70 with California Amendments).
2. CAL TITLE 24 P6 – California Energy Code.

C. Institute of Electrical and Electronic Engineers:

1. IEEE C2 - National Electrical Safety Code.

D. Illuminating Engineering Society

1. IES LM-63 - IESNA Standard File Format for Electronic Transfer of Photometric Data and Related Information.
2. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products.
3. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules.

E. National Electrical Contractors Association/Illuminating Engineering Society of North America:

1. NECA 1 - Standard for Good Workmanship in Electrical Construction.
2. NEMA C78.377 – Electric Lamps – Specifications for the Chromaticity of Solid-state Lighting Products.
3. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems.

F. National Fire Protection Association:

1. NFPA 70 - National Electrical Code with California Amendments.

G. Underwriters Laboratories:

1. UL 1598 - Luminaires.
2. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:
   a. Include estimated useful life, calculated based on IES LM-80 test data.
   b. Include IES LM-79 test report.

2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IES LM-63 standard format upon request.
3. Ballasts and LED Drivers: Include wiring diagrams and list of compatible lamp configurations.
4. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.
5. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

B. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

C. Certification that luminaire, ballast or LED driver, and lamps comply with CAL TITLE 24 P6 requirements.

D. Field Quality Control Reports.

1. Include test report indicating measured illumination levels.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

F. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

G. Maintenance Materials: Furnish the following for LLNS's use in maintenance of project.

1. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.
2. Extra Ballasts: Two percent of total quantity installed for each type, but not less than one of each type.
3. Touch-Up Paint: 2 gallons, to match color of pole finish.

H. Project Record Documents: Record actual connections and locations of pole foundations, luminaires, and any pull or junction boxes.

1.5 QUALITY ASSURANCE

A. Comply with requirements of The 2022 California Electrical Code.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.7 WARRANTY

A. Provide five-year manufacturer warranty for all LED luminaires, drivers, material, fixture finish, and workmanship. On-site warranty includes transportation, removal, and installation of new products.

1. Finish warranty includes warranty against failure and against substantial deterioration such as blistering, cracking, peeling, chalking, or fading.
2. Material warranty includes power supply units (drivers) and replacement with more than 10 percent of LED sources in any lightbar or subassembly are defection or non-starting.

B. Provide luminaire useful life certificate.

PART 2 - PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LED LUMINAIRES

A. Where a specific manufacturer or model is indicated elsewhere in the luminaire schedule or on the drawings, substitutions are not permitted unless explicitly indicated.

B. Provide products of the same type by the same manufacturer.

C. Provide products that comply with requirements of The 2022 California Electrical Code, CAL TITLE 24 P3, and CAL TITLE 24 P6.

D. Provide products that are listed and labeled as complying with UL 1598, where applicable.

E. Provide products that comply with the seismic requirements of ASCE 7-16.

F. Provide products listed, classified, and labeled as suitable for the purpose intended.

G. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts or lamp drivers, reflectors, lenses, housings, and other components required to position, energize, and protect the lamp and distribute the light.

H. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, and accessories as necessary for a complete operating system.

I. Provide products suitable to withstand normal handling, installation, and service without damage, distortion, corrosion, fading, or discoloring.

J. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

K. LED Luminaires:

1. Components: UL 8750 recognized or listed as applicable.
2. Tested in accordance with IES LM-79 and IES LM-80 prior to shipment from the factory.
3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.3 POWER SUPPLY UNITS (DRIVERS)

A. Manufacturers:

1. Where a specific manufacturer or model is indicated elsewhere in the luminaire schedule or on the drawings, substitutions are not permitted unless explicitly indicated.

B. LED Drivers:

1. Minimum Efficiency: Provide drivers complying with current federal and CAL TITLE 24 P6 efficiency standards for ballasts and not less than 85 percent efficiency.
2. Drive current to each individual LED must not exceed the current limit specification of the LED manufacturer.
3. Rated to operation between ambient temperatures of 20 degrees F and 104 degrees F.
4. Designed to operation on the voltage system to which they are connected, typically ranging from for 120 to 480 V.
5. Operating Frequency: 60 Hz
6. Power Factor (PF): 0.90, minimum
7. Total Harmonic Distortion (THD): 20 percent, maximum
8. Must meet requirements of 47 CFR 15, class B
9. Control Compatibility: Fully compatible with the lighting controls to be installed.
10. Power Supply: Mounted integral to the luminaire. Remote mounting of power supply is prohibited.
11. Equipped with over-temperature protection circuit that turns lamp off until normal operating temperature is achieved.

C. Dimmable LED Drivers:

1. Dimming Range: Continuous dimming from 100 percent to 10 percent relative light output unless dimming capability to lower level is indicated, without flicker.
2. Control Compatibility: Fully compatible with the dimming controls to be installed.

D. LED Luminaire Surge Protection: Provide surge protection integral to luminaire to meet C low waveforms as defined by IEEE C62.41.2, scenario 1, location category C.

2.4 CONTROLS

A. Provide a control system interface within each luminaire to provide control by photocell, auto switch, and bypass switch or lighting control panel.

B. Photocells:

1. Designed to fail in the ON position
2. Provide hermetically sealed light sensor type.
3. Provide time delay to prevent accidental switching from transient light sources.
4. Provide surge protection.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with The 2022 California Electrical Code.

B. Verify that suitable support frames are installed where required.

C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 EXISTING WORK

A. Disconnect and remove abandoned exterior luminaries.

B. Extend existing exterior luminaire installations using materials and methods compatible with existing installations, or as specified.

C. Clean and repair existing exterior luminaries to remain or to be reinstalled.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires in accordance with NECA/IESNA 501.

D. Provide required support and attachment.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Recessed Luminaires:

1. Install trims tight to mounting surface with no visible light leakage.
2. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and fire-stopping materials to meet regulatory requirements for fire rating.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.4 FIELD QUALITY CONTROL

A. Inspect each product for damage and defects.

B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts.

D. Measure illumination levels to verify conformance with performance requirements.

E. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.5 ADJUSTING

A. Aim and adjust luminaries to provide illumination levels and distribution as indicated on Drawings.

B. Luminaires with Field-Rotatable Optics: Position optics according to manufacturer's instructions to achieve lighting distribution as indicated.

3.6 CLEANING

A. Clean photometric control surfaces as recommended by manufacturer.

B. Clean finishes and touch up damage.

3.7 PROTECTION OF FINISHED WORK

A. Relamp luminaries having failed lamps at Substantial Completion.

B. Replace drivers that have failed at Substantial Completion.

END OF SECTION 26 56 00

SECTION 31 05 00 NONDESTRUCTIVE LOCATION AND MARKING OF UNDERGOUND UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. This specification describes nondestructive location and marking of underground utilities.

B. The purpose of this specification is to provide engineers and specifiers a suggested framework for detailing the minimum requirements for a nondestructive location of underground utilities prior to excavation/ground disturbance.

1.02 Codes, Standards & Definitions

A. Occupational Safety and Health Administration - Safety and Health Standards Digest Construction Industry (OSHA) - 3149/1996)

B. American Society for Nondestructive Testing, (ASNT). The ASNT is the world's largest technical society for nondestructive testing (NDT) professionals. The society provides a forum for exchange of NDT technical information; NDT educational materials and programs; as well as standards and services for the qualification and certification of NDT personnel.

C. ASNT Recommended Practice No. SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing. This Recommended Practice establishes the general framework for a qualification and certification program. In addition, the document provides the educational experience and training recommendations for different test methods including use and application of ground penetrating RADAR. This recommended practice is not intended to be used as a strict specification. It is recognized, however, that contracts require programs which meet the intent of this document. For such contracts, purchaser and supplier must agree upon acceptability of an employer’s program.

D. Federal Communications Division, (FCC). The Federal Communications Commission (FCC) is an independent United States government agency. The FCC was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable.

E. Common Ground Alliance, (CGA). The CGA is a member-driven association of 1,700 individuals, organizations and sponsors in every facet of the underground utility industry. Established in 2000, CGA is committed to saving lives and preventing damage to underground infrastructure by promoting effective damage prevention practices. CGA has established itself as the leading organization in an effort to reduce damages to underground facilities in North America through shared responsibility among all stakeholders. The underground utility location contractor shall adhere to all applicable safety guidelines in accordance with federal, state, and local ordinances.

F. Definitions

1. Subsurface Investigation Methodology, (SIM). Set of methods, training, field mentoring, and necessary equipment required for a complete subsurface investigation of underground utilities resulting in mark out of critical targets. Examples: power , communication, water and sewer, gas line and other commercial/industrial buried service lines.

2. Utility location. The process of identifying and labeling public and private utility lines that are underground. These lines may include telecommunication, electricity distribution, natural gas, cable television, fiber optics, traffic lights, street lights, storm drains, water mains, and wastewater pipes.

3. Owner – Legal owner of the structure or property to be investigated.

4. Contracting agency – The contractor hired directly or indirectly by the owner who is sub-letting the scanning requirements to a scanning contractor.

5. Scanning contractor – The contractor hired to perform the scanning operation resulting in location of underground utilities.

6. Ground Penetrating Radar (GPR) – A geophysical method that uses pulses of electromagnetic wave energy to image the subsurface. Ground penetrating radar transmits energy in the microwave band of the of the electromagnetic spectrum

7. Frequency - The frequency describes the number of waveforms transmitted from a GPR antenna per second. Frequency is measured in cycles per second, or Hertz (Hz).

8. Line Scan - Collection of one straight line of GPR data resulting in the display of a cross-sectional depth representation of the RADAR signal moving through the material scanned.

9. Electromagnetic locator (EM)– Also known as a pipe and cable locator, is used for tracing utility lines and metallic pipes, and clearing excavation and drilling locations. These utility locators consist of two main parts, a transmitter and a receiver.

1.03 Quality Assurance

A. Scanning contractor shall submit certification of experienced-based training that meets or exceeds the guidelines detailed in ASNT document 'Recommended Practice SNT-TC-1A, *Personnel Qualification and Certification in Nondestructive Testing Level I* '. The ASNT document recommends 8 hours as a minimum for training and a minimum of 60 hours practicing GPR in order to be a certified NDT Level I in Ground Penetrating Radar.

B. Scanning contractor shall utilize detailed methods, Subsurface Investigation Methodology, SIM requirement for competent field personnel:

1. Field mentoring, 4 weeks of application training from mentor.

2. 80 hours of classroom curriculum, GPR theory, underground utility location training, SIM investigative method training.

3. Post classroom training mentoring, 4 week practical application of testing

equipment and investigative methods.

C. Field technicians shall maintain minimum OSHA 10 safety training certificate.

D. GPR equipment provided by scanning contractor:

1. Ground penetrating radar system, to include:

2. Radar Data Acquisition System/Controller with integrated display.

3. Various applicable RADAR antennas, Utility and Concrete.

4. Miscellaneous hardware, cables, hand cart, marking tape, and power supply.

E. Electromagnetic Locating Equipment, “Pipe Locator”:

1. Capable of receiving electromagnetic and communication line frequencies passively or induced.

1.04 SUBMITTALS

A. Photographs or video tape, sufficiently detailed, of existing conditions and site improvements including all underground utilities.

B. Record drawings according to Division 01 Section “Contract Closeout.” Identify and accurately locate capped utilities and other subsurface structural, electrical and mechanical conditions.

1.05 JOB CONDITIONS

A. Conduct all operations in such a manner as to prevent damage to existing structures and surfaces to remain. Keep free of damage those portions of existing site appurtenances which are to remain. Repair any damage incurred because of the work of this Section to satisfaction of Owner. See applicable Sections of Division 1, “General Requirements” for further protection requirements.

PART 2 PRODUCTS

2.01 INVESTIGATION SCOPE

A. Scanning contractor will utilize job site information, available as-builts and prints/plans and previously detailed equipment to locate and mark out underground facilities and unknown anomalies.

1. This mark out may include depth estimates of targets.

2. If the scan area includes a slab on grade and the post scan work requires trenching a lower frequency antenna may be used to locate targets in the backfill material under the slab.

3. Review of equipment capabilities and potential job-site performance impedances.

PART 3 EXECUTION

3.01 SIM PRE-SCAN INVESTIGATION

A. SIM Pre-investigation Steps :

1. Job Hazard Analysis, form review, or equal site safety review documentation. Review and sign site safety plan if applicable.

2. Site walk and project scope meeting, review scan locations. Note: look for visible clues such as electrical rooms, service access ports like manholes and other utility boxes, visible conduits, etc.

3. Site contact interview, review known utilities, discuss possible unknowns, and anticipated critical targets. Review site post scan scope of work. Suggest scan area options.

4. Will GPR data samples be required for reporting.

5. Type of markings (paint, flags, other)

6. Client deliverable requirements, report format/documentation. GPS Mapping of site findings.

B. SIM SCANNING PROCEDURES

1. It is recommended that the scanning contractor calibrate the GPR system to the conditions at each site. This calibration may be estimated or a test performed to determine the correct dielectric of the soil using hyperbola matching or calibrating to an object at a known depth.

2. Perform several test scans through the scan area to determine the approximate maximum depth penetration and to gauge the probability of success in finding the desired targets.

3. Review the clarity of the scan data. Adjustments in gain, depth range, filters, and other settings may be necessary.

3.02 SIM METHODS FOR COMPLETE INVESTIGATION

A. Follow and document the SIM methods applied.

1. Confirm information collected from section 4.2 and 4.3.

a. As-built site plans, original design plans.

b. Site walk aboveground utility indicators.

B. Scan and mark with electromagnetic locator.

1. Trace all known utilities. Typical known utility list includes five primary utilities to any building, water, electric, gas, sanitary sewer, and communication lines. Additionally, all utilities identified on a drawing not on list, any that have been communicated verbally, and any utility for which a feature can be observed.

2. Use EM Locator at visible features valve, manhole, riser, etc.

3. Use direct connection method when possible (note: do not connect directly to any potentially live electrical wires)

4. Use induction clamp if direct connection is not possible

5. Use induction method if induction clamp is not possible

6. After connecting or inducing with the transmitter, use the receiver to complete a full 360° sweep around the connection point.

7. Mark and trace all potential fields that are detected.

8. During this sweep, measure mA levels on the receiver in order to assist in correctly identifying the target line.

9. Identify the target line by tracing it to the connection point and at least to the next feature.

10. After tracing and marking any utility, sweep parallel to the utility on both sides in order to check for laterals/T's.

11. Insert traceable rodder or sonde into known sewer, storm, and drain lines.

12. Trace the rodder or sonde using the receiver.

13. Use EM receiver to attempt to locate any unidentified, known utilities from features using passive modes (Power/Radio).

14. Sweep using passive modes parallel to the utility on both sides in order to check for laterals/T's.

C. Scan with GPR standard utility antenna, typical frequency 400 MHz or 350 Hyper stacking antenna.

1. Calibrate GPR settings to current site conditions.

2. Use GPR to attempt to locate any unidentified, known utilities.

3. Collect scans with GPR parallel to any marked utility in order to check for laterals/T's.

4. Document any known utilities that could not be located.

5. Perform passive sweeps with electromagnetic locator to locate unknown utilities.

6. Sweep all areas in a grid with spacing determined by site conditions.

7. Sweep separately with Power mode and Radio mode (and Cathodic Protection mode when applicable)

8. Collect GPR scans to locate unknown utilities.

9. Scan all areas in a grid with spacing determined by site conditions.

10. Collect GPR scans across all previously located utilities to confirm locations and approximate depths.

11. Document findings with photos and additional reporting/mapping if required.

3.03 SIM POST INVESTIGATION HAND OFF

A. If possible, a recap and review of findings with site contact

1. Explain scan findings, where did the technologies work well and where results were inconclusive due to interference and or soil conditions.

2. Explain markings and depth estimates.

3. Review original scope to confirm expectations were met/exceeded.

END OF SECTION

SECTION 31 10 00: SITE CLEARING

PART 1 - GENERAL

1.1 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The General Conditions, Supplementary Conditions and Division 1 are fully applicable to this Section, as if repeated herein.

1.2 CODES

A. The following are minimum requirements and shall govern, except that all local, state and/or federal codes and ordinances shall govern when their requirements are in excess hereof.

1.3 DESCRIPTION

A. Furnish all materials, labor, equipment, services, etc., necessary and incidental for the completion of all site clearing and removal work as shown on the drawings and as specified herein.

B. All onsite and offsite work included consists of but is not limited to the following:

1. Removal of existing sidewalks, drives, curbs, pavements, etc. per plans. Trees, shrubs, irrigation. See Abatement Report.
2. Removal and capping off or relocation of existing underground utilities, underground structures, etc. per plans.
3. Removal from site and disposal of all waste, debris and unusable material.
4. Backfill all open excavations created by the removal of underground utilities, underground structures, etc.

1.4 RELATED SECTIONS

A. Related work specified elsewhere:

1. Section 31 05 00 -- Nondestructive location and marking of underground utilities.

2. Section 31 20 00 – Earth Moving.

1.5 QUALITY ASSURANCE

A. Obtain and pay for any permits, bonds, licenses, etc., required for Site Clearing and Removal work.

B. All clearing and removal work shall be accomplished in strict accordance with all local and state building codes, requirements and regulations including but not limited to noise abatement, dust control, classification of disposal materials, etc.

C. Any work within street or highway right-of-way shall be done in accordance with the requirements of the governmental agencies having jurisdiction and shall not begin until these governing authorities have been notified.

1.6 REFERENCES AND STANDARDS

A. California Building Code (CBC), edition as noted on the drawings, as adopted by the California Division of State Architect (DSA).

B. California Green Building Standards Code, edition as noted on the drawings, as adopted by the California Division of the State Architect (DSA).

C. Caltrans Standard Specifications Section 17.

1.7 JOB CONDITIONS

A. An attempt has been made to show all existing structures, utilities, drives, pavements, curbs, walks, etc. in their approximate location on the survey and/or working drawings. However, others that are not shown may exist and may be found upon visiting the site or during the clearing and removal work. It will be the responsibility of this contractor to accurately locate all existing facilities and to determine their extent. If such facilities obstruct the progress of the work and are not indicated to be removed or relocated, they shall be removed or relocated only as directed by the Owner.

1. Report any existing site element not shown on the working drawings to the Architect of Record so that the proper dispensation of that element may be made.

B. Natural features, existing structures, existing landscaping, existing utilities, etc. which are indicated to remain on the drawings and specifications shall be protected and shall not be defaced or damaged in any manner.

C. Restore to their present conditions any pavement in the public right-of-way that is disturbed by the work under this section. All pavement restoration work in public rights-of-way shall be performed to the full satisfaction of the governmental agencies having local jurisdiction.

D. Traffic: Minimize interference with adjoining walks and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner's Representative and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Noise producing activities shall be held to a minimum. Internal combustion engines and compressors, etc., shall be equipped with mufflers to reduce noise to a minimum. Comply with all noise abatement ordinances.

B. Keep all areas within the clearing and removal area sufficiently dampened to prevent dust from rising due to clearing or removal operations. Comply with all anti-pollution ordinances.

1. The contractor shall see to it that trucks leaving the site shall do so in such a manner that debris, vegetation, mud and earth will not be deposited on adjacent street pavements. Any debris, vegetation, mud or earth deposited on street pavements shall be promptly removed by the contractor.

C. All clearing and removal operations shall be performed in a manner such as to prevent any wash-off of soils from the site into streams and/or storm drainage systems. Appropriate sedimentation ponds, dikes, silt fences, collars, and filter media shall be employed to insure compliance with these requirements. Where a specific statute governs these procedures, such statute shall be complied with in its entirety.

1.9 PROTECTION AND SHORING

A. Protect all existing structures, utilities and landscaping indicated to remain on the drawings.

1. All trees, shrubs, and other items, indicated to remain shall be protected during the entire progress of the work. This includes protection of the root system. The trees shall be fenced at the drip line if they are located in or near an area being used for material storage or subject to damage by traffic during construction. Low hanging branches and unsound or unsightly branches on trees or shrubs designated to remain shall be removed. All trimmings shall be done by skilled workman and in accordance with good tree surgery practices. Contractor shall have a California C61 license, allowing him/her to perform D49 tree work. All tree work shall comply with both the American National Standards Institute (ANSI) Standard Practices for Tree Care Operations.

2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

3. Do not excavate within drip line of trees, unless otherwise indicated.

4. Where excavation for new construction is required within drip line of trees, excavation shall be by hand to minimize impact on roots. Contractor shall use care as to keep the damage to the root system to the minimum extent practicable.
   a. Cover exposed roots with burlap and water regularly.
   b. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
   c. Roots 3/4 inch or greater in size encountered during excavation shall be cleanly cut and treated with a sealing agent to reduce loss of moisture to the tree. Roots greater than 1-1/2 inches shall be preserved and protected at the direction of the Owner's Representative.
   d. Cover exposed roots with wet burlap to prevent roots from drying out. Place backfill in the excavation as soon as possible.
   e. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the Owner's Representative.
   f. Construction vehicles, equipment, or materials shall not be parked or stored within the tree dripline.
   g. All construction wastes, including but not limited to building material debris, roofing materials, cleaning of cement trucks, chemicals, adhesives, solvents, etc., shall be stored or disposed of no closer than 50 feet from any tree dripline.

B. Any damage done by this contractor to existing structures, pipe lines, utilities, landscaping, etc. indicated to remain shall be repaired by him and at his expense in a manner acceptable to the Owner of the damaged property. This contractor shall report any existing damage prior to the beginning of this work.

C. All temporary shoring, bracing, etc., and maintenance there required for the completion of clearing and removal work shall be provided by the Contractor whose work requires protection.

1. This contractor shall work in concert per local and state codes to insure the provisions of adequate bracing, shoring, temporary cross over for pedestrian and vehicular traffic including guard rails, lamps, warning signs and flags as required by agencies having jurisdiction as directed by the Owner. Remove same when necessity for protection ceases.

1.10 DRAINAGE MAINTENANCE

A. During the entire course of clearing and removal operations, all existing drainage ways, both into and from the project area shall be rerouted as required and/or maintained in a functional condition.

B. At all times during the clearing and removal operation, the exposed areas of subgrade shall be maintained in a condition compatible with positive drainage of the work area. Failure to maintain such drainage shall be considered adequate cause for the District Representative to order temporary suspension of the work.

C. If it should become necessary to stop work for indefinite periods, take every precaution to prevent damage or deterioration of the work already performed. Provide suitable and functional drainage by installing ditches, filter drains, temporary cut-off lines, etc., and erect temporary protective structures where necessary. All embankments shall be back-bladed and suitably sealed to protect against adverse weather conditions.

PART 2 - PRODUCT

2.1 MATERIALS

A. All materials used to backfill excavations, trenches, holes, pits, etc. caused by utility, underground structure or underground storage tank removal shall meet the requirements for fill material and compaction indicated in Sections: Earthwork, and Trenching and Backfilling.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Visit the site so that a full understanding of the difficulties and restrictions attending complete clearing of the site and removal of underground tanks and utilities is obtained. Verify the location of all pertinent items.

B. Verify with sewer department, water company, gas company, electric company, etc. that all existing utilities, services and overhead lines have been deactivated and abandoned prior to beginning removal work. Notify affected utility department or company prior to beginning removal work.

1. Contact the local “USA North” at 811 to locate underground utilities prior to beginning clearing and removal work.

3.2 PREPARATION

A. Cut drainage swales and provide temporary grading to carry storm water away from clearing area. No storm water will be permitted to stand in open excavations.

B. Provide, erect and maintain temporary barriers and security devices as required. Protect all existing landscaping, structures, utilities and site elements which are not to be demolished.

C. Notify all affected utility companies and local authorities and agencies prior to beginning the work.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
2. Notify Owner's Representative not less than two (2) days in advance of proposed utility interruptions.
3. Do not proceed with utility interruptions without written permission from the Owner's Representative.

D. Identify and tag all existing trees and other landscaping designated to remain.

E. Identify and locate a permanent stockpile area for topsoil. Verify with District Representative and see plans for fill soil stockpile area. Coordinate with Landscape Contractor.

F. Identify and locate a waste area for temporary storage of removed materials and a permanent topsoil stockpile area.

1. No materials may be buried or burned on the site as a means of disposal.

3.3 PERFORMANCE

A. The contractor shall be responsible for all clearing, grubbing, removing and disposing of trash and debris and for clearing and stockpiling all topsoil which are within the designated limits of the property, easements and roadway rights-of-way, unless otherwise indicated on the drawings.

B. Prior to rough grading, storage of construction materials or the installation of any temporary construction facilities, strip areas per plans to be occupied by site improvements.

C. The contractor shall be responsible for removal of sidewalks, pavements, curbs and gutters, exterior slabs and sidewalks indicated to be removed on plans.

D. The contractor shall be responsible for removal of all underground utilities, underground structures, etc., according to plans.

E. Protect any existing structures, utilities and all appurtenances to remain. Prevent movement or settling. Provide bracing and shoring as required.

1. Cease cleaning and removal operations immediately if any existing structure or utility appears in danger. Notify the District Representative and Architect. Do not resume operations until directed.

F. All broken construction material, trash and debris, tree slash, sidewalks, curbs, etc. will be considered "waste" and shall be removed from the site.

G. “Waste” material shall be removed from the site as soon as possible and shall not be allowed to accumulate. Short-term storage of removed material shall be restricted to previously designated “waste” areas or as directed by the District Representative.

   1. No burning or burying of “waste” material will be permitted.

H. Continuously dampen all clearing and removal areas to prevent dust from rising during the operation. Provide hoses and/or water trucks as required.

3.4 FIELD QUALITY CONTROL

A. The Owner shall retain an independent inspection firm or contact local officials and inspectors at locations where local building codes require special inspections.

3.5 CLEAN UP

A. Material designated for removal shall become the property of the contractor, and any salvage value therefrom will accrue to the contractor, unless otherwise requested by the Owner’s Representative.

B. Remove from the site and make legal disposition of all waste and debris. No waste or debris shall be burned or buried on the site as a means of disposal.

END OF SECTION

SECTION 31 20 00: EARTH MOVING

PART 1 GENERAL

1.01 SUMMARY

A. Contractor Shall:
   1. Prepare subgrades for slabs-on-grade and pavements.
   2. Excavate and backfill for buildings and structures.
   3. Provide rock capillary break for slabs-on-grade.
   4. Provide base course for asphalt paving.
   5. Provide subsurface drainage backfill for walls and trenches.
   6. Excavate and backfill for utility trenches.

1.02 RELATED SECTIONS AND DOCUMENTS INCLUDE THE FOLLOWING

1. Section 31 05 00 -- Nondestructive location and marking of underground utilities.

1.03 DEFINITIONS

A. Backfill: Soil material or lean concrete used to fill an excavation.
   1. Trench Backfill: Backfill placed over pipe bedding to fill the trench.

B. Aggregate Base: Granular material placed between the subgrade and hot-mix asphalt paving, or between subgrade and concrete pavement.

C. Pipe Bedding: Material supporting, surrounding, and extending to 6 inches above the top of the pipe as shown on the Plans.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Rock Capillary Break: Clean crushed rock layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

G. Engineered Fill: Compacted soil materials used to raise existing grades or to backfill excavations.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill.

J. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.04 SUBMITTALS

A. Product Data: For the following:
   1. Aggregate base gradation

B. Samples:
   1. 25 to 30-pound Sample in 5-gallon bucket of each of the following:
      a. Engineered fill (each material if more than one)
      b. Structural fill (each material if more than one)
      c. Pipe bedding
      d. Trench backfill (each material if more than one)

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for the following with requirements indicated:

Material	*Test*	*Test Method*
Engineered Fill:	Compaction Curve Atterberg Limits	ASTM D1557 ASTM D4318
Structural Fill:	Compaction Curve Atterberg Limits	ASTM D1557 ASTM D4318
Pipe Bedding:	Compaction Curve Sand Equivalent	ASTM D1557 CTM 217
Trench Backfill:	Compaction Curve Sand Equivalent	ASTM D1557 CTM 217

D. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.05 QUALITY ASSURANCE

A. Agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in the Section for Project Management and Coordination.

1.06 PROJECT CONDITIONS

A. The Contractor is presumed to have visited the site and familiarized himself with existing site conditions. The Contractor shall not be relieved of liability under the contract for any loss sustained as a result of any variance between conditions indicated by or deduced from the drawings and the actual conditions encountered during the course of the work.

B. The Contractor shall, upon becoming aware of surface and/or subsurface conditions differing from those disclosed by the drawings, promptly notify the Owner as to the nature and extent of the differing conditions, first verbally to permit verification of the conditions and then in writing. No claim by the Contractor for any conditions differing from those anticipated in the plans and specifications will be allowed unless the Contractor has so notified the Owner's representative verbally and in writing, as required above, of such changed conditions.

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

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect’s written permission.
3. Contact utility-locator service for area where Project is located before excavating.

D. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Aggregate Base for Asphalt and Concrete Pavements: Aggregate base shall conform to the requirements of the State Standard Specifications for Class 2 aggregate base, ¾-inch maximum size (Caltrans).

C. Engineered Fill: Requirements for engineered fill, as well as applicable test procedures to verify material suitability are provided in the table below. Requirements may be modified only with approval of project Architect.

ENGINEERED FILL REQUIREMENTS

Fill Requirement		Test Procedures	
		ASTM[1]	**Caltrans[2]**
Gradation			
Sieve Size	**Percent Passing**		
3 inch	100	C 136	202
¾-inch	50-100	C 136	202
No. 4	25-100	C 136	202
No. 40	5-100	C 136	---
No. 50	5-100	---	202
No. 200	0-70	C 136	202
Plasticity			
Liquid Limit	Plasticity Index		
<30	<15	D 4318	204
Organic Content			
Less than 3%		D2974	---
Expansion Potential			
Less than 20	---	---	---
Maximum Dry Density			
More than 105 pcf	---	D1557	---

[1]AMERICAN SOCIETY FOR TESTING AND MATERIALS STANDARDS (LATEST EDITION)

[2]State of California, Department of Transportation, Standard Test Methods (latest edition)

D. Pipe Bedding: Bedding and backfill should conform to pipe manufacturer's recommendations and applicable sections of City of Colusa Standards and Specifications. General trench backfill should consist of native soils backfilled in maximum 12-inch lifts and compacted to at least 90 percent of the ASTM D1557 maximum dry density. Utility trench backfill within the upper six inches of the final pavement subgrade should be compacted to 95 percent of the maximum dry density. The moisture content at the time of compaction should be at least the optimum moisture content.

E. Rock Capillary Break: Washed crushed rock mixture with 100 percent passing a 1-inch sieve and zero percent passing a No. 4 sieve.

F. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

G. Trench Backfill: Native material compacted to 90 percent of the max dry density.

PART 3 EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section 31 "Site Clearing," and shall be in accordance with the requirements of the drawings.

C. Protect and maintain erosion and sedimentation controls, which are specified in Section 31 "Site Clearing," during earthwork operations.

3.02 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.03 EXPLOSIVES

A. Explosives: Do not use explosives.

3.04 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.05 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.06 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance Between Parallel Water and Sewer:

a. Vertical: water a minimum of 12 inches vertical above sewer on solid shelf.

b. Horizontal: a minimum of 18 inches clearance.

2. Clearance between water and sewer crossings shall be 12 inches minimum with water being above sewer.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course.

3.07 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a loaded 10-wheel, tandem-axle water truck with a rear axle load of not less than 8 tons.

3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.08 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.09 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage,

dampproofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 SURFACE PREPARATION FOR FILL PLACEMENT

A. After site stripping and any required grubbing and/or overexcavation, areas to receive fill shall be scarified to a depth of 8 inches, uniformly moisture conditioned to at or above optimum moisture content, and compacted to at least 90 percent of the material's maximum dry density as determined by ASTM Test Method D1557. Scarification and compaction may not be required within earthwork cut areas consisting of undisturbed bedrock and if approved by the project Geotechnical Engineer during construction.

B. If soft or yielding soils are encountered during scarification and compaction, they shall be removed by over excavation to expose firmer soils. The horizontal and vertical extent of the over excavation shall be determined in the field by the project Geotechnical Engineer. Bench sloped surfaces steeper than 1 vertical to 6 horizontal so fill material will be placed on a level surface; benches shall be at least six feet wide and the rise between successive benches shall not exceed two feet.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact pipe bedding on trench bottoms as shown on the Plans. Shape bedding to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section "Cast-in-Place Concrete."

D. Place and compact remainder of pipe bedding material to a height of 6 inches over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Backfill voids with trench backfill material while removing shoring and bracing.

F. Place and compact trench backfill material to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to at or above the optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that is too wet to compact to specified dry unit weight or that is unstable under the earthwork or proofrolling equipment.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 8 inches of existing subgrade and each layer of backfill or fill soil material to at least 90 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material to at least 90 percent.
3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material to at least 85 percent.
4. For utility trenches, compact each layer of bedding and backfill material to at least 90 percent.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.15 AGGREGATE BASE

A. Place aggregate on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place aggregate base as follows:
1. Shape aggregate base to required crown elevations and cross-slope grades.
2. Place aggregate base 6 inches or less in compacted thickness in a single layer.
3. Place aggregate base that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact aggregate base at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 90 percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 90 percent of maximum dry unit weight according to ASTM D 1557.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 1557, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
2. Trench Backfill: At each compacted initial and final trench backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by at the site. Streets and adjacent property shall be fully protected throughout the operations.

B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal work hours.

C. Any construction review of the contractor's performance conducted by the Architect, Engineer, or the Soil Engineer is not intended to include review of the adequacy of the Contractor's safety measures in, on or near the construction site

D. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

E. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

F. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

SECTION 31 50 00: EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. The Contractor shall provide temporary excavation support and protection systems.

1.02 RELATED SECTIONS INCLUDE THE FOLLOWING:

A. Section 01 50 00 -- Temporary Facilities and Controls.
B. Section 31 20 00 -- Earth Moving.
C. Section 31 05 00 -- Nondestructive location and marking of underground utilities.

1.03 PERFORMANCE REQUIREMENTS

A. Furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.

1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified professional engineer.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.

1.04 SUBMITTALS

A. Shop Drawings for Information: Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems.

1. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

B. Qualification Data: For Installer and professional engineer.

C. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage

caused by the absence of, the installation of, or the performance of excavation support and protection systems.1.05 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.

D. Wood Lagging: Lumber, mixed hardwood.

E. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces is not impeded.

D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.02 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.

1. Repair or replace, as approved by the Project Manager, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION

SECTION 32 11 23 AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 RELATED REQUIREMENTS

A. Section 32 12 16 - Asphalt Concrete: Finish asphalt courses.

B. Section 32 13 13 - Concrete Paving: Finish concrete surface course.

1.03 MEASUREMENT AND PAYMENT PROCEDURES

A. Measurement of aggregate base material will be made on the basis of weight, as determined by scale weight of each load of material. Materials shall be weighed in accordance with the provisions of Section 9-1.01 of the State Standard Specifications. The weight of water in the material at the time of weighing, in excess of one percentage paint over the optimum moisture as determined by ASTM Test D-1557, will not be paid for. The actual moisture content of the material will be determined by ASTM Test D-2216.

B. Payment will be made at the contract price per ton, which shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing, placing, shaping, compacting and finishing the aggregate base material and shall include furnishing and installing of geosynthetic fabric.

1.04 REFERENCE STANDARDS

A. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand- Cone Method; 2007.

B. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2006.

1.05 SUBMITTALS

A. See Section 01 33 01 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

D. Compaction Density Test Reports.

E. Manufacturers specification for geosynthetic fabric.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate stockpiles where indicated.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

C. When geosynthetic fabric is stored outdoors, the fabric shall be elevated from the ground and covered with a tarpaulin or opaque plastic.

PART 2 PRODUCTS

2.01 MATERIALS

A. Class 2 Aggregate, 3/4 inch maximum: Conforming to the requirements of Section 26 of the State Standard Specifications.

B. Geosynthetic fabric shall be woven with a minimum weight of 8.0 ounces per square yard conforming to US Fabrics, Inc. US 230 or approved equal.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 45 29 Testing Laboratory Services for general requirements for testing and analysis of aggregate materials.

B. Where aggregate materials are specified using ASTM D 2487 classification, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re- compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Geosynthetic fabric shall be installed per manufacturer's recommendations. Fabric shall be secured in place with pins, staples or other suitable means to avoid shifting or moving during fill placement. Overlap adjacent rolls a minimum of 36 inches. Any damage to fabric during construction shall be repaired at the Contractor's expense. Repairs shall be per manufacturer recommendations.

B. Aggregate base material shall be spread, watered, compacted and finished in accordance with the requirements of Section 26 of the State Standard Specifications and these Contract Documents.

C. Place aggregate in maximum 0.5 foot layers and roller compact to specified density.

D. The aggregate base shall be compacted to at least 95 percent of the maximum density.

E. Level and contour surfaces to elevations and gradients indicated.

F. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

G. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 01 45 29 Testing Laboratory Services for general requirements for field inspection and testing.

B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM 01556. Field density tests will be performed in accordance with ASTM Test 0-1556 or ASTM Test 0-2992, Method B.

3.06 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 12 13: CONCRETE PAVING

PART 1 GENERAL

1.01 SUMMARY

A. Furnish and install exterior cement concrete pavement systems including form work, reinforcement steel, mesh, curing compounds and accessories as required for a complete installation. The systems specified include:
   1. Walkways.
   2. Plazas.

1.02 RELATED SECTIONS INCLUDE THE FOLLOWING:.

A. Section 31 20 00 Earth Moving.

1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.04 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Provide 1’ x 1’ sample panel of all concrete finishes and colors indicated in the drawings. Approved samples to be kept at the jobsite to serve as a prerequisite for all finishes until final acceptance.

1.05 QUALITY ASSURANCE

A. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

B. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.06 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.01 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

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

2.02 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

C. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

D. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.03 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type

B. Normal-Weight Aggregates: ASTM C 33, Class 4M coarse aggregate, uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.04 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

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

C. Water: Potable.Evaporation retarder in paragraph below temporarily reduces moisture loss from concrete surfaces awaiting finishing in hot, dry, and windy conditions. Evaporation retarders are neither curing compounds nor chemical surface retarders used to delay concrete setting.

2.05 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.06 PAVEMENT MARKINGS

A. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, with drying time of less than 45 minutes.

1. Color: As indicated.

B. Glass Beads: AASHTO M 247, Type 1.

2.07 WHEEL STOPS

A. Wheel Stops: Precast, air-entrained concrete, 2500-PSI minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length.

2.08 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 2500 PSI.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 3-1/2 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.09 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel tandem-axle water truck with not less than 8 tons on the rear axles.

3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Section "Earthmoving."

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.02 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.03 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.04 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.05 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
2. Provide tie bars at sides of pavement strips where indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, buildings, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Control Joints: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a **1/4-inch** radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groove marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 3/16-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint
4. Spacing: Sidewalks: control joints shall be placed not more than 4 feet on center both ways. Outdoor slabs: Control joints shall not be spaced more than 8 feet on center both ways.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a **3/8-inch** radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.06 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Do not add water to fresh concrete after testing.

G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

J. Screed pavement surfaces with a straightedge and strike off.

K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

L. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.07 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

C. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.08 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.09 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Control Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.10 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

1. Spread glass beads uniformly into wet pavement markings at a rate of 6 lb/gal..

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 PSI.

C. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

D. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 32 12 16 ASPHALT PAVING

PART 1 – GENERAL

1.01 SUMMARY

A. Provide asphalt pavement, including aggregate base course and materials as required for complete finished paving system.

1.02 REFERENCES

A. Standard Specifications: The Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, current edition.

B. The Asphalt Institute: Asphalt Paving Manual, Manual Series No. 8 (MS-8).

1.03 PROJECT CONDITIONS

A. Do not install pavement during inclement weather or when air temperature is below that recommended by Standard Specifications or The Asphalt Institute (AI) MS-8.

PART 2 PRODUCTS

2.01 MATERIALS

A. Conform to applicable requirements of Standard Specifications for type of asphaltic pavement indicated, and requirements of AI MS-8; where conflicts occur, follow Standard Specifications.

B. Aggregate Base: Class 2, 3/4" maximum size; sound, angular crushed stone, crushed gravel or crushed slag, sand, stone, or slag screenings.

C. Surface Course Aggregate: Crushed stone, crushed gravel, crushed slag, and sharp-edged natural sand.

D. Mineral Filler: Rock or slag dust, hydraulic cement, or inert material complying with Standard Specifications and AASHTO M17/ASTM D242.

E. Asphalt Cement: Comply with Standard Specifications for type of paving indicated, but no less than AR 4000, Type B aggregate, and AASHTO M226/ASTM D3381; minimum Viscosity Grade AC-20, AR-80.

F. Tack Coat: Standard Specifications or AASHTO M140/ASTM D977 SS1h type asphalt emulsion diluted with water.

G. Herbicide Treatments: Commercial chemical for weed control, registered by Environmental Protection Agency; granular, liquid or wettable powder form.

1. Manufacturers: Use only products registered by EPA and acceptable to applicable authorities; verify acceptability of materials with applicable authorities.

a. Allied Chemical Corp.

b. Dow Chemical Co.

c. U.S. Borax and Chemical Corp.

d. Substitutions: Refer to Section 01 62 00.

2.02 MIXES

A. Provide asphalt-aggregate mixture as recommended by Standard Specifications, Section 39, Type B; maintain thorough and uniform mixture.

B. Bring asphalt cement and mineral constituents to required temperatures before mixing; ensure aggregates are sufficiently dry so as not to cause foaming in mixture.

PART 3 PART 3 - EXECUTION

3.01 EXAMINATION

A. Ensure buried work in paved areas has been completed, inspected, tested and approved prior to starting work.

B. Ensure grading of sub-grade is to required elevations.

3.02 PREPARATION

A. Where not previously excavated, thoroughly scarify pavement sub-grade to a minimum depth 6" and compact to 95% dry density.

1. Prepare sub-grade to provide optimum moisture content.

a. Water and thoroughly mix sub-grade when deficiency exists.

b. When excess of moisture exists, rework and aerate sub-grade.

B. Before final rolling shape entire section add additional sub-soil as required and compact sub-grade to provide grades, elevation and cross-section indicated.

1. Points of finished sub-grade surface shall be within 1" of elevations indicated.

C. Herbicide Treatment: Apply chemical weed control agent in strict accordance with manufacturer's recommended dosages and instructions.

3.03 INSTALLATION

A. Aggregate Base Course:

1. Bring aggregate base course to required depths and profiles.

a. Extend minimum 6" beyond asphalt pavement width.

b. Place in layers not exceeding 5" in depth.

c. Compact each layer to 95% dry density unless otherwise indicated.

2. Properly compact areas adjacent to curbs and areas not accessible to rollers with mechanical or hand tamping devices.

3. Ensure aggregate base course materials are not contaminated with deleterious materials.

4. Spread base course materials over prepared sub-base.

a. Depth: As indicated on Drawings.

b. Compaction: 90% dry density unless otherwise indicated.

5. Ensure top surface of base course is true to lines and grades indicated, within 1/2" of elevations indicated.

6. Add water during compaction to bring aggregate base course materials to optimum moisture content.

7. When excess moisture exists, rework aggregate base course materials until optimum moisture content is obtained.

B. Tack Coat: Apply liquid asphalt tack coat to vertical surfaces asphaltic concrete will be placed against; comply with Standard Specifications and manufacturer recommendations.

C. Asphaltic Concrete Pavement:

1. Depths: As indicated on Drawings.

2. Compaction: Compact asphalt paving with approved rolling equipment; start compaction as soon as pavement will bear equipment without checking or undue displacement.

a. Carry out compaction in three operations in pass sequence; ensure each pass of roller overlaps previous passes to ensure smooth surface free of roller marks.

b. Prevent pick-up of material on roller wheels.

c. Density: Minimum 95% density unless otherwise indicated.

3. Perform hand tamping in areas not accessible to rolling equipment.

4. Ensure joints made during paving operations are straight, clean, vertical and free of broken or loose material; prime vertical surfaces of joints to ensure tight bond.

5. Ensure surface of completed asphalt pavement is true to lines, profiles, and elevations indicated.

6. Ensure surface is free of depressions exceeding 1/4" when measured with a 10'-0" straight-edge.

3.04 PATCHING

A. Remove and replace defective paving areas and paving areas mixed with foreign materials.

B. Cut out areas and fill with fresh, hot asphaltic concrete; compact by rolling to maximum surface density and smoothness.

3.05 FIELD QUALITY CONTROL

A. Site Tests and Inspection: Allow for testing and inspection of asphalt pavement mixes and testing of placed aggregate base course and asphalt pavement; refer to Division 1 testing laboratory services.

1. Testing and inspection will be performed to minimize disruption to work.

2. Allow testing laboratory access to mixing plant for verification of weights or

proportions, character of materials used, and determination of temperatures used in preparation of paving mix.

3. When required, testing laboratory will perform laboratory tests of proposed asphalt pavement mixes to determine conformity with requirements.
4. Testing laboratory will perform one series of compaction tests for aggregate base course and for each asphalt pavement course.
5. Notify testing laboratory to perform density tests when aggregate base course or portion thereof has been placed and compacted in accordance with requirements,
   a. Do not place asphalt pavement until results have been verified and base course installation approved.
6. If compaction tests indicate aggregate base course or asphalt paving do not meet specified requirements, remove defective work, replace and retest with no additional cost to Owner.

3.06 PROTECTION

A. Do not allow vehicular traffic on newly paved areas until surface has cooled to atmospheric temperature and not less than 24 hours after completing asphaltic concrete work.

END OF SECTION

SECTION 33 41 00: STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Includes but not limited to:

1. Storm drainage piping, fittings, and accessories.
2. Connection of building storm water drainage system to site storm drainage system.
3. Catch basins, paved area drainage, manhole access, site surface drainage, and miscellaneous concrete structures.

1.02 RELATED SECTIONS

A. Section 31 20 00 Earth Moving

1.03 REFERENCES

A. ASTM C443 - Joints for Circular Concrete Drainage and Culvert Pipe, Using Rubber Gaskets.

B. ANSI/ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Drainage Pipe.

C. ANSI/ASTM D2729 – polyvinyl chloride (PVC) Drainage Pipe and Fittings.

D. ASTM D3033 – Type PSP polyvinyl chloride (PVC) Drainage Pipe and Fittings.

E. ASTM D3034 – Type PSM polyvinyl chloride (PVC) Drainage Pipe and Fittings.

1.04 REGULATORY REQUIREMENTS

A. Conform to Standard Specifications for Public Works Construction and City of Colusa Construction Standards for materials and installation of the Work of this Section.

1.05 PROJECT RECORD DOCUMENTS

A. Submit record documents per Section 01 41 00.

B. Accurately record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 DRAINAGE PIPE MATERIALS

A. ADS corrugated smooth interior wall polyethylene pipe with all necessary connection fittings. Pipe shall be perforated if installed in storm drain infiltration trench.

B. Reinforced Concrete Pipe Joint Device: ANSI/ASTM C443, rubber compression gasket joint.

C. Plastic Pipe: ANSI/ASTM D3034, SDR35 Type PSM, polyvinyl chloride (PVC) material; inside nominal diameter of 2, 4, 6, 8, 10, 12, 15 & 18 inches bell and spigot style solvent sealed end joints.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe, molded or formed to suit pipe size and end design, in required 'T', bends, elbows, cleanouts, reducers, traps, and other configurations required.

2.03 STORM DRAIN INFILTRATION TRENCHES:

A. Drain Rock: ¾”-2” washed drain rock.

B. Filter Fabric: Shall be permeable and nonwoven manufactured from one of the following: polyester, polypropylene, or combined polyester polypropylene.

2.04 AREA DRAINS/CATCH BASINS

A. Catch basins: Cristy or E.W. Cook precast concrete with ADA cast iron grate and 12" concrete collar all around. Sized to handle all pipes and angles.

B. Landscape drains: ADS Nyloplast Inline Drain, or approved equal, with locking H-10 pedestrian grate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that excavation base is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.

B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with fill material aggregate.

B. Remove large stones or other hard matter which could damage drainage pipe or impede consistent backfilling or compaction.

3.03 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM C12 and ASTM D2321 and manufacturer's instructions. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings, with maximum variation from true slope of 1/8 inch in 10 feet.

C. Backfill trench in accordance with Section 31 20 00.

D. Increase compaction of each successive lift. Do not displace or damage pipe when compacting.

E. Connect to building, through installed sleeves.

3.04 INSTALLATION - AREA DRAINS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for storm drainage pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout.

3.05 LEACH TRENCH / DRY WELL INSTALLATION

A. Install perforated storm drain pipe within leach trench section as shown on plans.

B. Wrap top and sides of trench with geotextile fabric.

C. Drain rock shall be washed and clean prior to installation of trench.

D. Protect trenches from debris, silts, dirt, etc., during construction.

3.06 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01 41 00.

B. Request inspection by Architect prior to placing cover over pipe.

3.07 PROTECTION

A. Protect finished installation under provisions of Section 01 76 00.

B. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION