

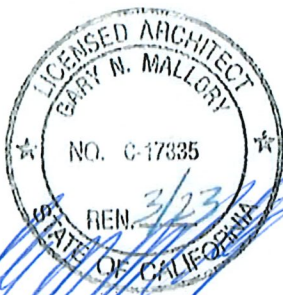
# FF & J ARCHITECTS, INC.

Specifications and Contract Documents For:

Alterations to

OSBORN TWO WAY ACADEMY

TURLOCK UNIFIED SCHOOL DISTRICT



Project No.: TU17.02

April 2, 2021

**GENERAL CONDITIONS**

**under**

**LEASE-LEASEBACK AGREEMENT**

**FOR THE [REDACTED] PROJECT**

**TURLOCK UNIFIED SCHOOL DISTRICT**

**[REDACTED], 20**

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**ARTICLE 1  
GENERAL CONDITIONS**

**1.1 BASIC DEFINITIONS**

**1.1.1 THE CONTRACT DOCUMENTS**

The “Contract Documents” consist of the Lease-Leaseback Agreement between Owner and Contractor (the “Agreement”), the Request for Proposals, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda, Payment Bond, Performance Bond, the Site Lease, the Sublease, required insurance certificates, additional insured endorsement and declarations page, list of proposed subcontractors, Non-collusion Declaration, Roof Project Certification (where applicable), Sufficient Funds Declaration (Labor Code section 2810) and the Fingerprinting Notice and Acknowledgment and Independent Contractor Student Contact Form, other documents referred to in the Agreement, and Modifications issued after execution of the Agreement. A Modification is a written amendment to the Contract signed by both parties, a Change Order, a Construction Change Directive, or a written order for a minor change in the Work issued by the Owner. The Contract Documents are complementary, and each obligation of the Contractor, Subcontractors, and material or equipment suppliers in any one shall be binding as if specified in all.

**1.1.2 THE CONTRACT**

The Contract Documents form the Contract. The “Contract” represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, between the Owner and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the Owner and the Contractor. The terms of the Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever except by written agreement signed by the parties and approved or ratified by the Owner’s Governing Board.

**1.1.3 THE WORK**

The “Work” shall include all labor, materials, services and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents, including, but not limited to, punch list items and submission of documents. It shall include the initial obligation of any Contractor or Subcontractor, who performs any portion of the Work, to visit the Site of the proposed Work with Owner’s representatives, a continuing obligation after the commencement of the Work to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried on under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor or Subcontractor shall also thoroughly examine and become familiar with the Drawings, Specifications, and associated bid documents. The “Site” refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work. The Work shall constitute a “work of improvement” under Civil Code section 8050 and Public Contract Code section 7107.

#### 1.1.4 THE PROJECT

The “Project” is the total construction of the work of improvement, and includes the Work performed in accordance with the Contract Documents, and may include construction by the Owner or by separate contractors.

#### 1.1.5 THE DRAWINGS

The “Drawings” are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect.

#### 1.1.6 THE SPECIFICATIONS

The “Specifications” are that portion of the Contract Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

#### 1.1.7 THE PROJECT MANUAL

The “Project Manual” is the volume usually assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Agreement, Conditions of the Contract, and Specifications.

#### 1.1.8 OR

“Or” shall include “and/or.”

#### 1.1.9 COMPLETION AND COMPLETE

Statutory definitions of “completion” and “complete” shall apply for those statutory purposes. For all other purposes, including accrual of liquidated damages, Claims and warranty purposes, “completion” and “complete” mean the point in the Project where (1) Contractor has fully and correctly performed all Work in all parts and requirements, including corrective and punch list work, and (2) Owner’s representatives have conducted a final inspection that confirmed this performance. “Substantial” or any other form of partial or non-compliant performance of the Work shall not constitute “completion” or “complete” under the Contract Documents.

### 1.2 EXECUTION, CORRELATION AND INTENT

#### 1.2.1 CORRELATION AND INTENT

1.2.1.1 *Documents Complementary and Inclusive.* The Contract Documents are complementary and are intended to include all items required for the proper execution and completion of the Work. Any item of work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both.

1.2.1.2 *Coverage of the Drawings and Specifications.* The Drawings and Specifications generally describe the work to be performed by Contractor. Generally, the Specifications describe work

which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown. All materials or labor for Work, which is shown on the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to complete the Work), shall be provided by the Contractor whether or not the Work is expressly covered in the Drawings or the Specifications. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by Contractor.

1.2.1.3 **Conflicts.** Without limiting Contractor's obligation to identify conflicts for resolution by the Owner, it is intended that the more stringent, higher quality, and greater quantity of Work shall apply for any conflict within the Contract Documents.

1.2.1.4 **Conformance with Laws.** Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon request of either party the Contract shall be amended in writing to make such insertion or correction.

Before commencing any portion of the Work, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public utilities affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. If Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with any such restrictions or special requirements of the Contract Documents, then Contractor shall promptly notify Architect and Owner in writing of same and shall ensure that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Project. Where requirements of the Contract Documents exceed those of the applicable building codes and ordinances, the Contract Documents shall govern. Contractor shall comply with all applicable Federal, State and local laws.

If, as, and to the extent that Public Contract Code section 1104 is deemed to apply after the execution or award of the Contract, then Contractor shall not be required to assume responsibility for the completeness and accuracy of architectural or engineering plans and specifications, notwithstanding any other provision in the Contract Documents, except to the extent that Contractor discovered or should have discovered and reported any errors and omissions to the Owner, including, but not limited to, as the result of any review of the plans and specifications by Contractor required by the Instructions to Bidders or other Contract Documents, whether or not actually performed by Contractor.

1.2.1.5 **Ambiguity.** Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify Architect and Owner in writing of any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be

in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, then Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Total Sublease Amount or the time for performance. If Contractor performs, permits, or causes the performance of any Work under the Contract Documents prepared by or on behalf of Contractor which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, then Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction, without increase to or adjustment in the Total Sublease Amount or the time for performance. In no case shall any Subcontractor proceed with the Work if uncertain without the Contractor's written direction and/or approval.

1.2.1.6 **Execution.** Execution of the Agreement Between Owner and Contractor by the Contractor is a representation that the Contractor has visited the site, become familiar with the local conditions under which the Work is to be performed and has correlated personal observations with the requirements of the Contract Documents.

## 1.2.2 ADDENDA AND DEFERRED APPROVALS

1.2.2.1 **Addenda.** Subsequent addenda issued shall govern over prior addenda only to the extent specified. In accordance with Title 24, California Code of Regulations, addenda shall be approved by the Division of the State Architect ("DSA").

1.2.2.2 **Deferred Approvals.** The requirements approved by the DSA on any item submitted as a deferred approval in accordance with Title 24, California Code of Regulations, shall take precedence over any previously issued addenda, drawing or specification.

## 1.2.3 SPECIFICATION INTERPRETATION

1.2.3.1 **Titles.** The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of work to be performed by any trade.

1.2.3.2 **As Shown, Etc.** Where "as shown," "as indicated," "as detailed," or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where "as directed," "as required," "as permitted," "as authorized," "as accepted," "as selected," or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.

1.2.3.3 **Provide.** "Provide" means "provided complete in place," that is, furnished, installed, tested, and ready for operation and use.

1.2.3.4 **General Conditions.** The General Conditions and any supplementary general conditions are a part of each and every section of the Specifications.

1.2.3.5 **Abbreviations.** In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as "Contractor shall," "shall be," etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.

1.2.3.6 **Plural.** Words in the singular shall include the plural whenever applicable or the context so indicates.

1.2.3.7 **Metric.** The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1” (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the “International System of Units” (SI) and generally follow ASTM E 380, “Standard for Metric Practice.”

1.2.3.8 **Standard Specifications.** Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization’s standard specifications, which are in effect as of the date the Notice to Bidders is first published. If applicable specifications are revised prior to completion of any part of the Work, then the Contractor may, if acceptable to Owner and Architect, perform such Work in accordance with the revised specifications. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.

1.2.3.9 **Absence of Modifiers.** In the interest of brevity, the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### 1.3 **OWNERSHIP AND USE OF ARCHITECT’S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS**

The Drawings, Specifications, and other documents prepared on behalf of the Owner are instruments of the services of the Architect and its consultants and are the property of the Owner. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them. All copies of them, except the Contractor’s record set, shall be returned or suitably accounted for to the Owner, upon request upon completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner and the Architect. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner’s property interest or other reserved right. All copies made under this license shall bear appropriate attribution and the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect.



## **ARTICLE 2 OWNER**

### **2.1 DEFINITION**

The term “Owner” means the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term “Owner” means the Owner and/or the Owner’s authorized representatives, including, but not limited to, architects and construction managers. To the extent the Contract Documents indicate that Owner has assigned duties to particular representatives of the Owner (such as the Architect, or any Construction Manager), Owner reserves the right at all times to reassign such duties to different Owner representatives.

### **2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER**

#### **2.2.1 INTENTIONALLY LEFT BLANK**

#### **2.2.2 SITE SURVEY**

When required by the scope of the Project, the Owner will furnish, at its expense, a legal description or a land survey of the Site, giving, as applicable, grades and lines of streets, alleys, pavements, adjoining property, rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries, and contours of the Site. Surveys to determine locations of construction, grading, and site work shall be provided by the Contractor.

#### **2.2.3 SOILS**

**2.2.3.1 *Owner Furnished Services.*** When required by the scope of the Project, the Owner will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required or as required by local or state codes. Such services with reports and appropriate professional recommendations shall include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests, including necessary operations for determining subsoil, air, and water conditions.

**2.2.3.2 *Contractor Reliance.*** Test borings and soils reports for the Project have been made for the Owner to indicate the subsurface materials that might be encountered at particular locations on the Project. The Owner has made these documents available to the Contractor and the Contractor has studied the results of such test borings and information that it has as to the subsurface conditions and Site geology as set forth in the test borings and soils reports. The Owner does not assume any responsibility whatsoever with respect to the sufficiency or accuracy of the borings made, or of the logs of the test borings, or of other investigations, or of the soils reports furnished pursuant hereto, or of the interpretations to be made beyond the location or depth of the borings. There is no warranty or guarantee, either express or implied that the conditions indicated by such investigations, borings, logs, soil reports or other information are representative of those existing throughout the site of the Project, or any part thereof, or that unforeseen developments may not occur. At the Owner’s request, the Contractor shall make available to the Owner the results of any Site investigation, test borings, analyses, studies or other tests conducted by or in the possession of the Contractor of any of its agents. Nothing herein contained shall be deemed a waiver by the Contractor to pursue any available legal right or remedy it may have at any time against any third party who may have prepared any report and/or test relied upon by the Contractor.

#### 2.2.4 UTILITY SURVEY

When required by the scope of the Project, the Owner will furnish, at its expense, all information regarding known existing utilities on or adjacent to the Site, including location, size, inverts, and depths.

#### 2.2.5 INFORMATION

Upon the request of the Contractor, Owner will make available such existing information regarding utility services and Site features, including existing construction, related to the Project as is available from Owner's records. The Contractor may not rely upon the accuracy of any such information, other than that provided under Sections 2.2.2 and 2.2.4 (except that the Contractor may not rely upon and must question in writing to the Owner and the Architect any information which appears incorrect based upon Contractor's Site inspection, knowledge of the Project, and prior experience with similar projects), unless specifically stated in writing that the Contractor may rely upon the designated information.

#### 2.2.6 EXISTING UTILITY LINES; REMOVAL, RELOCATION

**2.2.6.1 *Removal, Relocation.*** Pursuant to Government Code section 4215, the Owner assumes the responsibility for removal, relocation, and protection of utilities located on the Site at the time of commencement of construction under this Contract with respect to any such utility facilities which are not identified in the drawings and specifications made part of the invitation to bid. The Contractor shall not be assessed for liquidated damages for delay in completion of the Work caused by failure of the Owner to provide for removal or relocation of such utility facilities. Owner shall compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, removing or relocating such utility facilities, and for equipment necessarily idle during such work.

**2.2.6.2 *Assessment.*** These subparagraphs shall not be construed to preclude assessment against the Contractor for any other delays in completion of the Work. Nothing in these subparagraphs shall be deemed to require the Owner to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site.

**2.2.6.3 *Notification.*** If the Contractor, while performing work under this Contract, discovers utility facilities not identified by the Owner in the Contract plans or specifications, then Contractor shall immediately notify the Owner and the utility in writing.

**2.2.6.4 *Underground Utility Clearance.*** It shall be Contractor's sole responsibility to timely notify all public and private utilities serving the Site prior to commencing work. The Contractor shall notify and receive clearance from any cooperative agency, such as Underground Service Alert, in accordance with Government Code section 4216, et seq. Contractor shall promptly provide a copy of all such notifications to the Owner.

#### 2.2.7 EASEMENTS

Owner shall secure and pay for easements for permanent structures or permanent changes in existing facilities, if any, unless otherwise specified in the Contract or Contract Documents.

### **2.2.8 REASONABLE PROMPTNESS**

Information or services under Owner's control will be furnished by the Owner with reasonable promptness. The Owner shall not be liable under Section 8.4.2 for any delays caused by factors beyond the Owner's control including, but not limited to, DSA's or any other local, State or federal agency's review of bids, change order requests, RFI's or any other documents.

### **2.2.9 COPIES FURNISHED**

The Contractor will be furnished such copies of Drawings and Project Manuals as are stated in the Contract Documents.

### **2.2.10 DUTIES CUMULATIVE**

The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein, and especially those in Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion), and Article 11 (Insurance and Bonds).

## **2.3 OWNER'S RIGHT TO STOP THE WORK**

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or persistently fails to carry out Work in accordance with the Contract Documents, then the Owner, after providing Notice pursuant to paragraph 2.4, may order the Contractor to stop the Work or any portion thereof, until the Contractor corrects the deficiencies. The right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Article 6.

## **2.4 OWNER'S RIGHT TO CARRY OUT THE WORK**

If the Contractor fails or refuses to carry out the Work in accordance with the Contract Documents, then Owner may correct such deficiencies by whatever reasonable method the Owner may deem expedient without prejudice to other remedies the Owner may have, including, but not limited to, having another contractor perform some or all of the Work without terminating the Contract with Contractor. Owner may exercise this right at any time during the Contractor's Work.

Owner shall first provide written notice to Contractor of Contractor's failure or refusal to perform. The notice will provide the time period within which Contractor must begin correction of the failure or refusal to perform. If the Contractor fails to begin correction within the stated time, or fails to continue correction, then the Owner may proceed to correct the deficiencies. If the Owner bids the work, then Contractor shall not be eligible for the award of the contract. The Contractor may be invoiced the cost to Owner of the work, including compensation for additional professional and internally generated services and expenses made necessary by Contractor's failure or refusal to perform. Owner may withhold that amount from the sublease payments due the Contractor, pursuant to Section 9.5. If payments withheld then or thereafter due the Contractor are not sufficient to cover that amount, then the Contractor shall pay the difference to the Owner.

**ARTICLE 3  
THE CONTRACTOR**

**3.1 DEFINITION**

The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term “Contractor” means the Contractor or the Contractor’s authorized representative. To the extent that any portion of the Work is provided with the Contractor’s own forces, any reference to Subcontractors shall be equally applicable to the Contractor.

**3.2 SUPERVISION AND CONSTRUCTION PROCEDURES**

**3.2.1 CONTRACTOR**

The Contractor shall supervise and direct the Work using the Contractor’s best skill and attention, which shall meet or exceed the standards in the industry. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures, and coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters. If any of the Work is performed by contractors retained directly by the Owner, then Contractor shall be responsible for the coordination and sequencing of the Work of those other contractors so as to avoid any impact on the Project Schedule pursuant to the requirements of Article 6. Specific duties of the Contractor shall be in accordance with Title 24 of the California Code of Regulations. Contractor shall fully comply with any and all reporting requirements of Education Code sections 17309 and 81141 in the manner prescribed by Title 24.

**3.2.2 CONTRACTOR RESPONSIBILITY**

The Contractor shall be responsible to the Owner for acts and omissions of the Contractor’s employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with the Contractor or any of its Subcontractors.

**3.2.3 OBLIGATIONS NOT CHANGED BY OTHERS’ ACTIONS**

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by the activities or duties of the Owner’s representatives, including, but not limited to, any construction manager and the Architect, or the Inspector of Record; or by tests, inspections, or approvals required or performed by persons other than the Contractor.

**3.2.4 CONTRACTOR RESPONSIBILITY FOR READINESS FOR WORK**

The Contractor shall be responsible for inspection of Work already performed under the Contract Documents to determine that such portions are in proper condition to receive subsequent work.

**3.2.5 PROJECT MEETINGS**

Contractor shall attend Owner’s Project meetings as scheduled by the Contract Documents, or as otherwise instructed by Owner, to discuss the current status of the Project and the future progress of the Work.

Contractor shall have five (5) days after receipt of Owner's Project meeting minutes to provide written objections and suggested corrections.

### **3.3 SUPERINTENDENT**

#### **3.3.1 FULL TIME SUPERINTENDENT**

The Contractor shall provide a competent superintendent and assistants as necessary, all of whom shall be reasonably proficient in speaking, reading and writing English and, who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

#### **3.3.2 STAFF**

The Contractor and each Subcontractor shall: furnish a competent and adequate staff as necessary for the proper administration, coordination, supervision, and superintendence of its portion of the Work; organize the procurement of all materials and equipment so that the materials and equipment will be available at the time they are needed for the Work; and keep an adequate force of skilled workers on the job to complete the Work in accordance with all requirements of the Contract Documents.

#### **3.3.3 RIGHT TO REMOVE**

Owner shall have the right, but not the obligation, to require the removal from the Project of any superintendent, staff member, agent, or employee of any Contractor, Subcontractor, material or equipment supplier, etc., for cause.

### **3.4 LABOR AND MATERIALS**

#### **3.4.1 CONTRACTOR TO PROVIDE**

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, material, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Owner shall have no responsibility for security of, or repair or replacement costs of, any and all material, equipment, tools, construction equipment, and machinery provided by Contractor pursuant to this Subsection.

#### **3.4.2 QUALITY**

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of such quality as required to satisfy the standards of the Contract Documents. The Contractor shall, if requested, promptly furnish satisfactory evidence as to kind and quality of all materials and equipment. All labor shall be performed by workers skilled in their respective trades, and the quality of their work shall meet whichever is the higher standard for their work: the standard in the industry or the standard in the Contract Documents.

### **3.4.3 REPLACEMENT**

Any work, materials, or equipment, which does not conform to these standards may be disapproved and rejected by the Owner, in which case, they shall be removed and replaced by the Contractor at no cost to Owner.

### **3.4.4 DISCIPLINE**

The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract in accordance with paragraph 5.5.1 including, but not limited to, Subcontractors, and material or equipment suppliers retained for the Project.

### **3.5 WARRANTY**

For the period of one (1) year after completion of the Work (see Sections 9.7.1, 12.2.5, and 12.2.6), the Contractor warrants to the Owner that material and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty does not cover damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

### **3.6 TAXES**

Contractor will pay all applicable Federal, State, and local taxes on all materials, labor, or services furnished by it, and all taxes arising out of its operations under the Contract Documents. Owner is exempt from Federal Excise Tax, and a Certificate of Exemption shall be provided upon request.

### **3.7 PERMITS, FEES AND NOTICES**

#### **3.7.1 PAYMENT**

The Contractor shall secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and are legally required by any authority having jurisdiction over the Project, except those required by the Division of the State Architect (DSA). Owner shall be responsible for all testing and inspection as required by the DSA on-Site or within the distance limitations set forth in paragraph 13.5.2, unless a different mileage range is specified in the Contract Documents.

#### **3.7.2 COMPLIANCE**

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work.

### 3.7.3 CONTRACT DOCUMENTS

It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with any applicable law, statute, ordinance, building codes, rule, or regulation. However, if the Contractor knew, or should have known, or observes that portions of the Contract Document are at variance therewith, the Contractor shall promptly notify the Architect, any construction manager, and Owner in writing, and necessary changes shall be accomplished by appropriate modification.

### 3.7.4 RESPONSIBILITY

If the Contractor performs Work that it knows, or should have known, is contrary to any law, statute, ordinance, building code, rule or regulation, then the Contractor shall assume full responsibility for such Work, and shall bear the attributable cost of correction and delay to the Work, other contractors' work, and the Project.

## 3.8 ALLOWANCES

### 3.8.1 CONTRACT

The Contractor shall include in the Total Sublease Amount all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against whom the Contractor makes reasonable and timely objection.

### 3.8.2 SCOPE

3.8.2.1 **Prompt Selection.** Materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay to the Work.

3.8.2.2 **Cost.** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the Site and all required taxes, less applicable trade discounts, etc., as delineated in paragraph 7.7.4.

3.8.2.3 **Cost Included in Total Sublease Amount.** Contractor's costs for unloading and handling at the Site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Total Sublease Amount and not in the allowances.

3.8.2.4 **Total Sublease Amount Adjustment.** Whenever costs are more than or less than allowances, the Total Sublease Amount shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual cost and the allowances under paragraph 3.8.2.2 and the change in the Contractor's costs under paragraph 3.8.2.3.

## 3.9 CONTRACTOR'S CONSTRUCTION SCHEDULES

### 3.9.1 REQUIREMENTS

Unless otherwise stated in Division 1 of the Specifications, the Contractor, within two (2) weeks after executing the Contract, shall prepare and submit for the Owner's, and any construction manager's,

information the baseline construction schedule for the Work, which shall conform to the Contract Documents' requirements.

Contractor shall submit a monthly updated schedule that will include an accurate as-built schedule and the current as-planned schedule, both of which shall conform to the Contract Documents' requirements. Contractor shall submit its daily logs for the prior month with the updated schedule.

The schedule and updates shall conform, at a minimum, to industry standards for (a) critical path scheduling, and (b) facilitation of Owner's Project management and evaluation of Contractor Claims for additional money or time.

The schedule and updates shall not exceed time limits (including milestone deadlines) under the Contract Documents and shall comply with the Contract Documents scheduling requirements and with any scheduling requirements the Owner provides to the Contractor at the beginning of the Work. The original schedule and all updates shall accurately reflect work performed to date, all construction tasks (including procurement), the critical path schedule for completion of the remainder of the Project, and the percentage of the Work completed. The original schedule and updates shall include all delay days for weather not unusually severe, even though that weather will not entitle Contractor to additional time or money.

The construction schedule shall be in the form of either a tabulation, chart, or graph, unless otherwise stated in Division 1 of the Specifications, and shall be in sufficient detail to show the chronological relationship of all activities of the Project including, but not limited to, estimated starting and completion dates of various activities, (including early and late dates and reasonable float for each activity), procurement of materials, the critical path, and scheduling of equipment. Float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity durations, or imposed dates shall be apportioned for the benefit of the Project. Whenever in the Contract Documents Contractor is required to provide a schedule and/or schedule updates, the Contractor shall provide the schedule and updates in electronic format as well as hard copy. Contractor shall be solely responsible for the accuracy, utility and reasonableness of all of its schedules. Owner's acceptance, approval or non-rejection of Contractor's schedules shall not affect Contractor's responsibility for its schedules.

The Contractor and Owner shall use any float on a "first come, first served" basis. The original schedule and updates shall reflect Contractor's and Owner's use of float. Float is not for the exclusive use or benefit of either Owner or Contractor, but it is a jointly owned expiring Project resource available to both parties as needed to meet schedule milestones. For the original schedule and updates, Contractor shall use a critical path network format with the critical paths clearly indicated. Contractor shall use an MS Project, Primavera, or an equivalent or better program. Contractor shall include reports that sort and list the activities in order of increasing float and by early and late start dates. Contractor shall endeavor to label ten to thirty percent (10-30%) of the tasks as critical, but shall not label less than five (5%) or more than fifty (50%) as critical. Contractor shall use calendar days.

If any change in Contractor's method of operations will cause a change in the construction schedule, then Contractor shall submit to Owner, Architect, and any construction manager, a revised construction schedule within seven (7) days of the change, unless a different time period is stated in Division 1 of the Specifications.

If, in the Owner's opinion, the Contractor is not prosecuting the Work at a rate sufficient to meet the Work schedule or the Date for Completion (as adjusted by change orders) or if the Contractor's actual progress falls behind the Project schedule or it is apparent to Owner or Contractor that Contractor will not meet the



Date for Completion (as adjusted by change orders), then the Owner may require that the Contractor prepare and submit a recovery plan. Contractor must submit a recovery plan within seven (7) days of a demand for the plan, unless a different time period is stated in Division 1 of the Specifications. At a minimum, the recovery plan must include a revised schedule that gets the Work back on schedule and completes all Work by the Date for Completion (as adjusted by change orders) or by other dates Owner specifies in the demand for a recovery plan. The recovery plan shall state the corrective actions Contractor will undertake to implement it. The recovery plan shall also list any additional money that Contractor believes it should receive if Owner orders Contractor to fully or partially implement the recovery plan. If the Owner orders Contractor to implement the recovery plan, then Contractor shall do so, but the order shall not constitute an admission by Owner that Contractor is entitled to additional money. To recover additional money, Contractor must comply with General Conditions Articles 4.5, 7 and 8.

All schedules Contractor submits shall be certified as true and correct, as follows:

I, [name of declarant], declare the following:

[Contractor company name] has contracted with [public entity name] for the [name of project] Project. [Contractor company name] authorized me to prepare schedules for [public entity name] for this Project, and I prepared the attached schedule. I am the most knowledgeable person at [contractor company name] regarding the scheduling of this Project.

The attached schedule does not breach the Contract between [contractor company name] and [public entity name] for this Project, does not violate any applicable law, satisfies all provisions of the Contract applicable to submission of the Claim, only contains truthful and accurate as-built and as-planned dates of work on the Project (including supporting data), and is not a false claim.

The attached schedule is submitted in compliance with all laws applicable to submission of a Claim, including, but not limited to, California Penal Code section 72 (Fraudulent Claims), Government Code sections 12650 et seq. (False Claims Act; for example, Government Code section 12651(a)(7)), and Business and Professions Code sections 17200 et seq. (Unfair Business Practices Act). I am aware that submission or certification of false claims, or other Claims that violate law or the Contract, may lead to fines, imprisonment, and/or other serious legal consequences for myself and/or [contractor company name].

While preparing this declaration and schedule I consulted with others (including attorneys, consultants, or others who work for [contractor company name]) when necessary to ensure that the statements were true and correct.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed \_\_\_\_\_, 20\_\_, at \_\_\_\_\_, California.

\_\_\_\_\_  
[name of declarant]

### 3.9.2 DSA OVERSIGHT PROCESS

In connection with the DSA Construction Oversight Process, which includes the use of inspection cards and review of changes to the DSA-approved construction documents, the Contractor must (a) include

specific tasks in its baseline schedule to take into account these procedures since they are critical path issues; and (b) include a reasonable amount of float in the baseline schedule to accommodate the additional time required by these DSA procedures.

### 3.9.3 FAILURE TO MEET REQUIREMENTS

Failure of the Contractor to provide proper schedules may, at the sole discretion of Owner, constitute either grounds to withhold, in whole or in part, sublease payments to the Contractor, or a breach of contract allowing Owner to terminate the Contract.

### 3.10 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the Site for the Owner one applicable copy of Titles 19 and 24 and record copy of the Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings, Product Data, Samples, and similar required submittals. These documents shall be available to the Owner and shall be delivered to the Owner, or the Architect for delivery to the Owner upon completion of the Work.

### 3.11 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

#### 3.11.1 SUBMITTALS DEFINED

3.11.1.1 *Shop Drawings.* The term “shop drawings” as used herein means drawings, diagrams, schedules, and other data, which are prepared by Contractor, Subcontractors, manufacturers, suppliers, or distributors illustrating some portion of the Work, and includes: illustrations; fabrication, erection, layout and setting drawings; manufacturer’s standard drawings; schedules; descriptive literature, instructions, catalogs, and brochures; performance and test data including charts; wiring and control diagrams; and all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and their position conform to the requirements of the Contract Documents. The Contractor shall obtain and submit with the shop drawings all seismic and other calculations and all product data from equipment manufacturers. “Product data” as used herein are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work. As used herein, the term “manufactured” applies to standard units usually mass-produced, and “fabricated” means items specifically assembled or made out of selected materials to meet individual design requirements. Shop drawings shall: establish the actual detail of all manufactured or fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical systems and equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

3.11.1.2 *Samples.* The term “samples” as used herein are physical examples furnished by Contractor to illustrate materials, equipment, or quality and includes natural materials, fabricated items, equipment, devices, appliances, or parts thereof as called for in the Specifications, and any other samples as may be required by the Owner to determine whether the kind, quality, construction, finish, color, and other characteristics of the materials, etc., proposed by the Contractor conform to the required characteristics of the various parts of the Work. All Work shall be in accordance with the approved samples.

3.11.1.3 **Contractor's Responsibility.** Contractor shall obtain and shall submit to Architect all required shop drawings and samples in accordance with Contractor's "Schedule for Submission of Shop Drawings and Samples" provisions in Division 1 of the Specifications and in accordance with the Contractor's original and updated schedules, and with such promptness as to cause no delay in its own Work or in that of any other contractor, Owner or subcontractor but in no event later than ninety (90) days after the execution of the Agreement. Contractor may be assessed \$100 a day for each day it is late in submitting a shop drawing or sample. No extensions of time will be granted to Contractor or any Subcontractor because of its failure to have shop drawings and samples submitted in accordance with the Schedule. Each Subcontractor shall submit all shop drawings, samples, and manufacturer's descriptive data for the review of the Owner, the Contractor, and the Architect through the Contractor. By submitting shop drawings, product data, and samples, the Contractor or submitting party (if other than Contractor) represents that it has determined and verified all materials, field measurements, field conditions, catalog numbers, related field construction criteria, and other relevant data in connection with each such submission, and that it has checked, verified, and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. At the time of submission, any deviation in the shop drawings, product data, or samples from the requirements of the Contract Documents shall be narratively described in a transmittal accompanying the submittal. However, submittals shall not be used as a means of requesting a substitution, the procedure for which is defined in paragraph 3.11.4, "Substitutions." Review by Owner and Architect shall not relieve the Contractor or any Subcontractor from its responsibility in preparing and submitting proper shop drawings in accordance with the Contract Documents. Contractor shall stamp, sign, and date each submittal indicating its representation that the submittal meets all of the requirements of the Contract Documents. Any submission, which in Owner's or Architect's opinion is incomplete, contains numerous errors, or has been checked only superficially by Contractor, will be returned unreviewed for resubmission by the Contractor.

3.11.1.4 **Extent of Review.** In reviewing shop drawings, the Owner will not verify dimensions and field conditions. The Architect will review and approve shop drawings, product data, and samples for aesthetics and for conformance with the design concept of the Work and the information given in the Contract Documents. The Architect's review shall neither be construed as a complete check nor relieve the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called the Architect's attention to the deviations at the time of submission and the Architect has given specific written approval. The Architect's review shall not relieve the Contractor or Subcontractors from responsibility for errors of any sort in shop drawings or schedules, for proper fitting of the Work, or from the necessity of furnishing any Work required by the Contract Documents, which may not be indicated on shop drawings when reviewed. Contractor and Subcontractors shall be solely responsible for determining any quantities, whether or not shown on the shop drawings.

### 3.11.2 **DRAWING SUBMISSION PROCEDURE**

3.11.2.1 **Transmittal Letter and Other Requirements.** All shop drawings must be properly identified with the name of the Project and dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the Project and to the Specification section number for identification of each item clearly stating in narrative form, as well as "clouding" on the submissions, all qualifications, departures, or deviations from the Contract Documents, if any. Shop drawings, for each section of the Work, shall be numbered consecutively, and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor. Only shop drawings required to be submitted by the Contract Documents shall be reviewed.

3.11.2.2 **Copies Required.** Each submittal shall include one (1) legible, reproducible sepia and five (5) legible prints of each drawing, including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the Specifications until final acceptance thereof is obtained. Subcontractor shall submit copies, in an amount as requested by the Contractor, of: manufacturers' descriptive data for materials, equipment, and fixtures, including catalog sheets showing dimensions, performance, characteristics, and capacities; wiring diagrams and controls; schedules; all seismic calculations and other calculations; and other pertinent information as required.

3.11.2.3 **Corrections.** The Contractor shall make any corrections required by Architect and shall resubmit as required by Architect the required number of corrected copies of shop drawings or new samples until approved. Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections required by the Architect on previous submissions. Professional services required for more than one (1) re-review of required submittals of shop drawings, product data, or samples are subject to charge to the Contractor pursuant to paragraph 4.4.

3.11.2.4 **Approval Prior to Commencement of Work.** No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been reviewed by Owner and approved by Architect unless specifically directed in writing by the Owner. All such portions of the Work shall be in accordance with approved shop drawings and samples.

### 3.11.3 SAMPLE SUBMISSIONS PROCEDURE

3.11.3.1 **Samples Required.** In case a considerable range of color, graining, texture, or other characteristics may be anticipated in finished products, a sufficient number of samples of the specified materials shall be furnished by the Contractor to indicate the full range of characteristics, which will be present in the finished products; and products delivered or erected without submittal and approval of full range samples shall be subject to rejection. Except for range samples, and unless otherwise called for in the various sections of the Specifications, samples shall be submitted in duplicate. All samples shall be marked, tagged, or otherwise properly identified with the name of the submitting party, the name of the Project, the purpose for which the samples are submitted, and the date and shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number for identification of each item. Each tag or sticker shall have clear space for the review stamps of Contractor and Architect.

3.11.3.2 **Labels and Instructions.** Samples of materials, which are generally furnished in containers bearing the manufacturers' descriptive labels and printed application instructions, shall, if not submitted in standard containers, be supplied with such labels and application instructions.

3.11.3.3 **Architect's Review.** The Architect will review and, if appropriate, approve submissions and will return them to the Contractor with the Architect's stamp and signature applied thereto, indicating the appropriate action in compliance with the Architect's standard procedures.

3.11.3.4 **Record Drawings and Annotated Specifications.** The Contractor will prepare and maintain on a current basis an accurate and complete set of Record Drawings showing clearly all changes, revisions, and substitutions during construction, including, without limitation, field changes and the final location of all mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features, and Annotated Specifications showing clearly all changes, revisions, and substitutions during construction. A copy of such Record Drawings and Annotated Specifications will be delivered to Owner in accordance with the schedule prepared by Contractor. If there is a specification that

allows Contractor to elect one of several brands, makes, or types of material or equipment, then the annotations shall show which of the allowable items the Contractor has furnished. The Contractor will update the Record Drawings and Annotated Specifications as often as necessary to keep them current but no less often than weekly. The Record Drawings and Annotated Specifications shall be kept at the Site and available for inspection by the Owner, Inspector of Record and the Architect. On completion of the Contractor's Work and prior to the Final Sublease Payment, the Contractor will provide one complete set of Record Drawings and Annotated Specifications to the Owner, certifying them to be a complete and accurate reflection of the actual construction conditions of the Work.

**3.11.3.5 *Equipment Manuals.*** Contractor shall obtain and furnish to the Owner three (3) complete sets of manuals containing the manufacturers' instructions for maintenance and operation of each item of equipment and apparatus furnished under the Contract Documents and any additional data specifically requested under the various sections of the Specifications for each division of the Work. The manuals shall be arranged in proper order, indexed, and placed in three-ring binders. At the completion of its Work, the Contractor shall certify, by endorsement thereon, that each of the manuals is complete, accurate, and covers all of its Work. Prior to the final Sublease Payment, and as a further condition to its approval by the Architect, each Subcontractor shall deliver the manuals, arranged in proper order, indexed, endorsed, and placed in three-ring binders, to the Contractor, who shall assemble these manuals for all divisions of the Work, review them for completeness, and submit them to the Owner through the Architect.

**3.11.3.6 *Owner's Property.*** All shop drawings and samples submitted shall become the Owner's property.

#### **3.11.4 SUBSTITUTIONS**

**3.11.4.1 *One Product Specified.*** Unless the Specifications state that no substitution is permitted, whenever in the Contract Documents any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction is indicated or specified by name, make, trade name, or catalog number, with or without the words "or equal," such specification shall be deemed to be used for the purpose of facilitating description of material, process, or article desired and shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer any material, process, or article, which shall be substantially equal or better in every respect to that so indicated or specified and will completely accomplish the purpose of the Contract Documents.

**3.11.4.2 *Two or More Products Specified.*** When two or more acceptable products are specified for an item of the Work, the choice will be up to the Contractor. Contractor shall utilize the same product throughout the Project. If a timely substitution request as set forth in Section 3.11.4.3 is not provided and an "or equal" substitution is requested, then the Owner may consider the substitution if the product specified is no longer commercially available. If the Owner allows the substitution to be proposed pursuant to such an untimely request, then the Contractor will be responsible for the professional fees incurred by the Architect or Architect's consultants in reviewing the proposed substitution, which fees may be withheld from sublease payments.

**3.11.4.3 *Substitution Request Form.*** Requests for substitutions of products, materials, or processes other than those specified must be made on the Substitution Request form available from the Owner prior to the establishment of the Total Sublease Amount. Unless otherwise allowed by the Owner, any Requests submitted less than fourteen (14) days prior to the said date will not be considered, except as noted in paragraph 3.11.4.2. A Substitution Request must be accompanied by evidence as to whether or not the proposed substitution: is equal in quality and serviceability to the specified item; will entail no changes

in detail and construction of related work; will be acceptable in consideration of the required design and artistic effect; will provide no cost disadvantage to Owner; and will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts. The burden of proof of these facts shall be upon the Contractor. The Contractor shall furnish with its request sufficient information to determine whether the proposed substitution is equivalent including, but not limited to, all drawings, specifications, samples, performance data, calculations, and other information as may be required to assist the Architect and the Owner in determining whether the proposed substitution is acceptable. The final decision shall be the Owner's. The written approval of the Owner, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. Owner may condition its approval of the substitution upon delivery to Owner of an extended warranty or other assurances of adequate performance of the substitution. All risks of delay due to the Division of the State Architect's approval, or the approval of any other governmental agency having jurisdiction, of a requested substitution shall be on the requesting party.

3.11.4.4 **List of Manufacturers and Products Required.** The Subcontractor shall prepare and submit to the Contractor within thirty (30) days of execution of the Subcontract comprehensive lists, in quadruplicate, of the manufacturers and products proposed for the Project, including information on materials, equipment, and fixtures required by the Contract Documents, as may be required for Contractor's or Architect's preliminary approval. Approval of such lists of products shall not be construed as a substitute for the shop drawings, manufacturer's descriptive data, and samples, which are required by the Contract Documents, but rather as a base from which more detailed submittals shall be developed for the final review of the Contractor and the Architect.

### 3.11.5 DEFERRED APPROVALS

Deferred approvals shall be submitted and processed pursuant to the requirements of Division 1 of the Specifications. All risks of delay due to the Division of the State Architect's, or any other governmental agency having jurisdiction, approval of a deferred approval shall be on the requesting party.

## 3.12 CUTTING AND PATCHING

### 3.12.1 SCOPE

The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

### 3.12.2 CONSENT

The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work. All cutting shall be done promptly, and all repairs shall be made as necessary.

### **3.12.3 STRUCTURAL MEMBERS**

New or existing structural members and elements, including reinforcing bars and seismic bracing, shall not be cut, bored, or drilled except by written authority of the Architect. Work done contrary to such authority is at the Contractor's risk, subject to replacement at its own expense and without reimbursement under the Contract. Agency approvals shall be obtained by the Architect, not by the Contractor.

### **3.12.4 SUBSEQUENT REMOVAL**

Permission to patch any areas or items of the Work shall not constitute a waiver of the Owner's or the Architect's right to require complete removal and replacement of the areas or items of the Work if, in the opinion of the Architect or the Owner, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents. Any costs caused by defective or ill-timed cutting or patching shall be borne by the person or entity responsible.

## **3.13 CLEANING UP**

### **3.13.1 CONTRACTOR'S RESPONSIBILITY**

The Contractor shall keep the Site and surrounding area free from accumulation of waste material or rubbish caused by operations under the Contract. The Site shall be maintained in a neat and orderly condition. All crates, cartons, paper, and other flammable waste materials shall be removed from Work areas and properly disposed of at the end of each day. The Contractor shall continuously remove from and about the Site the waste materials, rubbish, tools, construction equipment, machinery, and materials no longer required for the Work.

### **3.13.2 FAILURE TO CLEANUP**

If the Contractor fails to clean up as provided in the Contract Documents, then the Owner may do so, without prior notice to the Contractor and the cost thereof shall be invoiced to the Contractor and withheld from sublease payments. Each Subcontractor shall have the responsibility for the cleanup of its own Work. If the Subcontractor fails to clean up, then the Contractor must do so.

### **3.13.3 CONSTRUCTION BUILDINGS**

When directed by the Owner or the Architect, Contractor and Subcontractor shall dismantle temporary structures, if any, and remove from the Site all construction and installation equipment, fences, scaffolding, surplus materials, rubbish, and supplies belonging to Contractor or Subcontractor. If the Contractor does not remove the tools, equipment, machinery, and materials within fifteen (15) days after completion of its Work, then they shall be deemed abandoned, and the Owner can dispose of them for its own benefit in whatever way it deems appropriate. Contractor shall pay for any costs to dispose of the items.

## **3.14 ACCESS TO WORK**

The Contractor shall provide the Owner, the Architect, and the Inspector of Record, access to the Work in preparation and progress wherever located.

### **3.15 ROYALTIES AND PATENTS**

#### **3.15.1 PAYMENT AND INDEMNITY**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims of infringement of patent rights and shall hold the Owner and the Architect harmless and indemnify them, from loss on account thereof, to the extent not caused by the Owner's active negligence, sole negligence or willful misconduct, and shall not be responsible for such defense or loss when a particular design, process, or product of a particular manufacturer is required by the Contract Documents. However, if the Contractor has reason to believe the required design, process, or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Owner and Architect.

#### **3.15.2 REVIEW**

The review by the Owner or Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for the use by the Contractor in violation of any patent or other rights of any person or entity.

### **3.16 INDEMNIFICATION**

#### **3.16.1 SCOPE: CONTRACTOR**

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, the Construction Manager, Architect, Architect's consultants, the Inspector of Record, the State of California, and their respective agents, employees, officers, volunteers, Boards of Trustees, members of the Boards of Trustees, and directors ("Indemnitees"), from and against claims, actions, damages, liabilities, losses (including, but not limited to, injury or death of persons, property damage, and compensation owed to other parties), and expenses (including, but not limited to, attorneys' fees and costs including fees of consultants) alleged by third parties against Indemnitees arising out of or resulting from the following: Contractor's, its Subcontractors', or its suppliers' performance of the Work, including, but not limited to, the Contractor's or its Subcontractors' use of the Site in accordance with the Site Lease; the Contractor's or its Subcontractors' construction of the Project, or failure to construct the Project, or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Contractor or its Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Contractor, its Subcontractors, its suppliers, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. The obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Contractor shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance policies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Contractor.



### 3.16.2 SCOPE: SUBCONTRACTORS

3.16.2.1 **Indemnity.** The Subcontractors shall defend, indemnify, and hold harmless the Indemnitees from and against claims, actions, damages, liabilities, and losses (including, but not limited to, injury or death of persons, property damage, and compensation owed to other parties), and expenses (including, but not limited to, attorneys' fees and costs including fees of consultants) alleged by third parties against Indemnitees arising out of or resulting from the following: Subcontractors' performance of the Work, including, but not limited to, the Subcontractors' use of the Site; the Subcontractors' construction of the Project or failure to construct the Project or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment, including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. This obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Subcontractors shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance policies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Subcontractors.

3.16.2.2 **Joint and Several Liability.** If more than one Subcontractor is connected with an accident or occurrence covered by this indemnification, then all such Subcontractors shall be jointly and severally responsible to each of the Indemnitees for indemnification, and the ultimate responsibility among such indemnifying Subcontractors for the loss and expense of any such indemnification shall be resolved without jeopardy to any Indemnitee. The provisions of the indemnity provided for herein shall not be construed to indemnify any Indemnitee for its own negligence if not permitted by law or to eliminate or reduce any other indemnification or right which any Indemnitee has by law or equity.

### 3.16.3 NO LIMITATION

The Contractor's and the Subcontractor's obligation to indemnify and defend the Indemnitees hereunder shall include, without limitation, any and all claims, damages, and costs: for injury to persons and property (including loss of use), and sickness, disease or death of any person; for breach of any warranty, express or implied; for failure of the Contractor or the Subcontractor to comply with any applicable governmental law, rule, regulation, or other requirement; and for products installed in or used in connection with the Work.

### 3.17 OWNER AS INTENDED BENEFICIARY

The Owner is an intended beneficiary of any architectural or engineering work secured by, or performed by, the Contractor to fulfill its obligations under the Contract. Contractor shall state in its contracts with architectural or engineering consultants that their work is for the intended benefit of the Owner.

### **3.18 NOTICE OF EXCUSE FOR NONPERFORMANCE**

If Contractor believes that acts or omissions of Owner (including, but not limited to, Owner caused delay) have prevented Contractor from performing the Work as required by the Contract Documents and Contractor intends to rely on Owner's acts or omissions and Civil Code section 1511(1) as reasons to excuse Contractor's nonperformance or to support, among other things, Contractor's requests for time extensions under Section 4.5, below, then Contractor shall provide written notice of the excuse within five (5) days of the Owner's acts or omissions. If Contractor fails to timely submit the written notice, then Contractor shall have waived any right to later rely on the acts or omissions as a defense to Contractor's nonperformance or as the basis for a time extension, regardless of the merits of the defense or time extension, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Contractor acknowledges that these written notices are of critical importance to the Owner's management of the Work and Project and the mitigation of costs and delays to the Work and Project.

## **ARTICLE 4 ADMINISTRATION OF THE CONTRACT**

### **4.1 ARCHITECT**

#### **4.1.1 DEFINITION**

The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative, and shall also refer to all consultants under the Architect's direction and control.

#### **4.1.2 MODIFICATION**

To the extent the Contract Documents indicate that Owner has assigned duties or responsibilities to the Architect, Owner reserves the right at all times to reassign such duties or responsibilities to different Owner representatives.

#### **4.1.3 TERMINATION**

In the case of the termination of the Architect, the Owner may appoint an architect or another construction professional or may perform such functions with its own licensed professional personnel. The status of the replacement Architect under the Contract Documents shall be that of the former architect.

### **4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT**

#### **4.2.1 STATUS**

The Architect will provide administration of the Contract and may be one of several of Owner's representatives during construction, through the Lease Term, and during the one (1) year period following the commencement of any warranties. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent set forth in the Owner/Architect agreement. The Architect will have all responsibilities and power established by law, including California Code of Regulations, Title 24, to the extent set forth in the Owner/Architect agreement.

#### **4.2.2 SITE VISITS**

The Architect will visit the Site at intervals necessary in the judgment of the Architect or as otherwise agreed by the Owner and the Architect in writing to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents.

#### **4.2.3 LIMITATIONS OF CONSTRUCTION RESPONSIBILITY**

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

#### **4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION**

The Owner and the Contractor shall communicate through the Architect, unless there is a construction manager for the Project or the Owner directs otherwise. Communications between Owner and Subcontractors or material or equipment suppliers shall be through the Contractor.

4.2.5 [Not Used]

#### **4.2.6 REJECTION OF WORK**

The Architect, Inspector of Record, any construction manager and others may recommend to the Owner that the Owner reject Work which does not conform to the Contract Documents or that the Owner require additional inspection or testing of the Work in accordance with paragraph 13.5.5, whether or not the Work is fabricated, installed, or completed. However, no recommendation shall create a duty or responsibility to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

#### **4.2.7 CHANGE ORDERS**

The Architect will prepare change orders and construction change directives and may authorize minor changes in the Work.

#### **4.2.8 WARRANTIES UPON COMPLETION**

The Architect in conjunction with the Inspector of Record, or as otherwise directed by Owner, will conduct field reviews of the Work to determine the date of completion, shall receive and forward to the Owner for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor. The handling by the Architect of such warranties, maintenance manuals, or similar documents shall not diminish or transfer to the Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities, parties, or persons performing or supplying the Work.

Except as may be otherwise directed by Owner, the Architect will conduct a field review of the Contractor's comprehensive list of items to be completed or corrected for development of a punch list and one (1) follow-up field review if required. The cost incurred by the Owner for further field reviews or the preparation of

further punch lists by the Architect shall be invoiced to the Contractor and withheld from sublease payments.

#### 4.2.9 INTERPRETATION

The Architect, Inspector of Record, any construction manager, the Owner or any independent consultant of Owner, as Owner deems appropriate, will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of the Contractor. The Owner's response to such requests will be made with reasonable promptness, while allowing sufficient time to permit adequate review and evaluation of the request.

#### 4.2.10 ADDITIONAL INSTRUCTIONS

4.2.10.1 *Architect's Interpretations and Decisions.* Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations of and decisions regarding the Contract Documents, the Architect will endeavor to secure faithful performance under the Contract Documents by both the Owner and the Contractor and will not show partiality to either. The Work shall be executed in conformity with, and the Contractor shall do no work without, approved drawings, Architect's clarifying instructions, and/or submittals.

4.2.10.2 *Typical Parts and Sections.* Whenever typical parts or sections of the Work are completely detailed on the Drawings, and other parts or sections which are essentially of the same construction are shown in outline only, the complete details shall apply to the Work which is shown in outline.

4.2.10.3 *Dimensions.* Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on Drawings, then Architect shall supply them on request. The Owner's decisions on matters relating to aesthetic effect will be final if consistent with the Contract Documents.

### 4.3 INSPECTOR OF RECORD

#### 4.3.1 GENERAL

One or more Project inspectors ("Inspector of Record") employed by the Owner and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. The Inspector of Record's duties will be as specifically defined in Title 24.

#### 4.3.2 INSPECTOR OF RECORD'S DUTIES

All Work shall be under the observation of or with the knowledge of the Inspector of Record. The Inspector of Record shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector of Record such information as may be necessary to keep the Inspector of Record fully informed regarding progress and manner of work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor's responsibility for providing efficient and capable superintendence. The Inspector of Record is not authorized to make changes in the drawings

or specifications nor shall the Inspector of Record's approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

#### **4.3.3 INSPECTOR OF RECORD'S AUTHORITY TO REJECT OR STOP WORK**

The Inspector of Record shall have the authority to reject work that does not comply with the provisions of the Contract Documents. In addition, the Inspector of Record may stop any work which poses a probable risk of harm to persons or property. The Contractor shall instruct its employees, Subcontractors, material and equipment suppliers, etc., accordingly. The absence of any Stop Work order or rejection of any portion of the Work shall not relieve the Contractor from any of its obligations pursuant to the Contract Documents.

#### **4.3.4 INSPECTOR OF RECORD'S FACILITIES**

Within seven (7) days after notice to proceed, the Contractor shall provide the Inspector of Record with the temporary facilities as required under Division 1 of the Specifications.

#### **4.4 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE OWNER FOR PROFESSIONAL SERVICES**

If at any time prior to the completion of the requirements under the Contract Documents, through no fault of its own, the Owner is required to provide or secure additional professional services for any reason by any act or omission of the Contractor, then the Contractor shall be invoiced by the Owner for any actual costs incurred for any such additional services, which costs may, among other remedies, be withheld from the sublease payments. Such invoicing shall be independent from any other Owner remedies, including, but not limited to, liquidated damages. If sublease payments then or thereafter due to the Contractor are not sufficient to cover such amounts, then the Contractor shall pay the difference to the Owner. Additional services shall include, but shall not be limited to, the following:

- A. Services made necessary by the default of the Contractor.
- B. Services made necessary due to the defects or deficiencies in the Work of the Contractor.
- C. Services required by failure of the Contractor to perform according to any provision of the Contract Documents.
- D. Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors proposed by the Contractor, and making subsequent revisions to drawings, specifications, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available).
- E. Services for evaluating and processing Claims submitted by the Contractor in connection with the Work outside the established Change Order process.
- F. Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time of completion.
- G. Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.

- H. Services in conjunction with more than one (1) re-review of required submittals of shop drawings, product data, and samples.

#### **4.5 NOTICES OF POTENTIAL CHANGE, CHANGE ORDER REQUESTS, AND CLAIMS**

If the Contractor identifies the potential for extra work, delay in the critical path schedule, or the need for additional money or time, or if the Contractor requests additional money or time, or if the Contractor believes that Owner has failed to pay amounts due or otherwise breached the Contract, or otherwise believes that it is entitled to a modification of the Contract terms and conditions, then Contractor shall follow the procedures in this Section 4.5 and Article 7, otherwise Contractor shall have waived its rights to pursue those issues and any later attempts to recover money or obtain a modification shall be barred. Contractor specifically acknowledges the Owner's and public's interest in, and need to know of, potential changes and disputes as early as possible so Owner can investigate, mitigate and resolve adverse cost and time impacts, if any. It is Contractor's obligation to know and comply with the requirements of Section 4.5 and Article 7, and Owner has no obligation to notify Contractor of any failure to comply with those requirements.

##### **4.5.1 NOTICE OF POTENTIAL CHANGE**

Contractor shall submit a written Notice of Potential Change for extra work, critical path delay, or additional money or time. Contractor shall submit written Notices of Potential Change to Owner within five (5) days of Contractor becoming aware of the issues creating the potential for change, unless the issues are, or may soon be, adversely affecting the costs or critical path of the Work, in which case the Contractor must submit the written notice without delay so the Owner may take immediate action to mitigate cost and schedule impacts of the change, if any. The written notice shall explain the nature of the potential change so the Owner may take action to mitigate costs and schedule impacts, if necessary.

When submitting a written Notice of Potential Change based on extra work, Contractor shall not perform the extra work until directed in writing to do so by Owner. When submitting a written Notice of Potential Change for an issue of critical path delay, Contractor shall proactively mitigate the effects of the alleged delay as much as reasonably possible so as to minimize any impact to the schedule, until otherwise directed by Owner. If Contractor intends to rely on Owner's acts or omissions in support of a request for a time extension, then Contractor must also provide the notice set forth in Section 3.18, above.

Failure to timely submit a written Notice of Potential Change shall constitute a complete waiver by Contractor of any right to later submit a change order request or pursue a Claim on that issue, or to later pursue any additional money or time extensions in any manner related to that issue, regardless of the merits, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Contractor acknowledges that these written notices are of critical importance to the Owner's Work and Project management and the mitigation of Work and Project costs and delays.

##### **4.5.2 CHANGE ORDERS REQUESTS**

If, after submitting a written Notice of Potential Change pursuant to Section 4.5.1, Contractor continues to believe that it is entitled to additional money or time (including, but not limited to, grant of a time extension; payment of money or damages arising from work done by, or on behalf of, the Contractor, payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to; or an amount the payment of which is disputed by the Owner) based on an issue, then Contractor shall submit a Change Order Request ("COR") to Owner within twenty (20) days of (i) becoming aware of the issues creating a potential change, or (ii) the date by which it should have become aware of the issues creating a

potential change. A rejection at any time or a lack of a rejection by Owner of a Notice of Potential Change does not affect the timeline for submitting a COR.

Failure to timely submit a COR related to an issue, or failure to comply with any of the COR requirements in the Contract shall constitute a complete waiver by Contractor of any right to later submit a COR or Claim on that issue, or to later pursue any additional money (including time extensions) in any manner related to that issue, regardless of the merits, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

The COR shall state the grounds for the additional money or time requested and the amount of money or time requested, and Contractor shall include all information and documentation supporting the COR, including but not limited to calculations and analysis that demonstrate that the requested money or time is allowed by the applicable Contract provisions and law. Contractor will have completely waived its rights to recover any additional time or money other than that time or money specifically requested in the COR. If the COR requests time, then the COR must identify the number of days of time being requested and must include some critical path schedule analysis to support the number of days requested. Contractor may not reserve its rights, whether in a COR or other document, to submit a COR at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a COR shall be grounds for rejection of the COR.

In the event that costs or delay are continuing to accrue at the time that a COR is required to be submitted, Contractor must still timely submit the COR with all available information and documentation supporting the COR as described above, and Contractor shall identify the costs or delay that are continuing. For continuing costs, the COR must include an estimate of when the extra work is expected to conclude and the total costs that will be incurred by the time that the extra work is expected to conclude. For continuing delay, the COR must include a schedule and delay analysis of when Contractor estimates that the delay will cease, what the final time extension request is estimated to be, and an estimate of the total delay of damages, if any, that will be requested. When the continuing cost or delay ends, within ten (10) days Contractor shall submit an updated COR that states the final dollar amount and/or time extension requested and that includes all required information and documentation. Failure to submit such final COR shall act as a waiver as described above.

Contractor shall certify each COR that it submits, including the initial COR and final COR for a continuing cost or delay, using the form set forth in Section 4.5.5.1, except that every reference to "Claim" shall be changed to "COR." If a COR is submitted without certification, then a certification can still be submitted within the timelines set forth in the first paragraph of section 4.5.2. If the COR is not timely certified, then Contractor will have completely waived its rights to any money or time for that issue, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies. A certification of an initial COR for a continuing cost or delay shall include a statement that "Any estimates in the attached initial COR for a continuing cost or delay are based on true and correct facts and reasonable assumptions, as explained in the initial COR."

The Owner may accept the entire COR, accept part of the COR and reject the remainder, reject the entire COR, or request additional information. If the Owner does not respond within thirty (30) days of the submission of the COR by accepting the entire COR, accepting part of the COR and rejecting the remainder, or requesting additional information, then the entire COR shall be deemed rejected as of the thirtieth (30th) day. In the case of continuing costs or delay, the 30-day timeline will not begin to run until a final COR

has been submitted. If the Owner requests additional information within thirty (30) days of submission, then the Contractor shall submit the information within fifteen (15) days of the date of the request and the Owner shall have fifteen (15) days after the receipt of the additional information to accept or reject (in whole or in part) the COR. If the Owner fails to respond within fifteen (15) days after the submission of additional information, then the entire COR shall be deemed rejected as of the fifteenth (15th) day.

#### 4.5.3 DEFINITION OF CLAIM

A “Claim” is a separate demand by the Contractor sent by registered mail or certified mail for (a) a time extension, including, without limitation, a request for relief from damages or penalties for delay assessed by Owner under the Contract Documents, (b) payment by Owner of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract Documents, and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (c) an amount the payment of which is disputed by the Owner. A claim includes any claim within the scope of Public Contract Code section 20104 et seq. Resubmittal in any manner of a COR which was previously rejected under Section 4.5.2 constitutes a Claim, whether the COR was rejected in whole or in part, and whether the COR was rejected expressly or deemed rejected by Owner inaction. A Claim includes any dispute Contractor may have with the Owner, including one which does not require a Notice of Potential Change or COR under Sections 4.5.1 and 4.5.2, and includes an alleged breach of contract by the Owner. A Claim under this Article 4.5 shall also constitute a claim for purposes of the California False Claims Act. If there is a conflict between a Claims provision in Division 1 of the Specifications and Section 4.5, then Section 4.5 shall take precedence.

The Notice of Potential Change and COR procedures above are less formal procedures which precede the more formal Claim. A Notice of Potential Change does not constitute a Claim. A COR does not constitute a Claim; **except that** if insufficient time remains before the Claim deadline (see Article 4.5.4) for Contractor to submit a COR and for Owner to process and reject the COR under Article 4.5.2, then either (1) Contractor may submit a COR which Owner shall treat as a Claim, but only if the COR complies with all requirements in this Article 4.5 and Article 7 for COR’s and Claims, or (2) a COR is not required so long as a Claim complying with this Article 4.5 is timely submitted.

“Claim” does not include vouchers, invoices, sublease payment submissions, or other routine or authorized forms of requests for sublease payments on the Contract; however, those documents remain “claims” for purposes of the California False Claims Act. “Claim” does not include a Government Code Claim. (“Government Code Claim” means a claim under Government Code sections 900 et seq. and 910 et seq.)

#### 4.5.4 TIME FOR SUBMITTING CLAIM; WAIVER

Contractor shall submit all Claims to the Owner’s Construction Manager (or in the absence of a Construction Manager, to Architect and Owner) within fifteen (15) days of the earliest of the following events: (a) The completion of the Work; (b) the thirtieth (30th) continuous day without labor by Contractor; and (c) Contractor’s submission of a final progress payment application. Owner’s rejection, or lack of rejection, of a COR at any time does not affect the deadline for filing a Claim.

In addition, on or before the fifteenth (15th) day after completion of the Work, Contractor shall submit to Owner, in writing, a summary of all Claims for money or time extensions under or arising out of this Contract which were timely filed and which were fully compliant with the Contract’s requirements for Claims. All Claims by Contractor, except those identified in the above summary, shall be waived after the fifteenth (15th) day after completion of the Work as Contractor will not have satisfied a condition precedent



or exhausted administrative remedies. This Claim summary requirement shall not extend the time for submitting a Claim.

Failure to timely submit a Claim, failure to include a Claim in the Claim summary, or failure to comply with any of the Claim requirements in the Contract, including, but not limited to, this Article 4, will act as a complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim for the money or time (see Section 4.5.6.4), and (c) initiate any action, proceeding or litigation for the money or time, regardless of the merits, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Owner does not have an obligation to reject the Claim for a failure to comply with any of the Claim requirements in the Contract, including the lack of certification, and any failure by Owner to reject, or any delay in rejecting, a Claim on that basis does not waive the Owner's right to reject the Claim on that basis at a later time. In no event may the Contractor reserve its rights to assert a Claim for a time extension or additional money beyond the timelines set forth in this provision unless the Owner agrees in writing to allow the reservation.

#### 4.5.5 CONTENT OF CLAIM

4.5.5.1 **Claim Format; Waiver.** Every Claim shall be in writing. All money or time extensions sought must be stated and itemized in the Claim at the time submitted. The responsibility to substantiate Claims shall rest with the Contractor, and the Contractor shall furnish reasonable documentation to support each Claim.

In addition, the Contractor shall include a certification with each and every Claim at the time of submission, as follows:

I, [name of declarant], declare the following:

[Contractor company name] has contracted with [public entity name] for the [name of project] Project. ([Contractor company name]) authorized me to prepare the attached Claim for money and/or time extension) for [public entity name] regarding this Project (dated \_\_\_\_\_, 20\_\_\_, entitled \_\_\_\_\_, and requesting \$ \_\_\_\_\_ and/or \_\_\_ additional days), and I prepared the attached Claim. I am the most knowledgeable person at [contractor company name] regarding this Claim.

The attached Claim complies with all laws applicable to submission of a Claim, including, but not limited to, California Penal Code section 72, Government Code sections 12650 et seq. (False Claims Act), and Business and Professions Code sections 17200 et seq. (Unfair Business Practices Act). I am aware that submission or certification of false claims, or other claims that violate law or the Contract, may lead to fines, imprisonment, and/or other serious legal consequences for myself or [contractor company name].

The attached Claim does not breach the Contract between [contractor company name] and [public entity name] for this Project, is not a false claim, does not violate any applicable law, satisfies all provisions of the Contract applicable to submission of the Claim, only contains truthful and accurate supporting data, and only requests money and/or time extensions that accurately reflect the adjustments to money and time for which I believe that [public entity name] is responsible under its Contract with [contractor company name].

While preparing this declaration and Claim I consulted with others (including attorneys, consultants, or others who work for [Contractor company name]) when necessary to ensure that the statements were true and correct.

Contractor understands and agrees that any Claim submitted without this certification does not meet the terms of the Contract Documents; that Owner, or Owner's representatives, may reject the Claim on that basis; and that unless Contractor properly and timely files the Claim with the certification, Contractor cannot further pursue the Claim in any forum and all rights to additional money or time for the issues covered by the Claim are waived due to a condition precedent not having been satisfied.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed \_\_\_\_\_, 2\_\_\_\_, at \_\_\_\_\_, California.

\_\_\_\_\_  
[name of declarant]

Contractor's failure to timely submit a certification will constitute a complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6.4) for the money or time, and (c) initiate any action, proceeding or litigation for the money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

**4.5.5.2 *Claims for Additional Money.*** Each Claim for additional money (including, but not limited to, those described in (b) and (c) of the first paragraph of Section 4.5.3) must include all facts supporting the Claim, including, but not limited to, all supporting documentation plus a written analysis as to (a) why the claimed cost was incurred, (b) why Contractor could not mitigate its costs, (c) why the claimed cost is the responsibility of the Owner, and (d) why the claimed cost is a reasonable amount. In no event will the Contractor be allowed to reserve its rights, whether in a Claim or other document, to assert a Claim for money at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a Claim shall be grounds for rejection of the Claim. Any costs, direct or indirect, not asserted shall be waived. A Claim may not include any costs incurred in preparation of the Claim or in preparation of any underlying COR, including, but not limited to, costs of delay analysis.

**4.5.5.3 *Claims for Additional Time.***

**4.5.5.3.1 *Notice of Extent of Claim.*** If the Contractor wishes to make a Claim for an extension in the Date for Completion (including, but not limited to, Section 4.5.3(a)), then the Claim shall include, but not be limited to, all facts supporting the Claim, all documentation of such facts, all information required by the Contract Documents, and a current schedule and delay analysis explaining (a) the nature of the delay, (b) the Owner's responsibility for the claimed delay, (c) the claimed delay's impact on the critical path, (d) the claimed delay's impact on the actual completion date (including an analysis of any float still remaining and whether the alleged delay in work exceeds such remaining float), and (e) why Contractor could not mitigate the delay impacts.

In no event will the Contractor be allowed to reserve its rights, whether in a Claim or other document, to assert a Claim for a time extension at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a Claim shall be grounds for rejection of the Claim. Any time extension not timely asserted in a certified Claim shall be waived.

4.5.5.3.2 **Unusually Severe Weather Claims.** If unusually severe weather is the basis for a Claim for additional time, then Contractor must provide Owner data and facts showing that the weather conditions were abnormal for the period of time, could not have been reasonably anticipated or mitigated, and had an adverse effect on the critical path of the scheduled construction.

4.5.5.4 **“Pass Through” Claims.** A Subcontractor or supplier to Contractor may not submit a request for additional time or money directly to the Owner. If a subcontractor or supplier submits a request for additional money or time to Contractor and Contractor wishes to pass it through to Owner, then Contractor must comply with all requirements of Section 4.5, including Notices of Potential Change, Change Order Requests, and Claims. Contractor must prepare and submit its own analysis of the Subcontractor’s request, and the Claim must include a copy of the Subcontractor’s request along with any other necessary supporting documentation.

In addition to other requirements in the Contract Documents, including but not limited to this Section 4.5, the Contractor’s analysis of the Subcontractor’s request must include Contractor’s detailed explanation as to why the Subcontractor or supplier’s request is the Owner’s responsibility, including Contractor’s analysis of (a) why the amount of damages the Subcontractor or supplier requests is justified and appropriate, (b) how Contractor’s breach of the subcontract caused the Subcontractor or supplier to incur these damages, and (c) how the Owner’s breach of the Contract caused the Contractor’s breach of the subcontract. Any Contractor Claim that fails to include the above information, or that states that Owner is responsible for the Subcontractor’s request only if that Contractor is found to owe money to Subcontractor, shall act as a complete waiver of Contractor’s rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6.3) for the money or time, and (c) initiate any action, proceeding or litigation for the money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

#### 4.5.6 PROCEDURES FOR CLAIMS (PUBLIC CONTRACT CODE SECTION 9204)

Claims are subject to this section 4.5.6, the separate procedures and substantive provisions of Sections 4.5.1 through 4.5.5, all other applicable provisions in the Contract Documents, and Public Contract Code section 9204. In addition, for claims that are \$375,000 or less, the provisions of Public Contract Code section 20104 et seq. also apply, to the extent they do not conflict with Public Contract Code section 9204.

4.5.6.1 **Claims.** Owner shall conduct a reasonable review of the Claim and shall respond in writing to any written Claim within 45 days of receipt of the Claim. During that 45 day period, plus any extension, Owner may request in writing additional documentation supporting the Claim or relating to defenses to the Claim the Owner may have against the Contractor. Owner shall review any additional documentation Contractor supplies in response to that request within the 45 day period plus any extension timeline.

After receipt of a Claim the 45-day period may be extended by Owner and Contractor. The written response shall identify which portion of the Claim is disputed and what portion is undisputed. If Owner needs approval from its governing board to provide the written response, and the governing board does not meet within the 45 days or any extended period of time, then the Owner shall have up to three days after the next publicly noticed meeting of the governing board to provide the written response. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the Owner issues the written response. Owner’s failure to respond to a Claim within the above time periods or to otherwise meet the above time requirements shall result in the Claim being deemed rejected in its entirety.

4.5.6.2 **Meet and Confer.** If the Contractor disputes the Owner's written response, or the Owner fails to respond within the time prescribed, then the Contractor may so notify the Owner, in writing, either within 15 days of receipt of the Owner's response or within 15 days of the Owner's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a written demand received through registered mail or certified mail, the Owner shall schedule a meet and confer conference for settlement of the dispute, which shall take place within 30 days of the demand. Upon written agreement of the Owner and Contractor, the conference may take place during regularly scheduled Project meetings.

If Contractor fails to timely notify the Owner that it wishes to meet and confer pursuant to the previous paragraph, then Contractor will have waived all rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6.3) for such money or time, and (c) initiate any action, proceeding or litigation for such money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

Within ten (10) business days after the conclusion of the meet and confer conference, the Owner shall give a written statement to the Contractor identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the Owner issues the written statement. Any disputed portion of the Claim shall be submitted to non-binding mediation (which may consist of any nonbinding process, including but not limited to neutral evaluation or a dispute review board), with the Owner and Contractor sharing the costs equally. The Owner and Contractor shall agree to a mediator within ten (10) business days after the written statement; and if they cannot agree upon a mediator, then each shall select a mediator and those two mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim (each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator). The parties may mutually waive the requirement for mediation in writing. If the Contractor fails to timely notify the Owner in writing that it wishes to mediate pursuant to this paragraph, then the Contractor will have waived all right to further pursue the Claim pursuant to section 4.5.4. The parties shall reasonably cooperate to schedule and attend a mediation as soon as reasonably possible. Failure by the Owner to respond to a Claim within the above time periods or to otherwise meet the above time requirements shall result in the Claim being deemed rejected in its entirety.

4.5.6.3 **Government Code Claim.** If the Claim or any portion remains in dispute after the mediation and Contractor wishes to pursue it, then the Contractor **must** file a timely and proper Government Code Claim. The filing of a Government Code Claim is specifically required in addition to all contractual procedures described in Sections 4.5 through 4.5.6.2. The above contractual procedures do not act as a substitute for the Government Code Claim process, and the two sets of procedures shall be sequential with the contractual procedures coming first.

Failure to timely file a Government Code Claim shall act as complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Government Code Claim was required, and (b) initiate any action, proceeding or litigation for such money or time, as Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

Owner and Contractor shall proceed with the Government Code Claim according to Government Code, Section 900 et seq., and as otherwise permitted by law. For purposes of the applicable Government Code provisions, and as provided in Public Contract Code section 20104.2(e), the running of the time period within which a Contractor must file a Government Code Claim shall be tolled from the time the Contractor submits a written Claim under Article 4.5 until the time that the Claim is denied, in whole or in part, as a

result of the meet and confer process in Section 4.5.6.2, including any period of time utilized by the meet and confer process.

#### 4.5.7 CONTINUING CONTRACT PERFORMANCE

Despite submission or rejection of a Notice of Potential Change, COR or Claim, the Contractor shall proceed diligently with performance of the Contract as directed by Owner, and the Owner shall continue to make any undisputed payments in accordance with the Contract.

#### 4.5.8 CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS

4.5.8.1 *Trenches or Excavations Less Than Four Feet Below the Surface.* If Contractor encounters conditions at the Site which are subsurface or otherwise concealed physical conditions, which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then the Contractor shall give notice to the Owner promptly before conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. If Contractor believes that such conditions differ materially and will cause an increase in the Contractor's cost of, time required for, or performance of any part of the Work, then Contractor must comply with the provisions above for Notice of Potential Change, Change Order Request, and Claims (beginning with Section 4.5.1).

4.5.8.2 *Trenches or Excavations Greater Than Four Feet Below the Surface.* Pursuant to Public Contract Code section 7104, when any excavation or trenching extends greater than four feet below the surface:

4.5.8.2.1 The Contractor shall promptly, and before the following conditions are disturbed, notify the Owner, in writing, of any:

(1) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, which is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law.

(2) Subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids.

(3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

4.5.8.2.2 The Owner shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work, then the Owner shall issue a change order under the procedures described in the Contract.

4.5.8.2.3 If a dispute arises between the Owner and the Contractor as to whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, then the Contractor shall not be excused from any deadline for completion provided for by the Contract, but shall proceed with all Work to be

performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

#### **4.5.9 INJURY OR DAMAGE TO PERSON OR PROPERTY**

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, any of the other party's employees or agents, or others for whose acts such party is legally liable, then written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding ten (10) days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. For a Notice of Potential Change, COR and Claim for additional cost or time related to this injury or damage, Contractor shall follow Section 4.5.

### **ARTICLE 5 SUBCONTRACTORS**

#### **5.1 DEFINITIONS**

##### **5.1.1 SUBCONTRACTOR**

A Subcontractor is a person or entity, who has a contract with the Contractor to perform a portion of the Work at the Site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor. To the extent that the term Trade Contractor is utilized in the Contract Documents, it shall have the same meaning as the term "Subcontractor."

##### **5.1.2 SUB-SUBCONTRACTOR**

A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the Site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

##### **5.1.3 SPECIALTY CONTRACTORS**

If a Subcontractor is designated as a "Specialty Contractor" as defined in section 7058 of the Business and Professions Code, then all of the Work outside of that Subcontractor's specialty shall be performed in compliance with the Subletting and Subcontracting Fair Practices Act, Public Contract Code sections 4100, et seq.

#### **5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

##### **5.2.1 ASSIGNMENT OR SUBSTITUTION - CONSENT OF OWNER**

In accordance with Public Contract Code sections 4107 and 4107.5, no Contractor whose bid is accepted shall, without the written consent of the Owner: substitute any person or entity as a Subcontractor in place of the Subcontractor designated in the original bid; permit any such Subcontract to be assigned or transferred, or allow it to be performed by any person or entity other than the original Subcontractor listed

in the original bid; sublet or subcontract any portion of the Work in excess of one-half of one percent (0.5%) of the Contractor's total bid as to which its original bid did not designate a Subcontractor. Any assignment or substitution made without the prior written consent of the Owner shall be void, and the assignees shall acquire no rights in the Contract. Any consent, if given, shall not relieve Contractor or its Subcontractors from their obligations under the terms of the Contract Documents.

#### 5.2.2 GROUNDINGS FOR SUBSTITUTION

Pursuant to Public Contract Code section 4107 and the procedure set forth therein, no Contractor whose bid is accepted may request to substitute any person or entity as a Subcontractor in place of a Subcontractor listed in the original bid except in the following instances:

- A. When the Subcontractor listed in the bid after having a reasonable opportunity to do so, fails or refuses to execute a written contract for the scope of work specified in the subcontractor's bid and at the price specified in the subcontractor's bid, when that written contract, based upon the general terms, conditions, plans and specifications for the Project involved or the terms of that Subcontractor's written bid, is presented to the Subcontractor by the Contractor;
- B. When the listed Subcontractor becomes insolvent or the subject of an order for relief in bankruptcy;
- C. When the listed Subcontractor fails or refuses to perform his or her Subcontract;
- D. When the listed Subcontractor fails or refuses to meet the bond requirements of the prime contractor set forth in Public Contract Code section 4108.
- E. When the Contractor demonstrates to the Owner, or its duly authorized officer, subject to the further provisions of Public Contract Code section 4107.5, that the name of the Subcontractor was listed as the result of inadvertent clerical error;
- F. When the listed Subcontractor is not licensed pursuant to the Contractors License Law; or
- G. When the Owner, or its duly authorized officer, determines that the Work being performed by the listed Subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or the Subcontractor is substantially delaying or disrupting the progress of the Work.
- H. When the listed Subcontractor is ineligible to work on a public works project pursuant to Section 1777.1 of the Labor Code.
- I. When the Owner determines that a listed Subcontractor is not a responsible contractor.

5.2.2.1 **No Change in Contract.** Any substitutions of Subcontractors shall not result in any increase in the Total Sublease Amount or result in the granting of any extension of time for the completion of the Work.

5.2.2.2 **Substitution Due to Clerical Error.** The Contractor, as a condition of asserting a claim of inadvertent clerical error in the listing of a Subcontractor, shall, pursuant to Public Contract Code section

4107.5, within two (2) working days after the time of the prime bid opening by the Owner, give written notice to the Owner and copies of such notice to both the Subcontractor it claims to have listed in error, and the intended Subcontractor who had bid to the Contractor prior to bid opening. Any listed Subcontractor who has been notified by the Contractor in accordance with the provisions of this section as to an inadvertent clerical error, shall be allowed six (6) working days from the time of the prime bid opening within which to submit to the Owner and to the Contractor written objection to the Contractor's claim of inadvertent clerical error.

In all other cases, the Contractor must make a request in writing to the Owner for the substitution of a subcontractor, giving reasons therefore. The Owner shall mail a written notice to the listed Subcontractor giving reasons for the proposed substitution. The listed Subcontractor shall have five (5) working days from the date of such notice within which to file with the Owner written objections to the substitution.

Failure to file written objections pursuant to the provisions of this section within the times specified herein shall constitute a complete waiver of objection to the substitution by the listed Subcontractor and, where the ground for substitution is an inadvertent clerical error, an agreement by the listed Subcontractor that an inadvertent clerical error was made.

If written objections are filed, then the Owner shall give five (5) days notice to the Contractor and to the listed Subcontractor of a hearing by the Owner on the Contractor's request for substitution as provided in Public Contract Code section 4107. The determination by the Owner shall be final.

### **5.3 SUBCONTRACTUAL RELATIONS**

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all obligations and responsibilities, which the Contractor, by the Contract Documents, assumes toward the Owner. Each subcontract agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

### **5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS**

Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

- A. Assignment is effective only after termination of the Contract with the Contractor by the Owner for cause pursuant to Article 14 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and



- B. Assignment is subject to the prior rights of the surety, if any, obligated under any bond relating to the Contract.

## **5.5 SUBCONTRACTOR'S RESPONSIBILITIES**

Every Subcontractor is bound to the following provisions, unless specifically noted to the contrary in the Subcontractor's contract subject to the limitations of section 5.3.

### **5.5.1 SUPERVISION BY SUBCONTRACTORS**

Subcontractors shall efficiently supervise their Work, using their best skill and attention. Each of them shall carefully study and compare all Drawings, Specifications, and other instructions, shall at once report to Contractor any error or omission which any of them may discover, and shall subsequently proceed with the Work in accordance with instructions from the Contractor concerning such error or omission. Each Subcontractor shall be fully responsible for and shall bear the full risk of loss of all of its property.

### **5.5.2 DISCIPLINE AND ORDER**

Each Subcontractor shall at all times enforce strict discipline and good order among its Subcontractors, material or equipment suppliers, or their agents, employees, and invitees, and shall establish and maintain surveillance over the activities of each of the foregoing to minimize any disturbance, damage, pollution, or unsightly conditions relative to property areas adjacent to or in the vicinity of the Site. The Contractor shall have the right to remove from the Work any employee of a Subcontractor for any reason including, without limitation, incompetence or carelessness.

### **5.5.3 DEFECTS DISCOVERED**

Should the proper and accurate performance of the Work depend upon the proper and accurate performance of other work not included in its Contract, each Subcontractor shall use all necessary means to discover any defect in such other work and shall allow the Contractor, the Owner and Architect, or other Subcontractors as Contractor elects, a reasonable amount of time to remedy such defects. If the Subcontractor should proceed with its Work, then it shall be considered to have accepted such other work, unless the Subcontractor shall have proceeded pursuant to instructions in writing by the Contractor over its written objection.

### **5.5.4 SUBCONTRACTOR INFORMATION**

Each Subcontractor shall submit to the Owner, the Contractor, or the Architect, as the case may be, promptly when requested by any of the foregoing, information with respect to the names, responsibilities, and titles of the principal members of its staff, the adequacy of the Subcontractor's equipment and the availability of necessary materials and supplies. Subcontractor shall fully cooperate with Contractor in its periodic review of the adequacy of Subcontractor's supervision, personnel, and equipment, and the availability of necessary materials and supplies and shall promptly comply with the requirements of the Contractor with respect thereto.

#### **5.5.5 TEMPORARY STRUCTURES**

Each Subcontractor shall furnish at its expense its own temporary facilities and storage except those specifically agreed to be furnished to it by the Contractor in the Subcontract Agreement. Subcontractor's material storage rooms and field offices, etc., will be placed in locations designated by the Contractor. When it becomes necessary due to the progress of the Work for the Subcontractor to relocate its field operations, it will do so in an expeditious manner and at no additional cost to Contractor or Owner. The construction of material storage rooms and field offices, etc., will be of fire resistive material only, such as concrete or gypsum block, rated drywall, or sheet metal.

#### **5.5.6 CHARGES TO SUBCONTRACTOR**

Each Subcontractor may be subject to the Contractor's reasonable charges for hoisting, repair to other work caused by the fault or negligence of Subcontractor, removal of Subcontractor's rubbish, and clean-up occasioned by Subcontractor.

#### **5.5.7 FINES IMPOSED**

Subcontractor shall comply with and pay any fines or penalties imposed for violation of any applicable law, ordinance, rule, regulation, Environmental Impact Report mitigation requirement, and lawful order of any public authority, including, without limitation, all OSHA and California OSHA requirements and those of other authorities having jurisdiction of the safety of persons or property.

#### **5.5.8 PROJECT SIGNS**

Each Subcontractor shall not display on or about the Project any sign, trademark, or other advertisement. The Owner will permit a single Project sign, which shall be subject to the Owner's prior and sole discretion and approval, as to all matters including, without limitation, size, location, material, colors, style and size of printing, logos and trademarks (if any), text, and selection of names to be displayed.

#### **5.5.9 REMEDIES FOR FAILURE TO PERFORM**

Without limitation of any other right or remedy available to Contractor under the Contract Documents or at law, should: the Subcontractor fail to perform its portion of the Work in a skilled and expeditious manner in accordance with the terms of the Contract Documents with sufficient labor, materials, equipment, and facilities; delays the progress of the job or otherwise fail in any of its obligations; or either a receiver is appointed for the Subcontractor or the Subcontractor is declared to be bankrupt or insolvent, and such appointment, bankruptcy, or insolvency proceedings or declaration is not set aside within thirty (30) days, then the Contractor, upon three (3) days notice to the Subcontractor (subject to the requirements of Pub. Contracts Code, § 4107), may provide such labor, materials, or perform such work and recover the cost plus profit and overhead from monies due or to become due thereafter to the Subcontractor. The Contractor may terminate the employment of the Subcontractor, taking possession of its tools, materials, and equipment related to the Work and cause the entire portion of the Subcontractor's Work to be finished either by another Subcontractor or through the Contractor's own forces.

#### **5.5.10 DISPUTES NOT TO AFFECT WORK**

If there is any dispute as to whether or not any portion of the Work is within the scope of the Work to be performed by a Subcontractor, or any dispute as to whether or not the Subcontractor is entitled to a Change

Order for any Work requested of it or entitled to payment, then the Subcontractor shall continue to proceed diligently with the performance of the Work. Regardless of the size or nature of the dispute, the Subcontractor shall not under any circumstances cease or delay performance of its portion of the Work during the existence of the dispute. The Contractor shall continue to pay the undisputed amounts called for under the Subcontract Agreement during the existence of the dispute. Any party stopping or delaying the progress of the Work because of a dispute shall be responsible in damages to the Owner, the Architect, and the Contractor for any losses suffered as a result of the delay.

#### **5.5.11 INVOICE FOR PAYMENT**

Contractor agrees to advise the Subcontractor if any documentation in connection with the Subcontractor's invoice for payment has not been accepted or is in any way unsatisfactory.

#### **5.5.12 COMPLIANCE WITH PROCEDURES**

Each Subcontractor shall comply with all procedures established by the Contractor for coordination among the Owner, the Owner's consultants, Architect, Contractor, and the various Subcontractors for coordination of the Work with all local municipal authorities, government agencies, utility companies, and any other agencies with jurisdiction over all or any portion of the Work. The Subcontractor shall cooperate fully with all of the foregoing parties and authorities.

#### **5.5.13 ON-SITE RECORD KEEPING**

Subcontractor shall comply with all on-Site record keeping systems established by the Contractor and shall, upon the request of the Contractor, provide the Contractor with such information and reports as the Contractor may deem appropriate. Without limitation of the foregoing, the Subcontractor shall assemble all required permits and certificates so that they are readily accessible at the Site.

#### **5.5.14 NON-EXCLUSIVE OBLIGATIONS**

The specific requirements of Article 5 are not intended to exclude the obligation of the Subcontractor to comply with any of the other provisions of the General Conditions and the other Contract Documents which are relevant to the proper performance of its portion of the Work.

### **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

#### **6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS**

##### **6.1.1 OWNER'S RIGHTS**

In accordance with its rights under the Sublease, the Owner has the right to perform Project work related to the Work with the Owner's own forces, or to award separate contracts in connection with such other Work or other construction or operations on the Site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance. Upon the election to perform such work with its own forces or by separate contracts, the Owner shall notify the Contractor. If the

Contractor claims that delay or additional cost is involved because of such action by the Owner, then the Contractor shall proceed pursuant to Section 4.5 in the Contract Documents.

#### **6.1.2 DESIGNATION AS CONTRACTOR**

When separate contracts are awarded for different portions of the Project or other construction or operations on the Site, the term “Contractor” in the Contract Documents in each of those contracts shall mean the contractor who executes each separate Owner/Contractor Agreement.

#### **6.1.3 CONTRACTOR DUTIES**

The Contractor shall have overall responsibility for coordination and scheduling of the activities of the Owner’s own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule and Total Sublease Amount deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors, and the Owner until subsequently revised.

#### **6.1.4 OWNER OBLIGATIONS**

Unless otherwise provided in the Contract Documents, when the Owner performs work related to the Project with the Owner’s own forces, the Owner shall be deemed to be subject to the same obligations, and to have the same rights, which apply to the Contractor under the General Conditions, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10 and 12.

### **6.2 MUTUAL RESPONSIBILITY**

#### **6.2.1 DELIVERY AND STORAGE**

The Contractor shall afford the Owner and separate contractors reasonable opportunity for delivery and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the separate contractors’ construction and operations with theirs as required by the Contract Documents.

#### **6.2.2 NOTICE BY CONTRACTOR**

If part of the Contractor’s Work depends upon proper execution or results from work by the Owner or a separate contractor, then the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Owner patent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the Owner’s or separate contractors’ completed or partially completed construction is fit and proper to receive the Contractor’s Work, except as to defects not then reasonably discoverable.

#### **6.2.3 COSTS INCURRED**

Costs, expenses, and damages caused by delays, improperly timed activities, defective construction, or damages to another’s work/Work shall be borne by the party responsible. Should Contractor cause damage to the work/Work or property of any other contractor on the Project, or to the Project or property of a third

party, or cause any delay to any such contractor or third party, the Contractor shall defend, indemnify and hold Owner harmless for such damage or delay under Section 3.16, below, and the Contractor shall be liable to Owner for any damages suffered by Owner, including liquidated damages for delay. Owner may withhold from sublease payments the cost of delay or damage to another contractor's work or damage to another contractor's property, and Owner's damages caused by Contractor.

#### **6.2.4 CORRECTION OF DAMAGE**

The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors.

#### **6.3 OWNER'S RIGHT TO CLEAN UP**

If a dispute arises among the Contractor, separate contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Section 3.13, then the Owner may clean up and allocate the cost among those responsible as the Owner determines to be just.

### **ARTICLE 7 CHANGES IN THE WORK**

#### **7.1 CHANGES**

##### **7.1.1 NO CHANGES WITHOUT AUTHORIZATION**

The Owner reserves the right to change the Work by making such alterations, deviations, additions to, or deletions from the plans and specifications, as may be deemed by the Owner to be necessary or advisable for the proper completion or construction of the Work contemplated, and Owner reserves the right to require Contractor to perform such work. No adjustment will be made in the Contract unit price of any Contract item regardless of the quantity ultimately required.

Owner shall compensate Contractor with money or grant extra time for any extra work ordered by the Owner to be performed. Contractor shall follow the provisions of Sections 7.6 and 7.7 when requesting additional money or additional time. Contractor shall expeditiously perform all extra work upon direction, even if no agreement has been reached on extra time or money. For all such changes resulting in a credit to Owner, Contractor shall follow Sections 7.5 and 7.7 in providing the credit to Owner. Contractor shall bring all potential credits to the Owner's attention.

There shall be no change whatsoever in the drawings, specifications, or in the Work or payments under the Contract Documents without an executed Change Order, Construction Change Directive, or order by the Owner pursuant to Section 7.1.2. Owner shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the same shall have been properly requested under Section 4.5 and authorized by, and the cost thereof approved in writing by, Change Order or Construction Change Directive. No extension of time for performance of the Work shall be allowed hereunder unless request for such extension is properly made under Section 4.5 and such time is thereof approved in writing by Change Order or Construction Change Directive. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications.

### **7.1.2 AUTHORITY TO ORDER MINOR CHANGES**

The Owner has authority to order minor changes in the Work not involving any adjustment in the Total Sublease Amount, an extension of the Date for Completion, or a change which is inconsistent with the intent of the Contract Documents. Such changes shall be effected by written Construction Change Directive and shall be binding on the Contractor. The Contractor shall carry out such written orders promptly.

### **7.2 CHANGE ORDERS (“CO”)**

A CO is a written instrument signed by the Owner and the Contractor, stamped (or sealed) and signed by Architect, and approved by the Owner’s Governing Board and DSA, stating the agreement of Owner and Contractor upon all of the following:

- A. A change in the Work;
- B. The amount of the adjustment in the Total Sublease Amount, if any; and
- C. The extent of the adjustment of the Date for Completion, if any.

Unless expressly stated otherwise in the CO, any CO executed by Owner and Contractor constitutes and includes full and complete money and time (including, but not limited to, adjustments to money and time) for all costs and effects caused by any of the changes described within it. Unless expressly stated otherwise in the CO, in consideration for the money received for the changes described in the CO, Contractor waives all Claims for all costs and effects caused by any of the changes, including, but not limited to, labor, equipment, materials, delay, extra work, overhead (home and field), profit, direct costs, indirect costs, acceleration, disruption, impaired productivity, time extensions, and any the costs and effects on Subcontractors and suppliers of any tier. However, if award of the Agreement was based on a proposed percentage fee, any requests by Contractor for additional compensation based on increased subcontractor costs, or increased material or equipment supplier costs, for which the Owner is responsible under the Contract Documents shall be solely based on the additional reasonable cost plus a markup using that percentage fee.

### **7.3 CONSTRUCTION CHANGE DIRECTIVES (“CCD”)**

#### **7.3.1 DEFINITION**

A CCD is a written unilateral order signed by the Owner, and if necessary by the Architect, directing a change in the Work and stating an adjustment, if any, in the Total Sublease Amount, Date for Completion. The Owner may by CCD, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions pursuant to Section 7.1.1.

#### **7.3.2 USE TO DIRECT CHANGE**

A CCD shall be used in the absence of agreement on the terms of a CO. If Contractor disagrees with the terms of a CCD, then it shall nevertheless perform the work directed by the CCD, but it may pursue the Notice of Potential Change, COR and Claim procedures of Section 4.5 if Contractor believes it is entitled to changes in the Total Sublease Amount or Date for Completion.

## **7.4 REQUEST FOR INFORMATION (“RFI”)**

### **7.4.1 DEFINITION**

An RFI is a written request prepared by the Contractor asking the Owner to provide additional information necessary to clarify an item which the Contractor feels is not clearly shown or called for in the drawings or specifications, or to address problems which have arisen under field conditions.

### **7.4.2 SCOPE**

The RFI shall reference all the applicable Contract Documents including specification section, detail, page numbers, drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and/or interpretations of the issue raised by the RFI. An RFI cannot modify the Total Sublease Amount, Date for Completion, Lease Term, or the Contract Documents.

### **7.4.3 RESPONSE TIME**

Unless Owner expressly directs otherwise in writing, Contractor shall submit RFIs directly to the Architect, with copies forwarded to the Owner. Contractor shall submit a revised and updated priority schedule with each RFI. The Architect shall endeavor to follow the Contractor’s requested order of priorities. The Owner and Contractor agree that an adequate time period for the Architect (or other designated recipient of the RFI) to respond to an RFI is generally fourteen (14) calendar days after the Architect’s receipt of an RFI, unless the Owner and Contractor agree otherwise in writing. However, in all cases, the Architect shall take such time, whether more or less than 14 days, as is necessary in the Architect’s professional judgment to permit adequate review and evaluation of the RFI. If Contractor informs the Architect that it needs a response to an RFI expedited to avoid delay to the critical path, then the Architect shall provide a response as quickly as reasonably possible. The total time required for the Architect to respond is subject to the complexity of the RFI, the number of RFI’s submitted concurrently and the reprioritization of pending RFI’s submitted by the Contractor, among other things. If Contractor believes that the Architect’s response results in a change in the Work that warrants additional money or time, or that Architect’s response was unreasonably delayed and caused delay to the Work’s critical path, then Contractor shall follow the procedures for additional money or time under Section 4.5. No presumption shall arise as to the timeliness of the response if the response is more than fourteen (14) days after the Architect’s receipt of the RFI. Contractor shall review the Contract Documents before submitting an RFI to ensure that the information is not already in the Contract Documents. To compensate the Owner for time and costs incurred for each time the information was already in the Contract Documents, Owner may withhold \$100 from sublease payments in addition to any other remedies which Owner may have the right to pursue.

### **7.4.4 COSTS INCURRED**

The Contractor shall be invoiced by the Owner for any costs incurred for professional services, which shall be withheld from sublease payments, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request.

## **7.5 REQUEST FOR PROPOSAL (“RFP”)**

#### **7.5.1 DEFINITION**

An RFP is Owner's written request asking the Contractor to submit to the Owner an estimate of the effect, including credits, of a proposed change on the Total Sublease Amount and the Date for Completion.

#### **7.5.2 SCOPE**

An RFP shall contain adequate information, including any necessary drawings and specifications, to enable Contractor to provide the cost breakdowns required by section 7.7. The Contractor shall not be entitled to any additional money for preparing a response to an RFP, whether ultimately accepted or not.

### **7.6 CHANGE ORDER REQUEST ("COR")**

#### **7.6.1 DEFINITION**

A COR is a written request prepared by the Contractor asking the Owner for additional money or time.

#### **7.6.2 CHANGES IN PRICE**

A COR shall include breakdowns per section 7.7 to validate any proposed change in Total Sublease Amount.

#### **7.6.3 CHANGES IN TIME**

Where a change in Date for Completion is requested, a COR shall also include delay analysis to validate any proposed change to the Date for Completion, and shall meet all requirements in these General Conditions, including, but not limited to, Section 8.4. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Work schedule as defined in section 3.9 and Division 1 of the Specifications.

### **7.7 PRICE OF CHANGE ORDERS**

#### **7.7.1 SCOPE**

Any COR shall provide in writing to the Owner, the Architect and any construction manager, the effect of the proposed CO upon the Total Sublease Amount and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit prices, wage rates, required for the change, and the effect upon the Date for Completion of such CO.

#### **7.7.2 DETERMINATION OF COST**

The amount of the increase or decrease in the Total Sublease Amount resulting from a CO, if any, shall be determined in one or more of the following ways as applicable to a specific situation:

- A. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- B. Unit prices stated in the Contractor's original bid, the Contract Documents, or subsequently agreed upon between the Owner and the Contractor;



- C. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; *however*, if award of the Agreement was based on a proposed percentage fee, any requests by Contractor for additional compensation based on increased subcontractor costs, or increased material or equipment supplier costs, for which the Owner is responsible under the Contract Documents shall be solely based on the additional reasonable cost plus a markup using that percentage fee; or
- D. By cost of material and labor and percentage of overhead and profit. If the value is determined by this method, then the following requirements shall apply:

1. **Daily Reports by Contractor.**

a) General: At the close of each working day, the Contractor shall submit a daily report to the Inspector of Record and any construction manager, on forms approved by the Owner, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, the location of the work, and for other services and expenditures when authorized concerning extra work items. An attempt shall be made to reconcile the report daily, and it shall be signed by the Inspector of Record and the Contractor. If there is disagreement, then pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by Subcontractors or others shall be submitted through the Contractor.

b) Labor: Show names of workers, classifications, and hours worked.

c) Materials: Describe and list quantities of materials used.

d) Equipment: Show type of equipment, size, identification number, and hours of operation, including, if applicable, loading and transportation.

e) Other Services and Expenditures: Describe in such detail as the Owner may require.

2. **Basis for Establishing Costs.**

a) Labor will be the actual cost for wages prevailing locally for each craft or type of workers at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. The use of a labor classification, which would increase the extra work cost, will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

b) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery.

The Owner reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the Owner.

c) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of \$100 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the work is performed.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Necessary loading and transportation costs for equipment used on the extra work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the Owner than holding it at the work Site, then it shall be returned unless the Contractor elects to keep it at the work Site at no expense to the Owner.

All equipment shall be acceptable to the Inspector of Record, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and modifications shall be used to classify equipment, and equipment shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

d) Other Items. The Owner may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted.

e) Invoices. Vendors' invoices for material, equipment rental, and other expenditures shall be submitted with the COR. If the costs are not substantiated by invoices or other documentation, then the Owner may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.

f) Overhead, premiums and profit. For overhead, including direct and indirect costs, submit with the COR and include: home office overhead, off-Site supervision, CO preparation/negotiation/research for Owner initiated changes, time delays, project interference and disruption, additional guaranty and warranty durations, on-Site supervision, additional temporary protection, additional temporary utilities, additional material handling costs, and additional safety equipment costs.

### 7.7.3 **FORMAT FOR PROPOSED COST CHANGE**

The following format shall be used as applicable by the Owner and the Contractor to communicate proposed additions and deductions to the Contract.

	<u>EXTRA</u>	<u>CREDIT</u>
A. Material (attach itemized quantity and unit cost plus sales tax, invoices, receipts, truck tags, etc., for force account work)	_____	_____
B. Labor (attach itemized hours and rates, daily logs, certified payroll, etc.)	_____	_____
C. Equipment (attach any invoices)	_____	_____
D. Subtotal	_____	_____
E. If Subcontractor performed Work, then add Subcontractor's overhead and profit to portions performed by Subcontractor, not to exceed fifteen percent (15%) of item D.	_____	_____
F. Liability and Property Damage Insurance, Worker's Compensation Insurance, Social Security, and Unemployment Taxes, not to exceed twenty-five percent (25%) of Item B.	_____	_____
G. Subtotal	_____	_____
H. General Contractor's Overhead and Profit, not to exceed fifteen percent (15%) of Item G; and for work performed by subcontractors, not to exceed five percent (5%).	_____	_____
I. Subtotal	_____	_____
J. Bond not to exceed one percent (1%) of Item I.	_____	_____
K. TOTAL	_____	_____

It is expressly understood that the value of such extra work or changes, as determined by any of the aforementioned methods, expressly includes (1) any and all of the Contractor's costs and expenses, both direct and indirect, resulting from additional time required on the project or resulting from delay to the project, and (2) any costs of preparing a COR, including, but not limited to, delay analysis. Any costs or expenses not included are deemed waived.

#### **7.7.4 DISCOUNTS, REBATES, AND REFUNDS**

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omissions in the Work as provided herein.

#### **7.7.5 ACCOUNTING RECORDS**

With respect to portions of the Work performed by COs and CCDs on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records satisfactory to the Owner, which shall be available to the Owner on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

#### **7.7.6 NOTICE REQUIRED**

Contractor shall submit a written Notice of Potential Change for additional money or time pursuant to section 4.5.1.

#### **7.7.7 APPLICABILITY TO SUBCONTRACTORS**

Any requirements under this Article 7 shall be equally applicable to COs or CCDs issued to Subcontractors by the Contractor to the same extent required of the Contractor.

#### **7.8 WAIVER OF RIGHT TO CLAIM MONEY OR TIME**

Failure to demand money based on costs, or time extensions, as part of a COR constitutes a complete waiver of Contractor's right to claim the omitted money or time. All money or time for an issue must be included in the COR at the time submitted.

### **ARTICLE 8 TIME**

#### **8.1 DEFINITIONS**

##### **8.1.1 DATE FOR COMPLETION**

Unless otherwise provided, the Date for Completion is the last day of the period of time, including authorized adjustments, allotted in the Contract Documents for Completion of the Work.

### 8.1.2 NOTICE TO PROCEED

Contractor shall not commence the Work until it receives a Notice to Proceed from Owner. The date of commencement of the Work is the date established in the Notice to Proceed. The date of commencement shall not be postponed by the failure to act of the Contractor or of persons or entities for which the Contractor is responsible.

### 8.1.3 DAYS

The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

## 8.2 HOURS OF WORK

### 8.2.1 SUFFICIENT FORCES

Contractors and Subcontractors shall furnish sufficient forces to ensure the prosecution of the Work in accordance with the Construction Schedule.

### 8.2.2 PERFORMANCE DURING WORKING HOURS

Work shall be performed during regular working hours, except that if there is an emergency or when required to complete the Work in accordance with job progress, then work may be performed outside of regular working hours with the advance written consent of the Owner.

### 8.2.3 LABOR CODE APPLICATION

As provided in Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day’s work. The time of service of any worker employed at any time by the Contractor or by any Subcontractor on any subcontract under this Contract, upon the work or upon any part of the work contemplated by this Contract, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, work performed by employees of Contractors in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon this public work with compensation provided for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

Contractor or subcontractor shall pay to the Owner a penalty of Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one (1) calendar week, in violation of the provisions of Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half (1-1/2) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

### 8.2.4 COSTS FOR AFTER HOURS INSPECTIONS

If the work done after hours is required by the Contract Documents to be done outside the Contractor’s or the Inspector of Record’s regular working hours, then the costs of any inspections, if required to be done

outside normal working hours, shall be borne by the Owner.

If the Owner allows the Contractor to do work outside regular working hours for the Contractor's own convenience, then the costs of any inspections required outside regular working hours, among other remedies, shall be invoiced to the Contractor by the Owner and withheld from sublease payments. Contractor shall give Owner at least 48 hours notice prior to working outside regular working hours.

If the Contractor elects to perform work outside the Inspector of Record's regular working hours, then costs of any inspections required outside regular working hours, among other remedies, may be invoiced to the Contractor by the Owner and withheld from sublease payments.

#### **8.2.5 TIME FOR COMMENCEMENT BY SUBCONTRACTORS**

Unless otherwise provided in the Contract Documents, all Subcontractors shall commence their Work within two (2) consecutive business days after notice to them by the Contractor and shall prosecute their Work in accordance with the progress of the Work.

### **8.3 PROGRESS AND COMPLETION**

#### **8.3.1 TIME OF THE ESSENCE**

Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Work can reasonably be completed by the Date for Completion.

#### **8.3.2 NO COMMENCEMENT WITHOUT INSURANCE**

The Contractor shall not knowingly, except by agreement or instruction of the Owner, in writing, commence operations on the Site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.

#### **8.3.3 EXPEDITIOUS COMPLETION**

The Contractor shall proceed expeditiously to perform the Work, with adequate forces, labor, materials, equipment, services and management, and shall achieve completion of the Work by the Date for Completion.

### **8.4 EXTENSIONS OF TIME - LIQUIDATED DAMAGES**

#### **8.4.1 CONDITIONS ALLOWING FOR EXTENSIONS OF TIME TO COMPLETE THE WORK, ONLY (EXCUSABLE DELAY)**

If Contractor exercises due diligence, but the critical path schedule of the Work is unavoidably delayed due to acts of God, acts of public enemy, acts of the Government, acts of the Owner or anyone employed by it, acts of another contractor in performance of a contract (other than this Contract) with the Owner, fires, floods, epidemics, quarantine restrictions, labor disputes, unusually severe weather, or delays of subcontractors due to such causes, then the Owner shall extend the time to complete the Work if Contractor

complies with Section 4.5 and Article 7. Owner shall take into consideration other relevant factors such as concurrent delays. Contractor has the burden of proving that any delay was excusable.

#### **8.4.2 COMPENSABLE DELAY (TIME AND MONEY)**

Compensable delays are those excusable delays (see above) for which Contractor is also entitled to monetary compensation. To be compensable, an excusable delay must be one for which the Owner is responsible, where the delay was unreasonable under the circumstances involved, and where the delay was not within the contemplation of the parties; *however*, Contractor shall not be entitled to monetary compensation when (a) Contractor could have reasonably anticipated the delay and avoided or minimized the cost impacts of it, (b) there was a concurrent delay which does not qualify for monetary compensation under this paragraph, (c) the cause of the delay was reasonably unforeseen by the Owner or the delay was caused by factors beyond the control of the Owner, including but not limited to a delay under Section 2.2.8 above or a delay caused by a utility company's failure to perform despite Owner's reasonable arrangements for such performance; or (d) any other defense available to Owner under law or equity applies. Contractor has the burden of proving that any delay was excusable and compensable, including an analysis that establishes non-concurrency.

#### **8.4.3 NOTICE BY CONTRACTOR REQUIRED; PROCEDURES FOR DEMANDING ADDITIONAL TIME OR MONEY**

For notice and other procedures related to requests by Contractor for additional time or money related to delay, Contractor shall comply with the Contract Documents, including but not limited to Sections 3.18 and 4.5, and Article 7.

#### **8.4.4 EARLY COMPLETION**

Regardless of the cause therefore, the Contractor may not maintain any Claim or cause of action against the Owner for damages incurred as a result of its failure or inability to complete its Work on the Project in a shorter period than established in the Contract Documents, the parties stipulating that the periods set forth in the Contract Documents are reasonable time periods within which to perform the Work on the Project.

#### **8.4.5 LIQUIDATED DAMAGES**

Failure to complete the Work within the time and in the manner provided for by the Contract Documents shall subject the Contractor to liquidated damages as described in Article 3 of the Agreement. For purposes of liquidated damages, the concept of "substantial completion" shall not constitute completion and is not part of the Contract. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer if the Work were not completed within the specified times set forth are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer if there is delay include, but are not limited to, loss of the use of the Work, disruption of activities, costs of administration, supervision, and the incalculable inconvenience and loss suffered by the public.

Accordingly, the parties agree that the amount set forth in the Agreement shall be presumed to be the amount of damages which the Owner shall directly incur as a result of each calendar day by which completion of the Work is delayed beyond the Date for Completion as adjusted by Change Orders.

If the Contractor fails to complete the Work by the Date for Completion as adjusted by Change Orders and liquidated damages therefore accrue, then the Owner, in addition to all other remedies provided by law, shall have the right to assess liquidated damages at any time, and to withhold liquidated damages (and any interest thereon) at any time from any and all Sublease Payments, which would otherwise be or become due the Contractor. In addition, if it is reasonably apparent to the Owner before the Date for Completion (as adjusted by Change Orders) that the Contractor cannot or will not complete the Work before those deadlines, then the Owner may assess and withhold, from Sublease Payments, the estimated amount of liquidated damages that will accrue in the future. If the withheld sublease payments are not sufficient to discharge all liabilities of the Contractor incurred under this Article, then the Contractor and its sureties shall continue to remain liable to the Owner until all such liabilities are satisfied in full.

If the Owner accepts any Work or makes any payment under this Agreement after a default by reason of delays, then the payment or payments shall in no respect constitute a waiver or modification of any Agreement provisions regarding periods of time for completion and liquidated damages.

#### **8.5 GOVERNMENT APPROVALS**

Owner shall not be liable for any delays or damages related to the time required to obtain government approvals.

### **ARTICLE 9 PAYMENTS AND COMPLETION**

#### **9.1 TOTAL SUBLEASE AMOUNT**

The Total Sublease Amount is stated in the Agreement or will be calculated after entering the Agreement, it may be later adjusted by Change Orders and Construction Change Directives, and it is the total amount payable by the Owner to the Contractor under the Contract Documents, and represents the fair market value for the Work and for use of the Site during the term of the Sublease.

#### **9.2 COST BREAKDOWN**

##### **9.2.1 REQUIRED INFORMATION**

Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, Contractor shall furnish to Owner the name, address, telephone number, fax number, license number, and classification, and for all projects over Twenty-five Thousand Dollars (\$25,000) the public works contractor registration number, of all of its Subcontractors and of all other parties furnishing labor, material, or equipment for its Contract, along with the amount of each such subcontract or the price of such labor, material, and equipment needed for its entire portion of the Work; except that if the Contractor will be selecting its subcontractors after award of the Contract (as may be allowed in accordance with the Agreement), it shall provide this information to the Owner after selection of the subcontractors.

#### **9.3 PROCEDURES FOR SUBLEASE PAYMENT**

##### **9.3.1 PROCEDURE**

On or before the fifth (5th) day of each calendar month during the Lease Term for the number of consecutive months indicated in the Sublease and any exhibits thereto, Owner will make a Sublease Payment to



Contractor, as may be adjusted by the terms of the Contract Documents. As a prerequisite and condition of each such payment, Contractor shall submit to the Architect and Owner the following information and documentation by the first (1st) day of each calendar month:

- A. A certification that the as-built Record Drawings and Annotated Specifications are current;
- B. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the Owner may require from time to time;
- C. Contractor's monthly reports, daily reports, and monthly schedule updates for all months of Work to date that Contractor has not previously submitted.
- D. Contractor's monthly report under Education Code section 17407.5(c)(1).
- E. For any post-Completion Sublease payments, all DVBE documentation required by the Agreement.

9.3.2 [Not Used]

#### 9.3.3 **WARRANTY OF TITLE**

The Contractor warrants that title to all work covered by a Sublease Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of the information and documents required by Section 9.3.1, above, all work performed by Contractor to date shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work. Transfer of title to Work does not constitute a waiver by Owner of any defects in the Work.

#### 9.4 **REVIEW OF SUBLEASE PAYMENT**

##### 9.4.1 **OWNER ACCEPTANCE**

If Contractor timely submits the required information and documents pursuant to Section 9.3.1, above, the Owner will, by the fifth (5th) day of the month, determine the amount of the Sublease Payment due to Contractor pursuant to the Contract Documents and make such payment.

##### 9.4.2 **OWNER'S REVIEW**

The review of the Contractor's required information and documents will be based, at least in part, on the Owner's observations at the Site and the data in the submissions. The review is also subject to an evaluation of the Work for conformance with the Contract Documents, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion, and to specific qualifications expressed by the Owner. The Owner may reject the submissions, or elect to not make a Sublease Payment, if the submissions are not complete under section 9.3 or if the Lease Term has been extended due to inexcusable delay (as set forth in the Sublease). The issuance of a Sublease Payment will constitute a representation that the Contractor is entitled to payment in that amount, subject to any specific qualifications from Owner that accompany the Sublease Payment. However, Contractor's entitlement to payment may be affected by subsequent evaluations of the Work for conformance with the Contract

Documents, test and inspections and discovery of minor deviations from the Contract Documents correctable prior to completion. The issuance of a Sublease Payment will not be a waiver by the Owner of any defects in the Work performed to date, nor will it be a representation that the Owner has:

- A. Made exhaustive or continuous on-Site inspections to check the quality or quantity of the Work;
- B. Reviewed construction means, methods, techniques, sequences, or procedures;
- C. Reviewed copies of requisitions received from Subcontractors, material and equipment suppliers, and other data requested by the Owner; or
- D. Made an examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Total Sublease Amount.

## 9.5 DECISIONS TO WITHHOLD PAYMENT

### 9.5.1 REASONS TO WITHHOLD PAYMENT

The Owner may withhold from a Sublease Payment, in whole or in part, to such extent as may be necessary to protect the Owner due to any of the following:

- A. Defective or incomplete Work not remedied;
- B. Stop Payment Notices. For any stop payment notice, the Owner shall withhold the amount stated in the stop payment notice, the stop payment notice claimant's anticipated interest and court costs, and an amount to provide for the public entity's reasonable cost of any litigation pursuant to the stop payment notice. For any stop payment notice action the parties resolve before judgment is entered, Owner has the right to permanently withhold for any reasonable cost of litigation for that stop payment notice, even if it exceeds the amount originally withheld by Owner for the estimated reasonable cost of litigation. However, if (1) the Contractor at its sole expense provides a bond or other security satisfactory to the Owner in the amount of at least one hundred twenty-five percent (125%) of the claim, in a form satisfactory to the Owner, which protects the Owner against such claim, and (2) the Owner chooses to accept the bond, then Owner would release the withheld stop payment notice funds to the Contractor, except that Owner may permanently withhold for any reasonable cost of litigation. Any stop payment notice release bond shall be executed by a California admitted, fiscally solvent surety, completely unaffiliated with and separate from the surety on the payment and performance bonds, that does not have any assets pooled with the payment and performance bond sureties.
- C. Liquidated damages against the Contractor, whether already accrued or estimated to accrue in the future;
- D. Reasonable doubt that the Work can be completed for the unpaid balance of any Total Sublease Amount or by the Date for Completion;
- E. Damage to the property or work of the Owner, another contractor, or subcontractor;

- F. Unsatisfactory prosecution of the Work by the Contractor;
- G. Failure to store and properly secure materials;
- H. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, monthly progress schedules, daily reports, monthly reports (including those required by Education Code section 17407.5(c)), shop drawings, submittal schedules, schedule of values, product data and samples, proposed product lists, executed change orders, and verified reports;
- I. Failure of the Contractor to maintain record drawings;
- J. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements, whether in a request for payment or Contract adjustment, in connection with a payment or Contract adjustment, or in connection with Contractor's submissions to Owner prior to any payment or Contract adjustment;
- K. Unauthorized deviations from the Contract Documents;
- L. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and completion deadlines;
- M. Subsequently discovered evidence or observations nullifying the whole or part of a previously issued Sublease Payment;
- N. Failure by Contractor to pay Subcontractors or material suppliers as required by Contract or law, which includes but is not limited to Contractor's failure to pay prevailing wage and any assessment of statutory penalties;
- O. Overpayment to Contractor on a previous payment;
- P. Credits owed to Owner for reduced scope of work or work that Contractor will not perform, including deductive CO's;
- Q. The estimated cost of performing work pursuant to Section 2.4;
- R. Actual damages related to false claims by Contractor;
- S. Breach of any provision of the Contract Documents;
- T. Owner's potential or actual loss, liability or damages caused by the Contractor; and
- U. As permitted by other provisions in the Contract or as otherwise allowed by law, including statutory penalties Owner or other entities assessed against Contractor (see, e.g., Labor Code section 1813 (working hours) or Public Contract Code section 4110 (subcontractor listings and substitutions)).

Owner may withhold from a Sublease Payment up to 150% of disputed amounts. No interest shall be paid on any amounts withheld.

Owner may, but is not required to, provide to Contractor with the Sublease Payment written notice of the items for which Owner is withholding amounts from the Sublease Payment. To claim wrongful withholding by the Owner, or if Contractor otherwise disputes any amount being withheld, Contractor must submit an inquiry in writing to Owner within thirty (30) days of receipt of the Sublease Payment, and Owner shall respond within fifteen (15) days of receipt of the inquiry. If any disputed issues remain unresolved after Owner's response, then Contractor shall timely submit a Claim pursuant to Section 4.5.

For any withhold amount based on an estimate where the actual amount later becomes known and certain, no later than the final accounting for the Project the Owner will release any amount withheld over that certain and known amount. If the certain and known amount exceeds the amount previously withheld, then Owner may withhold additional amounts from Contractor to cover the excess amount. If available funds are not sufficient, then Contractor shall pay Owner the difference.

#### **9.5.2 PAYMENT AFTER CURE**

When Contractor removes or cures the grounds for withholding amounts, payment shall be made for amounts withheld because of them. No interest shall be paid on any amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

#### **9.5.3 OVERPAYMENT AND/OR FAILURE TO WITHHOLD**

Neither Owner's overpayment to Contractor, nor Owner's failure to withhold an amount from payment that Owner had the right to withhold, shall constitute a waiver by Owner of its rights to withhold those amounts from future payments to Contractor or to otherwise pursue recovery of those amounts from Contractor.

### **9.6 SUBLEASE PAYMENTS**

#### **9.6.1 PAYMENTS TO CONTRACTOR**

Each Sublease Payment shall be made by Owner pursuant to the Contract Documents, including Section 9.3.1 above and Section 6 of the Sublease. Sublease Payments shall be based only on the original Total Sublease Amount plus any fully executed and Board-approved Change Orders; they shall not include Notices of Potential Claims, COR's, Claims, or disputed amounts.

The Contractor shall not be entitled to have any payment made so long as any lawful or proper direction given by the Owner concerning the Work, or any portion thereof, remains uncomplished with. Payment shall not be a waiver of any such direction.

#### **9.6.2 PAYMENTS TO SUBCONTRACTORS**

No later than ten (10) days after receipt of payment from Owner, pursuant to Business and Professions Code section 7108.5, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor, the amount to which said Subcontractor is entitled. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

### **9.6.3 PAYMENT INFORMATION**

The Owner will, on request, furnish to a Subcontractor, if practicable, information regarding the calculation of the Sublease Payments.

### **9.6.4 NO OBLIGATION OF OWNER FOR SUBCONTRACTOR PAYMENT**

The Owner shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

### **9.6.5 PAYMENT TO SUPPLIERS**

Payment to material or equipment suppliers shall be treated in a manner similar to that provided in paragraphs 9.6.2, 9.6.3 and 9.6.4.

### **9.6.6 PAYMENT NOT CONSTITUTING APPROVAL OR ACCEPTANCE**

The making of a Sublease Payment, or partial or entire use or occupancy of the Project, by the Owner shall not constitute acceptance or approval of any portion of the Work, especially any Work not in accordance with the Contract Documents.

### **9.6.7 JOINT CHECKS**

Owner shall have the right, if necessary for the protection of the Owner, to issue joint checks made payable to the Contractor and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. However, Owner has no duty to issue joint checks. In no event shall any joint check payment be construed to create any contract between the Owner and a Subcontractor of any tier, any obligation from the Owner to such Subcontractor, or rights in such Subcontractor against the Owner.

## **9.7 COMPLETION OF THE WORK**

### **9.7.1 CLOSE-OUT PROCEDURES**

As part of the Work, the Contractor shall:

- A. Deliver to the Owner (i) reproducible final Record Drawings and Annotated Specifications showing the Contractor's Work "as built," with the Contractor's certification of the accuracy of the Record Drawings and Annotated Specifications, (ii) all warranties and guarantees, (iii) operation and maintenance instructions, manuals and materials for equipment and apparatus, and (iv) all other documents required by the Contract Documents; and
- B. Provide extensive assistance in the utilization of any equipment or system such as initial start-up or testing, adjusting and balancing, preparation of operation and maintenance manuals and training personnel for operation and maintenance.

When the Contractor considers that the Work is complete and submits a written notice to Owner requesting an inspection of the Work, the Owner shall review the Work and prepare and submit to the Contractor a

comprehensive list of items to be completed or corrected (the “Punch List”). The Punch List shall include all outstanding obligations of Contractor, including training, start-up, testing, and submission to Owner of all required documentation (e.g., written guarantees, warranties, invoices, as-built drawings, manuals, bonds, and the documents described in paragraph 9.3).

The Contractor and/or its Subcontractors shall proceed promptly to complete and correct items on the Punch List. Failure to include an item on the Punch List does not alter the responsibility of the Contractor to complete all Work (including the omitted item) in accordance with the Contract Documents, and to complete or correct the work so long as the statute of limitations (or repose) has not run.

When the Contractor believes the Punch List Work is complete and in accordance with the Contract Documents, it shall then submit a request for an additional inspection by the Owner to determine completion. Owner shall again inspect the Work and inform the Contractor of any items that are incomplete or incorrect. Contractor shall promptly complete or correct items until no items remain.

After the Work, including all Punch List Work, is inspected and informally deemed by the Owner to be Complete, the Owner shall notify the Contractor, and the Owner’s governing body may formally accept the Work as complete at a meeting of the governing body. Warranties required by the Contract Documents shall commence on the date of Contractor’s completion of the Work (see Sections 3.5, 12.2.5, and 12.2.6). Owner may record a Notice of Completion as allowed by Civil Code section 9200 *et seq.*

#### **9.7.2 COSTS OF MULTIPLE INSPECTIONS**

More than two (2) requests by Contractor to make inspections to confirm completion as required under paragraph 9.7.1 shall be considered an additional service of Owner, and all subsequent costs will be invoiced to Contractor and withheld from remaining Sublease Payments.

#### **9.8 PARTIAL OCCUPANCY OR USE**

The Owner may occupy or use any completed, or partially completed, portion of the Work at any stage prior to acceptance, or prior to completion if there is no formal acceptance. Occupancy or use of any portion of the Work, or the whole Work, shall not constitute approval or acceptance of it, nor shall such occupancy or use relieve Contractor of any of its obligations under the Contract Documents regarding that portion of, or the whole, Work.

The Owner and the Contractor shall agree in writing to the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents. When the Contractor considers a portion complete, the Contractor may request an inspection of that portion and preparation of a Punch List by the Owner for that portion, as set forth for the entire Work under paragraph 9.7.1; however, such inspection and Punch List shall not act as any form of approval or acceptance of that portion of the Work, or of any Work not complying with the requirements of the Contract, and that portion shall be subject to subsequent inspections and Punch Lists.

Immediately prior to such partial occupancy or use, the Owner and the Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

## **9.9 FINAL SUBLEASE PAYMENT**

On or before the due date of the final Sublease Payment, as provided by the Contract Documents, Owner shall issue a Final Sublease Payment. If required to do so under Labor Code section 1773.3, subd.(d), Owner shall withhold the Final Sublease Payment.

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **10.1 SAFETY PRECAUTIONS AND PROGRAMS**

#### **10.1.1 CONTRACTOR RESPONSIBILITY**

The Contractor shall have responsibility for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. Each Contractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs. Contractor will ensure that his employees and Subcontractors cooperate and coordinate safety matters with any other contractors on the Project to form a joint safety effort.

#### **10.1.2 SUBCONTRACTOR RESPONSIBILITY**

Subcontractors have the responsibility for participating in, and enforcing, the safety and loss prevention programs established by the Contractor for the Project, which will cover all Work performed by the Contractor and its Subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

#### **10.1.3 COOPERATION**

All Subcontractors and material or equipment suppliers, shall cooperate fully with Contractor, the Owner, and all insurance carriers and loss prevention engineers.

#### **10.1.4 ACCIDENT REPORTS**

Subcontractors shall promptly report in writing to the Contractor all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, then the accident shall be reported immediately by telephone or messenger. Contractor shall thereafter promptly report the facts in writing to the Owner giving full details of the accident.

#### **10.1.5 FIRST-AID SUPPLIES AT SITE**

The Contractor will provide and maintain at the Site first-aid supplies for minor injuries.

## **10.2 SAFETY OF PERSONS AND PROPERTY**

### **10.2.1 THE CONTRACTOR**

The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

- A. Employees on the Work and other persons who may be affected thereby;
- B. The Work, material, equipment, tools, construction equipment, and machinery to be incorporated therein or necessary for the proper execution and Completion of the Work, whether in storage on or off the Site, under the care, custody, or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- C. Other property at the Site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

### **10.2.2 CONTRACTOR NOTICES**

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss.

### **10.2.3 SAFETY BARRIERS AND SAFEGUARDS**

The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

### **10.2.4 USE OR STORAGE OF HAZARDOUS MATERIAL**

When use or storage of explosives, other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall notify the Owner any time that explosives or hazardous materials are expected to be stored on Site. Location of storage shall be coordinated with the Owner and local fire authorities.

### **10.2.5 FINGERPRINTING**

At its own expense, Contractor shall comply with all fingerprinting requirements under law and Contract, including, but not limited to, the requirements of Education Code section 45125.2 and the Independent Contractor Student Contact Form which is a part of the Contract. Contractor shall hold harmless, defend and indemnify the Owner under section 3.16, for any costs, including attorneys' fees, Owner incurs from Contractor's failure to comply.



### **10.3 PROTECTION OF WORK AND PROPERTY**

#### **10.3.1 PROTECTION OF WORK**

The Contractor and Subcontractors shall continuously protect the Work, the Owner's property, and the property of others, from damage, injury, or loss until the earlier of formal acceptance of the Work or 30 days after completion of the Work. The Contractor and Subcontractors shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of the Owner.

#### **10.3.2 PROTECTION FOR ELEMENTS**

The Contractor will remove all mud, water, or other elements as may be required for the proper protection and prosecution of its Work. The Contractor shall at all times provide heat, coverings, and enclosures necessary to maintain adequate protection against weather so as to preserve the Work, materials, equipment, apparatus, and fixtures free from injury or damage.

#### **10.3.3 SHORING AND STRUCTURAL LOADING**

The Contractor shall not impose structural loading upon any part of the Work under construction or upon existing construction on or adjacent to the Site in excess of safe limits, or loading such as to result in damage to the structural, architectural, mechanical, electrical, or other components of the Work. The design of all temporary construction equipment and appliances used in construction of the Work and not a permanent part thereof, including, without limitation, hoisting equipment, cribbing, shoring, and temporary bracing of structural steel, is the sole responsibility of the Contractor. All such items shall conform to the requirements of governing codes and all laws, ordinances, rules, regulations, and orders of all authorities having jurisdiction. The Contractor shall take special precautions, such as shoring of masonry walls and temporary tie bracing of structural steel work, to prevent possible wind damage during construction of the Work. The installation of such bracing or shoring shall not damage or cause damage to the Work in place or the Work installed by others. Any damage which does occur shall be promptly repaired by the Contractor at no cost to the Owner.

#### **10.3.4 CONFORMANCE WITHIN ESTABLISHED LIMITS**

The Contractor and Subcontractors shall confine their construction equipment, the storage of materials, and the operations of workers to the limits indicated by laws, ordinances, permits, and the limits established by the Owner, and shall not unreasonably encumber the premises with construction equipment or materials.

#### **10.3.5 SUBCONTRACTOR ENFORCEMENT OF RULES**

Subcontractors shall enforce the Owner's and the Contractor's instructions, laws, and regulations regarding signs, advertisements, fires, smoking, the presence of liquor, and the presence of firearms by any person at the Site.

#### **10.3.6 SITE ACCESS**

The Contractor and the Subcontractors shall use only those ingress and egress routes designated by the Owner, observe the boundaries of the Site designated by the Owner, park only in those areas designated by the Owner, which areas may be on or off the Site, and comply with any parking control program established by the Owner such as furnishing license plate information and placing identifying stickers on vehicles.

### **10.3.7 PROTECTION OF MATERIALS**

The Contractor and the Subcontractors shall receive, count, inspect for damage, record, store, and protect construction materials for the Work and Subcontractors shall promptly send to the Contractor evidence of receipt of such materials, indicating thereon any shortage, change, or damage (failure to so note shall constitute acceptance by the Subcontractor of financial responsibility for any shortage).

## **10.4 EMERGENCIES**

### **10.4.1 EMERGENCY ACTION**

In an emergency affecting the safety of persons or property, the Contractor shall take any action necessary, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional money or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.5 and Article 7.

### **10.4.2 ACCIDENT REPORTS**

The Contractor shall promptly report in writing to the Owner all accidents arising out of or in connection with the Work, which caused death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious property damages are caused, then the accident shall be reported immediately by telephone or messenger to the Owner.

## **10.5 HAZARDOUS MATERIALS**

### **10.5.1 DISCOVERY OF HAZARDOUS MATERIALS**

If the Contractor encounters or suspects the presence on the Site of material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or any other material defined as being hazardous by section 25249.5 of the California Health and Safety Code, which (a) has not been rendered harmless, and (b) the handling or removal of which is not within the scope of the Work, then the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing, whether such material was generated by the Contractor, another contractor, or the Owner. The Work in the affected area shall not thereafter be resumed, except by written agreement of the Owner and the Contractor, if in fact the material is asbestos, polychlorinated biphenyl (PCB), or other hazardous material, and has not been rendered harmless. The Work in the affected area shall be resumed only in the absence of asbestos, polychlorinated biphenyl (PCB), or other hazardous material, or when it has been rendered harmless by written agreement of the Owner and the Contractor.

### **10.5.2 HAZARDOUS MATERIAL WORK LIMITATIONS**

If the presence of hazardous materials is suspected or discovered on the Site, then the Owner shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. The Contractor shall not be required pursuant to Article 7 to perform without consent any Work in the affected area of the Site relating to asbestos, polychlorinated biphenyl (PCB), or other hazardous material, until any known or suspected hazardous material has been removed, or rendered harmless, or determined to be harmless by Owner, as certified by an independent testing laboratory and/or approved by the appropriate government agency.

### **10.5.3 INDEMNIFICATION BY OWNER FOR HAZARDOUS MATERIAL NOT CAUSED BY CONTRACTOR**

If the presence of hazardous materials on the Site is not caused by the Contractor, then Owner shall pay for all costs of testing and remediation, if any, and shall compensate Contractor for any delay or additional costs incurred in accordance with the applicable provisions of Articles 7 & 8 herein. Owner shall defend, indemnify and hold harmless the Contractor and its agents, officers, directors and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with or arising out of, or relating to, the performance of the Work in the area affected by the hazardous material, except to the extent the claims, damages, losses, costs, or expenses were caused by Contractor's active negligence, sole negligence or willful misconduct. By providing this indemnification, District does not waive any immunities.

### **10.5.4 NATURALLY OCCURRING ASBESTOS**

If the Site is found to contain naturally occurring asbestos (asbestos naturally contained in rocks which can become airborne when released "NOA"), in addition to complying with applicable provisions in sections 10.5.1-10.5.3 above, Contractor shall comply with, and be solely responsible for, all applicable NOA requirements of the California Air Resources Board (CARB), California Department of Industrial Relations, California Division of Occupational Safety and Health (Cal/OSHA), any local air quality management district with jurisdiction over the Site, the County, and all other applicable federal, State and local governmental entities. This compliance and responsibility includes, but is not limited to, dust control mitigation measures and a monitoring plan.

### **10.5.5 INDEMNIFICATION BY CONTRACTOR FOR HAZARDOUS MATERIAL CAUSED BY CONTRACTOR**

If the presence of hazardous materials on the Site is caused by Contractor, Subcontractors, materialmen or suppliers, then the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the Owner for any additional costs incurred as a result of the generation of hazardous material on the Project Site. In addition, the Contractor shall defend, indemnify and hold harmless Owner and its agents, officers, and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with, arising out of, or relating to, the presence of hazardous material on the Site, except to the extent the claims, damages, losses, costs, or expenses were caused by Owner's active negligence, sole negligence or willful misconduct.

### **10.5.6 TERMS OF HAZARDOUS MATERIAL PROVISION**

The terms of this Hazardous Material provision shall survive the completion of the Work and/or any termination of this Contract.

### **10.5.7 ARCHEOLOGICAL MATERIALS**

If the Contractor encounters or reasonably suspects the presence on the Site of archeological materials, then the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing. The Work in the affected area shall not thereafter be resumed, except

after Contractor's receipt of written notice from the Owner.

## ARTICLE 11 INSURANCE AND BONDS

### 11.1. CONTRACTOR'S LIABILITY INSURANCE

#### 11.1.1 LIABILITY INSURANCE REQUIREMENTS

11.1.1 Before commencement of the Work and within limits acceptable to the Owner, the Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports such commercial general liability insurance per occurrence for bodily injury, personal injury and property damage as set forth in the Agreement and automobile liability insurance per accident for bodily injury and property damage combined single limit as set forth in the Agreement as will protect the Contractor from claims set forth below, which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations are by the Contractor, by a Subcontractor, by Sub-subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- 11.1.1.1 claims for damages because of bodily injury (including emotional distress), sickness, disease, or death of any person other than the Contractor's employees. This coverage shall be provided in a form at least as broad as Insurance Services Office (ISO) Form CG 0001 11188;
- 11.1.1.2 claims for damages arising from personal or advertising injury in a form at least as broad as ISO Form CG 0001 11188;
- 11.1.1.3 claims for damages because of injury or destruction of tangible property, including loss of use resulting therefrom, arising from operations under the Contract Documents; and
- 11.1.1.4 claims for damages because of bodily injury, death of a person, or property damage arising out of the ownership, maintenance, or use of a motor vehicle, all mobile equipment, and vehicles moving under their own power and engaged in the Work; and
- 11.1.1.5 claims involving blanket contractual liability applicable to the Contractor's obligations under the Contract Documents, including liability assumed by and the indemnity and defense obligations of the Contractor and the Subcontractors; and
- 11.1.1.6 claims involving Completed Operations, Independent Contractors' coverage, and Broad Form property damage, without any exclusions for collapse, explosion, demolition, underground coverage, and excavating. (XCU)

If commercial general liability insurance or another insurance form with a general aggregate limit is used, then either the general aggregate limit shall apply separately to the project location, (with the ISO CG 2501 or insurer's equivalent endorsement provided to the Owner) ~~or the general aggregate limit shall be twice the required occurrence limit.~~

Any deductible or self-insured retention must be declared to and approved by the Owner. At the option of the Owner, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its Board of Trustees, members of its Board of Trustees, officers, employees, agents and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

#### 11.1.2 **SUBCONTRACTOR INSURANCE REQUIREMENTS**

The Contractor shall require its Subcontractors and any Sub-subcontractors to take out and maintain similar public liability insurance and property damage insurance, in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports, in like amounts and scope of coverage.

#### 11.1.3 **OWNER'S INSURANCE**

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

#### 11.1.4 **ADDITIONAL INSURED ENDORSEMENT REQUIREMENTS**

The Contractor shall name, on any policy of insurance, the Owner and the Architect as additional insureds. Subcontractors shall name the Contractor, the Owner and the Architect as additional insureds. The Additional Insured Endorsement included on all such insurance policies shall state that coverage is afforded the additional insured with respect to claims arising out of on-going and completed operations performed by or on behalf of the insured. If the additional insureds have other insurance which is applicable to the loss, then such other insurance shall be excess to any policy of insurance required herein. The amount of the insurer's liability shall not be reduced by the existence of such other insurance.

#### 11.1.5 **WORKERS' COMPENSATION INSURANCE**

During the term of this Contract, the Contractor shall provide workers' compensation insurance for all of the Contractor's employees engaged in Work under this Contract on or at the Site of the Project and, in case any of the Contractor's work is sublet, the Contractor shall require the Subcontractor to provide workers' compensation insurance for all the Subcontractor's employees engaged in Work under the subcontract. Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in Work under this Contract on or at the Site of the Project is not protected under the Workers' Compensation laws, the Contractor shall provide or cause a Subcontractor to provide adequate insurance coverage for the protection of those employees not otherwise protected. The Contractor shall file with the Owner certificates of insurance as required under this Article and in compliance with Labor Code section 3700.

If the contractor fails to maintain such insurance, then the Owner may take out compensation insurance which the Owner might be liable to pay under the provisions of the Act by reason of an employee of the Contractor being injured or killed, and withhold from Sublease Payments the amount of the premium for such insurance.

#### **11.1.6 BUILDER'S RISK/"ALL RISK" INSURANCE**

##### **11.1.6.1 COURSE-OF-CONSTRUCTION INSURANCE REQUIREMENTS**

Unless provided by Owner at Owner's sole discretion, Contractor, during the progress of the Work and until final acceptance of the Work by Owner upon completion of the entire Contract, shall maintain Builder's Risk/Course-of-Construction insurance satisfactory to the Owner, issued on a completed value basis on all insurable Work included under the Contract Documents. This insurance shall insure against all risks, including, but not limited to, the following perils: vandalism, theft, malicious mischief, fire, sprinkler leakage, civil authority, sonic boom, explosion, collapse, flood, earthquake (for projects not solely funded through revenue bonds, limited to earthquakes equivalent to or under 3.5 on the Richter Scale in magnitude), wind, hail, lightning, smoke, riot or civil commotion, debris removal (including demolition) and reasonable compensation for the Architect's services and expenses required as a result of such insured loss. This insurance shall provide coverage in an amount not less than the full cost to repair, replace or reconstruct the Work. Such insurance shall include the Owner, the Architect, and any other person or entity with an insurable interest in the Work as an additional named insured.

The Contractor shall submit to the Owner for its approval all items deemed to be uninsurable under the Builder's Risk/Course-of-Construction insurance. The risk of the damage to the Work due to the perils covered by the Builder's Risk/Course-of-Construction insurance, as well as any other hazard which might result in damage to the Work, is that of the Contractor and the surety, and no claims for such loss or damage shall be recognized by the Owner, nor will such loss or damage excuse the complete and satisfactory performance of the Contract by the Contractor.

##### **11.1.7 CONSENT OF INSURER FOR PARTIAL OCCUPANCY OR USE**

Partial occupancy or use in accordance with the Contract Documents shall not commence until the insurance company providing property insurance has consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company and shall, without mutual consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of the insurance.

##### **11.1.8 FIRE INSURANCE**

Before the commencement of the Work, the Contractor shall procure, maintain, and cause to be maintained at the Contractor's expense, fire insurance on all Work included under the Contract Documents, insuring the full replacement value of such Work as well as the cost of any removal and demolition necessary to replace or repair all Work damaged by fire. The amount of fire insurance shall be subject to approval by the Owner and shall be sufficient to protect the Work against loss or damage in full until the Work is accepted by the Owner. Should the Work being constructed be damaged by fire or other causes during construction, it shall be replaced in accordance with the requirements of the drawings and specifications without additional expense to the Owner.

##### **11.1.9 OTHER INSURANCE**

The Contractor shall provide all other insurance required to be maintained under applicable laws, ordinances, rules, and regulations.

#### 11.1.10 PROOF OF CARRIAGE OF INSURANCE

The Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract until all required insurance, certificates, and an Additional Insured Endorsement and Declarations Page have been obtained and delivered in duplicate to the Owner for approval subject to the following requirements:

- (a) Certificates and insurance policies shall include the following clause:

This policy shall not be non-renewed, canceled, or reduced in required limits of liability or amounts of insurance until notice has been mailed to the Owner. Date of cancellation or reduction may not be less than thirty (30) days after the date of mailing notice.
- (b) Certificates of insurance shall state in particular those insured, the extent of insurance, location and operation to which the insurance applies, the expiration date, and cancellation and reduction notices.
- (c) Certificates of insurance shall clearly state that the Owner and the Architect are named as additional insureds under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by Owner and any other insurance carried by the Owner with respect to the matters covered by such policy shall be excess and non-contributing.
- (d) The Contractor and its Subcontractors shall produce a certified copy of any insurance policy required under this Section upon written request of the Owner.

#### 11.1.11 COMPLIANCE

If any contractor fails to furnish and maintain any insurance required by this Article, then the Contractor shall be in default under the Contract. Compliance by Contractor with the requirement to carry insurance and furnish certificates, policies, Additional Insured Endorsement and Declarations Page evidencing the same shall not relieve the Contractor from liability assumed under any provision of the Contract Documents, including, without limitation, the obligation to defend and indemnify the Owner and the Architect.

### 11.2 PERFORMANCE AND PAYMENT BONDS

#### 11.2.1 BOND REQUIREMENTS

Unless otherwise specified in the Contract Documents, prior to commencing any portion of the Work, the Contractor shall apply for and furnish Owner separate payment and performance bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate surety authorized and admitted to transact business in California. All bonds shall be submitted on the Owner's approved form.

To the extent, if any, that the Total Sublease Amount is increased in accordance with the Contract Documents, the Contractor shall cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the Owner. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Total Sublease Amount, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the surety. If the Contractor fails to furnish the required bond, then the Owner may terminate the Contract for cause.

#### **11.2.2 SURETY QUALIFICATION**

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure section 995.120 shall be accepted. The surety insurers must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bonds, have a rating not lower than “A-” as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurers selected by Contractor and to require Contractor to obtain bonds from surety insurers satisfactory to the Owner.

### **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

#### **12.1 UNCOVERING OF WORK**

##### **12.1.1 UNCOVERING WORK FOR REQUIRED INSPECTIONS**

If a portion of the Work is covered contrary to the Owner’s request or to requirements specifically expressed in the Contract Documents, then Contractor must, if so required in writing by the Owner, uncover it for the Owner’s observation and replace the removed work at the Contractor’s expense without change in the Total Sublease Amount or Date for Completion.

##### **12.1.2 COSTS FOR INSPECTIONS NOT REQUIRED**

If a portion of the Work has been covered which the Owner has not specifically requested to observe prior to its being covered, then the Owner may request to see such Work, and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, then costs of uncover and replacement shall, by appropriate Change Order, be paid by the Owner. If such Work is not in accordance with Contract Documents, then the Contractor shall pay such costs, unless the condition was caused by the Owner or a separate contractor, in which event the Owner shall be responsible for payment of such costs to the Contractor.

#### **12.2 CORRECTION OF WORK; WARRANTY**

##### **12.2.1 CORRECTION OF REJECTED WORK**

The Contractor shall promptly correct the Work rejected by the Owner for failing to conform to the requirements of the Contract Documents, until the statutes of limitation (or repose) and all warranties have run, as applicable, and whether or not fabricated, installed or completed.. The Contractor shall bear costs of correcting the rejected Work, including additional testing, inspections, and compensation for the Owner’s expenses and costs incurred.



#### **12.2.2 REMOVAL OF NONCONFORMING WORK**

The Contractor shall remove from the Site portions of the Work which are not in accordance with the requirements of the Contract Documents and are not corrected by the Contractor or accepted or approved by the Owner.

#### **12.2.3 OWNER'S RIGHTS IF CONTRACTOR FAILS TO CORRECT**

If the Contractor fails to correct nonconforming Work within a reasonable time, then Owner may correct it in accordance with Section 2.4. As part of Owner's correction of the Work, the Owner may remove any portion of the nonconforming Work and store any salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten (10) days after written notice, then Owner may upon ten (10) additional days written notice sell such material or equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's and other professionals and representatives' services and expenses, made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, then Contractor shall be invoiced for the deficiency or Owner may withhold such costs from payment pursuant to Section 9.5. If Sublease Payments then or thereafter due the Contractor are not sufficient to cover such amount, then Contractor shall pay the difference to the Owner.

#### **12.2.4 COST OF CORRECTING THE WORK**

The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or separate contractors, whether completed or partially completed, caused by the Contractor's correction or removal of the nonconforming Work.

#### **12.2.5 WARRANTY CORRECTIONS (INCLUDES REPLACEMENT)**

Pursuant to the warranty in Sections 3.5 and 9.7.1, if within one (1) year after the completion of the Work or within a longer time period for an applicable special warranty or guarantee required by the Contract Documents, any of the Work does not comply with the Contract Documents, then the Contractor shall correct it after receipt of Owner's written notice to do so, unless the Owner has previously waived in writing such right to demand correction. Contractor shall correct the Work promptly, and passage of the applicable warranty period shall not release Contractor from its obligation to correct the Work if Owner provided the written notice within the applicable warranty period. Contractor's obligation to correct the warranty item continues until the correction is made. After the correction is made to Owner's satisfaction, a new warranty period of the same length as the original warranty period shall run on the corrected work. The obligations under this paragraph 12.2.5 shall survive acceptance of the Work under the Contract and termination of the Contract.

#### **12.2.6 NO TIME LIMITATION**

Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one (1) year as described in Sections 3.5, 9.7.1, and 12.2.5 relates only to the specific warranty obligation of the Contractor to correct the Work after the date of commencement of warranties, and has, for example, no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, or to the time within which proceedings may be commenced to

establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

### **12.3 NONCONFORMING WORK AND WITHHOLDING THE VALUE OF IT**

If it is found at any time before completion of the Work that the Contractor has varied from the Contract Documents in materials, quality, form, finish, or in the amount or value of the materials or labor used, then the Owner may, in addition to other remedies in the Contract Documents or under law and as allowed by law, accept the improper Work. The Owner may withhold from any amount due or to become due Contractor that sum of money equivalent to the difference in value between the Work performed and that called for by the Drawings and Specifications. The Owner shall determine such difference in value. No structural related Work shall be accepted that is not in conformance with the Contract Documents.

## **ARTICLE 13 MISCELLANEOUS PROVISIONS**

### **13.1 GOVERNING LAW**

The Contract shall be governed by the law of the place where the Project is located.

### **13.2 SUCCESSORS AND ASSIGNS**

The Owner and the Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole or in part without written consent of the other. If either party attempts to make such an assignment without such consent, then that party shall nevertheless remain legally responsible for all obligations under the Contract.

### **13.3 WRITTEN NOTICE**

In the absence of specific notice requirements in the Contract Documents, written notice shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified or overnight mail to the last business address known to the party giving notice. Owner shall, at Contractor's cost, timely notify Contractor of Owner's receipt of any third party claims relating to the Contract pursuant to Public Contract Code section 9201.

### **13.4 RIGHTS AND REMEDIES**

#### **13.4.1 DUTIES AND OBLIGATIONS CUMULATIVE**

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

#### **13.4.2 NO WAIVER**

No action or failure to act by the Owner, Inspector of Record, Architect or any construction manager shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed to in a written amendment to the Contract.

#### **13.5 TESTS AND INSPECTIONS**

##### **13.5.1 COMPLIANCE**

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

##### **13.5.2 INDEPENDENT TESTING LABORATORY**

The Owner will select and pay an independent testing laboratory to conduct all tests and inspections, including shipping or transportation costs or expenses (mileage and hours). Selection of the materials required to be tested shall be made by the laboratory and not by the Contractor. However, if Contractor requests that the Owner use a different testing laboratory and Owner chooses to approve such request, then Contractor shall reimburse the Owner for any additional shipping or transportation costs or expenses (mileage and hours). Owner may invoice such costs or expenses to the Contractor or withhold such costs or expenses from Sublease Payments.

##### **13.5.3 ADVANCE NOTICE TO INSPECTOR OF RECORD**

The Contractor shall notify the Inspector of Record a sufficient time in advance of its readiness for required observation or inspection so that the Inspector of Record may arrange for same. The Contractor shall notify the Inspector of Record a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector of Record may arrange for the testing of the material at the source of supply.

##### **13.5.4 TESTING OFF-SITE**

Any material shipped by the Contractor from the source of supply, prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said Inspector of Record that such testing and inspection will not be required, shall not be incorporated in the Work.

##### **13.5.5 ADDITIONAL TESTING OR INSPECTION**

If the Inspector of Record, the Architect, the Owner, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under section 13.5.1, then the Inspector of Record will, upon written authorization from the Owner, make arrangements for such additional testing, inspection, or approval. The Owner shall bear such costs except as provided in section 13.5.6.

#### **13.5.6 COSTS FOR RETESTING**

If such procedures for testing, inspection, or approval under sections 13.5.1, 13.5.2 and 13.5.5 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, then the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect's services and expenses. Any such costs shall be paid by the Owner, invoiced to the Contractor, and, among other remedies, can be withheld from Sublease Payments.

#### **13.5.7 COSTS FOR PREMATURE TEST**

If the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, then the Contractor shall be invoiced by the Owner for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Architect's fees and expenses, and the amount of the invoice can among other remedies, be withheld from Sublease Payments.

#### **13.5.8 TESTS OR INSPECTIONS NOT TO DELAY WORK**

Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

### **13.6 INTENTIONALLY LEFT BLANK**

### **13.7 TRENCH EXCAVATION**

#### **13.7.1 TRENCHES GREATER THAN FIVE FEET**

Pursuant to Labor Code section 6705, if the Total Sublease Amount exceeds \$25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, then the Contractor shall, in advance of excavation, submit to the Owner or a registered civil or structural engineer employed by the Owner a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

#### **13.7.2 EXCAVATION SAFETY**

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, then the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the Owner or by the person to whom authority to accept has been delegated by the Owner.

#### **13.7.3 NO TORT LIABILITY OF OWNER**

Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the Owner or any of its employees.

#### **13.7.4 NO EXCAVATION WITHOUT PERMITS**

The Contractor shall not commence any excavation work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

#### **13.8 WAGE RATES**

##### **13.8.1 WAGE RATES**

Pursuant to the provisions of Article 2 (commencing at § 1770), Chapter 1, Part 7, Division 2, of the Labor Code, the governing board of the Owner has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification, or type of worker needed for this Project from the Director of Industrial Relations (“Director”). These rates are on file with the Clerk of the Owner’s governing board, and copies will be made available to any interested party on request.

##### **13.8.2 HOLIDAY AND OVERTIME PAY**

Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half (1½) times the above specified rate of per diem wages, unless otherwise specified. Holidays shall be defined in the Collective Bargaining Agreement applicable to each particular craft, classification, or type of worker employed.

##### **13.8.3 WAGE RATES NOT AFFECTED BY SUBCONTRACTS**

The Contractor shall pay and shall cause to be paid each worker engaged in the Work not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

##### **13.8.4 CHANGE IN PREVAILING WAGE DURING BID OR CONSTRUCTION**

If during the period this bid is required to remain open, the Director of Industrial Relations determines that there has been a change in any prevailing rate of per diem wages in the locality in which this public work is to be performed, then such change shall not alter the wage rates discussed in the Notice to Bidders or the Contract subsequently awarded.

##### **13.8.5 FORFEITURE AND PAYMENTS**

Pursuant to Labor Code section 1775, the Contractor and any subcontractor under the Contractor shall as a penalty to the Owner, forfeit not more than Two Hundred Dollars (\$200.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rate of per diem wages, determined by the Director, for such craft or classification in which such worker is employed for any public work done under the Agreement by the Contractor or by any Subcontractor under it. Minimum penalties shall apply, as also provided in Civil Code section 1775. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on both of the following: (1) whether the failure of the contractor or subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected upon being brought to the attention of the contractor or subcontractor; and (2) whether the contractor or subcontractor has a prior record of failing to meet its prevailing wage

obligations. The difference between such prevailing rate of per diem wage and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing rate of per diem wage shall be paid to each work by the Contractor or subcontractor. Labor Code section 1777.1 shall also apply.

#### **13.8.6 MINIMUM WAGE RATES**

Any worker employed to perform Work, which Work is not covered by any craft or classification listed in the general prevailing rate of per diem wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the craft or classification which most nearly corresponds to the Work to be performed by them, and such minimum wage rate shall be retroactive to time of initial employment of such person in such craft or classification.

#### **13.8.7 PER DIEM WAGES**

Pursuant to Labor Code section 1773.1, per diem wages includes employer payments for health and welfare, pension, and vacation pay.

#### **13.8.8 POSTING OF WAGE RATES**

The Contractor shall post at appropriate conspicuous points on the Site, a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned and all other required job site notices as prescribed by regulation.

### **13.9 RECORD OF WAGES PAID; INSPECTION**

#### **13.9.1 APPLICATION OF LABOR CODE**

Pursuant to section 1776 of the Labor Code:

(a) Each Contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that is made under penalty of perjury, stating both of the following:

- (1) The information contained in the payroll record is true and correct.
- (2) The employer has complied with the requirements of sections 1771, 1811 and 1815 for any work performed by his or her employees on the public works project.

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

- (1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract and as may be required by the Labor Commissioner under Labor Code section 1771.4. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner monthly or more frequently, if so specified in the Agreement and in a format the Labor Commissioner prescribes.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the Owner or the Division of Labor Standards Enforcement of the Department of Industrial Relations (“DIR”). If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of the preparation by the contractor, subcontractors, and the entity through which the request was made. The public may not be given access to such records at the principal office of the Contractor.

(c) Unless required as of January 1, 2015, to be furnished directly to the Labor Commissioner under Labor Code section 1771.4(a)(3), the certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement of the DIR or shall contain the same information as the forms provided by the division. The payroll records may consist of printouts of payroll data that are maintained as computer records, if the printouts contain the same information as the forms provided by the division and the printouts are verified in the manner specified in (a) above.

(d) A Contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested such records within 10 days after receipt of a written request.

(e) Except as provided in subdivision (f), any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body or the Division of Labor Standards Enforcement of the DIR shall be marked or obliterated to prevent disclosure of an individual’s name, address and social security number. The name and address of the Contractor awarded the Contract or the subcontractor performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a multiemployer Taft-Hartley trust fund (29 U.S.C. Sec. 186(c)(5) that requests the records for the purposes of allocating contributions to participants shall be marked or obliterated only to prevent disclosure of an individual’s full social security number, but shall provide the last four digits of the social security number. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (29 U.S.C. Sec. 175a) shall be marked or obliterated only to prevent disclosure of an individual’s social security number.

(f) Notwithstanding any other provision of law, agencies that are included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided non-redacted copies of certified payroll records. Any copies of records or certified payroll made available for inspection and furnished upon request to the public by an agency included in the Joint Enforcement Strike Force on the Underground Economy or to a law enforcement agency investigating a violation of law shall be marked or

redacted to prevent disclosure of an individual's name, address, and social security number. An employer shall not be liable for damages in a civil action for any reasonable act or omission taken in good faith in compliance with this subsection.

(g) The contractor shall inform the Owner of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

(h) The contractor or subcontractor has 10 days in which to comply subsequent to receipt of written notice requesting the records enumerated in subdivision (a). If the Contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit One Hundred Dollars (\$100.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Labor Standards Enforcement of the DIR, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of the subcontractor to comply with this section.

## **13.10 APPRENTICES**

### **13.10.1 APPRENTICE WAGES AND DEFINITIONS**

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he or she is employed, and shall be employed only at the work of the craft or trade to which he or she is registered. Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprenticeship agreements under Chapter 4 (commencing with § 3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training. Contractor shall pay apprentices for any preemployment activities, as set forth in Labor Code section 1777.5.

### **13.10.2 APPRENTICE LABOR POOL**

When the Contractor to whom the Contract is awarded by the Owner, or any Subcontractor under him or her, in performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and Subcontractor shall apply to the joint apprenticeship committee administering the apprenticeship standards of the craft or trade in the area of the Site of the Project, for a certificate approving the Contractor or Subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, approval as established by the joint apprenticeship committee or committees shall be subject to the approval of the Administrator of Apprenticeship. The joint apprenticeship committee or committees, subsequent to approving the subject Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor in order to comply with this section. Every Contractor and Subcontractor shall submit the contract award information to the applicable joint apprenticeship committee which shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. There shall be an affirmative duty upon the joint apprenticeship committee or committees administering the apprenticeship standards of the crafts or trade in the area of the Site of the public work, to ensure equal employment and affirmative action



and apprenticeship for women and minorities. Contractors or Subcontractors shall not be required to submit individual applications for approval to local joint apprenticeship committees provided they are already covered by the local apprenticeship standards. The ratio of work performed by apprentices to journeymen, who shall be employed in the craft or trade on the Project, may be the ratio stipulated in the apprenticeship standards under which the joint apprenticeship committee operates, but, except as otherwise provided in this section, in no case shall the ratio be less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman. However, the minimum ratio for the land surveyor classification shall not be less than one (1) apprentice for each five (5) journeymen.

### 13.10.3 JOURNEYMAN/APPRENTICE RATIO; COMPUTATION OF HOURS

Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the joint apprenticeship committee, is employed at the job Site and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the land surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the end of the Contract. However, the Contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the job Site. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a joint apprenticeship committee, may order a minimum ratio of not less than one (1) apprentice for each five (5) journeymen in a craft or trade classification.

### 13.10.4 JOURNEYMAN/APPRENTICE RATIO

The Contractor or Subcontractor, if he or she is covered by this section upon the issuance of the approval certificate, or if he or she has been previously approved in the craft or trade, then shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the apprenticeship standards. Upon proper showing by the Contractor that he or she employs apprentices in the craft or trade in the state on all of his or her contracts on an annual average of not less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman, or in the land surveyor classification, one (1) apprentice for each five (5) journeymen, the Division of Apprenticeship Standards may grant a certificate exempting the Contractor from the 1-to-5 hourly ratio as set forth in this section. This section shall not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor, when the contracts of general contractors or those specialty contractors involve less than Thirty Thousand Dollars (\$30,000) or twenty (20) working days. Any work performed by a journeyman in excess of eight (8) hours per day or forty (40) hours per week, shall not be used to calculate the hourly ratio required by this section.

13.10.4.1 *Apprenticeable Craft or Trade.* “Apprenticeable craft or trade” as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The joint apprenticeship committee shall have the discretion to grant a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting a Contractor from the 1-to-5 ratio set forth in this Article when it finds that any one of the following conditions is met:

- A. Unemployment for the previous three-month period in the area exceeds an average of fifteen percent (15%).
- B. The number of apprentices in training in such area exceeds a ratio of 1-to-5.

- C. There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth (1/30) of its journeymen annually through the apprenticeship training, either on a statewide basis or on a local basis.
- D. Assignment of an apprentice to any work performed under this contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman.

#### **13.10.5 RATIO EXEMPTION**

When exemptions are granted to an organization which represents Contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member Contractors will not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

#### **13.10.6 APPRENTICE FUND**

A Contractor to whom the Contract is awarded or any Subcontractor under him or her, who, in performing any of the work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the Site of the Project, to which fund or funds other contractors in the area of the Site of the Project are contributing, shall contribute to the fund or funds in each craft or trade in which he or she employs journeymen or apprentices on the Project in the same amount or upon the same basis and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept the funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The Contractor or Subcontractor may add the amount of the contributions in computing his or her bid for the contract. The Division of Labor Standards Enforcement is authorized to enforce the payment of the contributions to the fund or funds as set forth in the Labor Code section 227.

#### **13.10.7 PRIME CONTRACTOR COMPLIANCE**

The responsibility of compliance with section 13.10 and section 1777.5 of the Labor Code for all apprenticeable occupations is with the Prime Contractor.

#### **13.10.8 DECISIONS OF JOINT APPRENTICESHIP COMMITTEE**

All decisions of the joint apprenticeship committee under this section 13.10 and Labor Code section 1777.5 are subject to Labor Code section 3081.

#### **13.10.9 NO BIAS**

It shall be unlawful for an employer or a labor union to refuse to accept otherwise qualified employees as registered apprentices on any public works on the grounds of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in the Labor Code section 3077.

### 13.10.10 VIOLATION OF LABOR CODE

Pursuant to Labor Code sections 1777.1 and 1777.7, if a Contractor or Subcontractor fails to comply with the provisions of this section 13.10 and Labor Code section 1777.5, among other things:

- (a) If a Contractor or Subcontractor willfully fails to comply, the Labor Commissioner may deny to the contractor or subcontractor, and to its responsible officers, the right to bid on, or be awarded or perform work as a subcontractor on, any public works project for a period of up to one year for the first violation and for a period of up to three years for the second and subsequent violation. Each period of debarment shall run from the date the determination of noncompliance by the Labor Commissioner becomes a final order.
- (b) A contractor or subcontractor who violates section 1777.5 shall forfeit as a civil penalty an amount not exceeding the sum of One Hundred Dollars (\$100) for each full calendar day of noncompliance. Upon receipt of a determination that a civil penalty has been imposed, the awarding body shall enforce the penalty, which includes withholding the amount of the civil penalty from the Sublease Payments then due or to become due.
- (c) In lieu of the penalty provided, the Labor Commissioner may for a first time violation and with the concurrence of an applicable apprenticeship program, order the contractor or subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance.
- (d) Any funds withheld by the awarding body pursuant to this section shall be deposited in the General Fund.
- (e) The interpretation and enforcement of section 1777.5 and this section shall be in accordance with the regulations of the California Apprenticeship Council.

Pursuant to Public Contract Code section 6109, no contractor or subcontractor may bid on, be awarded, or perform work as a subcontractor on a public works project if ineligible to bid or work on, or be awarded, a public works project pursuant to section 1777.1 of the Labor Code.

### 13.11 ASSIGNMENT OF ANTITRUST CLAIMS

#### 13.11.1 APPLICATION

Pursuant to Public Contract Code section 7103.5 and Government Code section 4552, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the Owner all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Bus. & Prof. Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the Owner tenders Final Sublease Payment to the Contractor, without further acknowledgment by the parties. If the Owner receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, then the assignor may, upon demand, recover from the Owner any portion of the recovery, including treble damages, attributable

to overcharges that were paid by the assignor but were not paid by the Owner as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

#### **13.11.2 ASSIGNMENT OF CLAIM**

Upon demand in writing by the assignor, the Owner shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the Owner has not been injured thereby or the Owner declines to file a court action for the cause of action.

#### **13.12 AUDIT**

Pursuant to and in accordance with the provisions of Government Code section 8546.7, or any amendments thereto, all books, records, and files of the Owner, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state funds in excess of Ten Thousand Dollars (\$10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of three (3) years after the final Sublease Payment under this Contract. Contractor shall preserve and cause to be preserved such books, records, and files for the audit period. During the progress of the Work and for three (3) years after the final Sublease Payment under the Contract, Owner shall also have the right to an audit of Contractor's books, records, subcontracts, material and equipment contracts, files, and information related to the project, and Contractor must cooperate by producing all requested items within seven (7) days.

#### **13.13 STORM WATER DISCHARGE PERMIT**

If applicable, the Contractor shall file a Notice of Intent to comply with the terms of the general permit to discharge storm water associated with construction activity (WQ Order No. 920-08-DWQ). The Notice of Intent must be sent to the following address along with the appropriate payment (warrant to be furnished by the Owner upon request by the Contractor, allow warrant processing time.): California State Water Resources Control Board, Division of Water Quality, Storm Water Permit Unit, P.O. Box 1977, Sacramento, CA 95812-1977. The Contractor may also call the State Water Board's Construction Activity Storm Water Hotline at (916) 657-1146. The Notice of Intent shall be filed prior to the start of any construction activity.

### **ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT**

#### **14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE**

Contractor may not terminate for convenience. Contractor may only terminate for cause if the Work is stopped by others for a period of one hundred eighty (180) consecutive days through no act or fault of the Contractor, a Subcontractor of any tier, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, **and** the Work was stopped by others for one of the following reasons: (A) Issuance of an order of a court or other public authority having jurisdiction which requires Owner to stop all Work; or (B) an act of government, such as a declaration of national emergency, making material unavailable which requires Owner to stop all Work. If such grounds exist, then the Contractor may serve written notice of such grounds on Owner and demand a meet-and-confer conference to negotiate a resolution in good faith within twenty (20) days of Owner's receipt of such notice. If such conference does not lead to resolution and the grounds for termination still exist, then Contractor may terminate the Contract and recover from the Owner payment for Work executed and for

reasonable verified costs with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable overhead, profit, and damages for the Work executed, but excluding overhead (field and home office) and profit for (i) Work not performed and (ii) the period of time that the Work was stopped.

## 14.2 TERMINATION BY THE OWNER FOR CAUSE

### 14.2.1 GROUNDS FOR TERMINATION

The Owner may terminate the Contract if the Contractor:

- A. Refuses or fails to supply enough properly skilled workers or proper materials, or refuses or fails to take steps to adequately prosecute the Work toward completion by the Date for Completion;
- B. Fails to make payment to Subcontractors for materials or labor in accordance with Public Contract Code section 10262 or Business and Professions Code section 7108.5, as applicable;
- C. Disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction;
- D. Violates Labor Code section 1771.1(a), subject to the provisions of Labor Code section 1771.1(f); or
- E. Otherwise is in breach of the Contract Documents.

### 14.2.2 NOTIFICATION OF TERMINATION

When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner, give notice to Contractor of the grounds for termination and demand cure of the grounds within seven (7) days (a "Notice of Intent to Terminate"). If Contractor fails to **either** (a) completely cure the grounds for termination within seven (7) days **or** (b) reasonably commence cure of the grounds for termination within seven (7) days and reasonably continue to cure the grounds for termination until such cure is complete, then Owner may terminate the Contract effective immediately upon service of written Notice of Termination and may, subject to any prior rights of Contractor's surety on the performance bond ("Surety"):

- A. Take possession of the Site and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- B. Accept assignment of subcontracts pursuant to section 5.4; and
- C. Complete the Work by whatever reasonable method the Owner may deem expedient.

### 14.2.3 PAYMENTS WITHHELD

If the Owner terminates the Contract for one of the reasons stated in section 14.2.1, then the Contractor shall not be entitled to receive further payment until the Work is complete.

#### 14.2.4 PAYMENTS UPON COMPLETION

If the unpaid balance of the Total Sublease Amount exceeds costs of completing the Work, including compensation for professional services and expenses made necessary thereby, then such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, then the Contractor shall pay the difference to the Owner. This payment obligation shall survive completion of the Contract.

#### 14.2.5 INCLUSION OF TERMINATION FOR CONVENIENCE

Any purported termination by Owner for cause under this section 14.2, which is revoked or determined to not have been for cause, shall be deemed to have been a termination for convenience effective as of the same date as the purported termination for cause.

### 14.3 SUSPENSION OR TERMINATION BY THE OWNER FOR CONVENIENCE

#### 14.3.1 SUSPENSION BY OWNER

The Owner may, without cause, order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.3.1.1 *Adjustments.* An adjustment shall be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance caused by suspension, delay, or interruption. No adjustment shall be made to the extent:

- A. That performance is, was or would have been so suspended, delayed, or interrupted by another cause for which the Contractor is responsible; or
- B. That an equitable adjustment is made or denied under another provision of this Contract.

14.3.1.2 *Adjustments for Fixed Cost.* Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

#### 14.3.2 TERMINATION BY THE OWNER FOR CONVENIENCE

14.3.2.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

14.3.2.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

1. Cease operations as directed by the Owner in the notice;
2. Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
3. Except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

14.3.2.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

#### **14.4 NOT A WAIVER**

Any suspension or termination by Owner for convenience or cause under this Article 14 shall not act as a waiver of any claims by Owner against Contractor or others for damages based on breach of contract, negligence or other grounds.

#### **14.5 MUTUAL TERMINATION FOR CONVENIENCE**

The Contractor and the Owner may mutually agree in writing to terminate this Contract for convenience. The Contractor shall receive payment for all Work performed to the date of termination in accordance with the provisions of Article 9.

#### **14.6 EARLY TERMINATION**

Notwithstanding any provision herein to the contrary, if for any fiscal year of this Contract the governing body of the Owner fails to appropriate or allocate funds for future periodic payments under the Contract after exercising reasonable efforts to do so, then the Owner may upon thirty (30) days' notice, order work on the Project to cease. The Owner will remain obligated to pay for the work already performed but shall not be obligated to pay the balance remaining unpaid beyond the fiscal period for which funds have been appropriated or allocated and for which the work has not been done.

## SPECIFICATIONS - TRADE SECTIONS

### Addition of Classroom Buildings, Restrooms and Alterations to Office at OSBORN ELEMENTARY SCHOOL Turlock, California

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Section 07240 - Exterior Finish System 10  
Section 07260 - Vapor Retarders 3  
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Section 07311 - Laminate Shingles 5  
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DIVISION 12 - FURNISHINGS

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DIVISION 13 - SPECIAL CONSTRUCTION

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Increment No. 2

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DIVISION 21 - GENERAL MECHANICAL PROVISIONS

NOT USED

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Geotechnical Engineering Investigation 81

APPENDIX B -

Hazardous Materials Report as prepared by BOVEE Environmental Management, Inc., dated February 4, 2020, Report No. 20-41945 27

ABBREVIATIONS

AC -----	Acoustic	HB -----	Hose Bibb
ADJ -----	Adjustable	HDW -----	Hardware
AFF -----	Above Finish Floor	HM -----	Hollow Metal
ALT -----	Alternate	HOR -----	Horizontal
ALUM -----	Aluminum		
		INSUL-----	Insulation
BD -----	Board	INT -----	Interior
BLDG -----	Building		
BLKG -----	Blocking	JST -----	Joist
BM -----	Bench Mark		
BN -----	Boundary Nail	LAM -----	Laminated
BTTM -----	Bottom	LAV -----	Lavatory
BTWN -----	Between		
CAR -----	Carpet	MAX -----	Maximum
CLG -----	Ceiling	M.I. -----	Malleable Iron
CJ -----	Ceiling Joists	MIN -----	Minimum
COL -----	Column	MISC -----	Miscellaneous
CONC -----	Concrete	M.O. -----	Masonry Opening
CONT -----	Continuous	MTL -----	Metal
CONST-----	Construction		
CT -----	Ceramic Tile		
		(N) -----	New
DF -----	Douglas Fir	NAT -----	Natural
DIAG -----	Diagonal	N.I.C.-----	Not In Contract
DIAM -----	Diameter	No. -----	Number
DIM -----	Dimension	NOM -----	Nominal
DR.F -----	Drinking Fountain	NTS -----	Not to Scale
DO -----	Ditto		
DS -----	Downspout	o.c. -----	On Center
DW -----	Drywall	OD -----	Outside Diameter
		OPNG -----	Opening
(E) -----	Existing	O.T.O.-----	Out to Out
EJ -----	Expansion Joint		
ELEV -----	Elevation	PL -----	Plate
EN -----	Edge Nailing	PLAS -----	Plaster
EXIST-----	Existing	POL -----	Polished
EXP -----	Expansion	PLYWD-----	Plywood
EXT -----	Exterior	P.T.D.F.-----	Pressure Treated Douglas Fire
FF -----	Finish Floor	QTY -----	Quantity
F.H.W.S.-----	Flat Head Wood Screws		
FIN -----	Finish	R./RAD-----	Radius
F.G. -----	Finish Grade	REQD -----	Required
FL -----	Floor Line	RHB -----	Recessed Hose Bibb
F.E.C.-----	Fire Extinguisher Cabinet	R.H.W.S.-----	Round Head Wood Screws
F.H.C.-----	Fire Hose Cabinet		
F.O.S.-----	Face of Stud	RM -----	Room
F.N. -----	Field Nailing	R.O. -----	Rough Opening
		RWD -----	Redwood
GA -----	Gauge		
GALV -----	Galvanized		
G.I. -----	Galvanized		
GL -----	Glass		
GR -----	Grade		

ABBREVIATIONS Continued

SC ----- Solid Core  
SCR ----- Screen  
SHTG ----- Sheathing  
SIM ----- Similar  
S.L. ----- Score Line  
SQ ----- Square  
S/S ----- Stainless Steel  
STD ----- Standard  
STL ----- Steel  
STR ----- Structure

T ----- Tempered  
TERR ----- Terrazzo  
T.C. ----- Top of Concrete  
T & G ----- Tongue & Groove  
T.P. ----- Top of Parapet  
T.S. ----- Top of Sheathing  
T.W. ----- Top of Wall  
TYP ----- Typical

VAR ----- Varies  
VERT ----- Vertical  
V.G. ----- Vertical Grain  
V.L. ----- Verify Locations

w/ ----- with  
WD ----- Wood  
WDO ----- Window  
W.I. ----- Wrought Iron  
W/O ----- With Out  
WTR ----- Water

**GEOTECHNICAL DATA**

1. SUBSURFACE INVESTIGATION REPORT
  - A. A copy of the geologic/Seismic Hazards Update Report No. 25-0907G, dated January 7, 2020 prepared by CTE Cal, Inc. is included as a part of this Document.
  - B. This geotechnical report was obtained for the Architect's use in design and is not a Contract Document. The design recommendations contained within the report are a part of the contract documents and shall be complied with by the General Contractor and his sub-contractors.
  - C. The report is made available for bidder's information but is not a warranty of subsurface conditions. Bidders should visit the site and make themselves aware of existing conditions.
  - D. Contractor shall comply with all design conclusions and recommendations, including earthwork specifications and general paving specifications contained within the geotechnical investigation report as required by the Division of the State Architect.
  - E. See Appendix "A" at the end of the specification for the report.

END OF DOCUMENT

**SPECIAL CONDITIONS**

1. SCOPE

A. Work of this project consists of:

**Additions and Alterations  
to  
Osborn Elementary School**

All work shall be in conformity with plans and specifications prepared by F F & J Architects Inc., comply with Title 24, C.C.R., Parts 1 through 6, 9, and 12 hereinafter identified; including furnishing all material, labor, equipment, transportation, plant tools, and services necessary therefore and incidental thereto, complete and ready for use.

B. Work Not Included: Except for such auxiliary work as is shown or specified or is necessary as a part of the construction, the following work is NOT included in this contract:

1. Any work shown, but marked "not in contract (NIC)".

2. LOCATION OF SITE

A. The site of the work is on property of the Turlock Unified School District and is located 201 N. Soderquist Road, Turlock, California, 95380.

3. CONTRACT DOCUMENTS

A. The contract incorporates all of the Contract Documents. Contract Documents consist of the Plans, Specifications, Addenda and Change Orders.

4. PLANS AND SPECIFICATIONS

A. The plans consist of all drawing sheets indexed on Sheets T.0A and T.0B of the plans.

B. The specifications consist of all items and Sections of all Divisions shown on the Index.

5. ADDENDA

All Addenda shall comply with the requirements of Title 24, Part 1, Section 4-338(Sec. 4-338 (b). Addenda shall be stamped and signed by Architect of Record, delegated Design Professional when applicable, and approved by the Division of the State Architect. (Sec. 4-338(d), Part 1.

6. CHANGE ORDERS

All Change Orders shall comply with the requirements of Title 24, Part 1, Section 4-338(Sec. 4-338 (c). Change Orders shall be stamped and signed by Architect of Record, delegated Design Professional when applicable, and approved by the Division of the State Architect. (Sec. 4-338(c), Part 1.

7. CONSTRUCTION CHANGE DIRECTIVES

Construction Change Directives, (Preliminary Change Orders), must be signed by the Architect of Record or the delegated Design Professional and approved by DSA. (Sec. 4-338(d), Part 1.)

8. SUBSTITUTIONS

Substitutions affecting DSA regulated items shall be considered as construction change documents (CCD's) and shall be approved by DSA prior to fabrication and installation per DSA IR A-6 and Section 338C Part 1, Title 24 CCR.

9. COMPLETION OF WORK

A. Contract Time: Contractor must complete all portions of the Base Bid within \_\_\_\_\_ (\_\_\_\_) calendar days, commencing Five (5) days after date of Notice to Proceed.

10. GRADES, LINES AND LEVELS

A. Location and Elevations of all work to be done under this contract are shown on the drawings, and unless any inconsistency therein is brought to the attention of the Architects in writing prior to beginning construction operations, the Contractor will be held for the proper locations and elevations of the work as intended. Elevations shown refer to a bench mark designated by the Owner.

B. See specification section 01720 for additional requirements

11. EXCAVATION OR TRENCHING

A. Time Intervals: Time intervals between excavation or trenching, the installation of the particular conduit or piping concerned, and the back filling thereof shall be kept to the absolute minimum. At no time are any trenches to be left open and not secured for safety as per CAL-OSHA/OSHA requirements.

B. Excavation or Trenching: Crossing roadways, walks, paths, etc., shall be provided with suitable wood or metal temporary covers and or shoring in accordance with regulations stipulated with in CAL-OSHA/OSHA requirements. Covers shall be promptly removed when no longer necessary for public safety.

12. SITE INSPECTION

A. Prior to commencing work on the project the Contractor and the Inspector jointly shall inspect the entire site. A report of this inspection shall be on file in the Inspector's office.

B. Inspection, among other things, shall include the condition of all access roads, location of trees and landscaping to be protected and maintained, location of all utilities and underground facilities, particularly electrical conduits and steam lines.

13. WORK HOURS

A. All work shall be done in a normal eight-hour day and a five-day week. Work on Saturdays, Sundays and Holidays may only be done by written consent obtained from the District.

14. SAFETY PRECAUTIONS

A. Barricades, fences, lights and other required safety precautions shall be provided and maintained by the Contractor to protect against personal injury and property damage in accordance with CAL-OSHA/OSHA requirements.

15. SITE CONDITIONS AND REQUIREMENTS

- A. Contractor shall keep all drainage facilities, roadways, walks and paved areas free of mud, dirt and debris, obstacles, etc., so normal drainage and traffic may be maintained.
- B. Existing features not specified to be altered by this contract shall be protected from damage. Any damage shall be replaced or repaired as directed by District to the condition existing prior to work of this project.

16. SUBMITTALS

- A. Designation of a material by brand or trade name, together with the catalog cut sheet or other identifying information, is for descriptive purposes only and not a preference for any particular product. Alternative materials of equal quality and character will be acceptable when reviewed by the Architect.
- B. Contractor shall submit within THIRTY-FIVE (35) calendar days after notice to begin work on the contract all listed items to the Architect for examination. All submittals shall be in letter form and signed by the General Contractor. All submittals shall be clearly identified as to Project No., Project Name, Owner, Location and Contractor's Firm name.
- C. Submittals must contain shop drawings and descriptive data completely showing the materials, articles, equipment, proposed for use herein, roughing-in and setting drawings; actual details of manufactured items, proper relation to adjoining or related work. Submittals must amplify design details of mechanical, electrical and other equipment in proper relation to the physical spaces available. One set of submittals will be retained by the Architect, one set to the Inspector and three returned to the Contractor. Samples shall be actual color samples the Contractor proposes to use on this project. Samples must be from current stock immediately available. Final selections will not be made until all are in the Architect's hands. One set of samples will be retained by the Architect, one set to the Inspector, and one set to the Contractor. All submittals will be reviewed and signed by the Architect.

1. Submittal items that must be reviewed are as follows:

(SIX SETS)

- a. Concrete Mix Designs
- b. Reinforcing Steel
- c. Storm Drainage Components
- d. Site Water Distribution
- e. Metal Iron Fencing
- f. Chain Link Fencing
- g. Truncated Domes
- h. Concrete Unit Masonry, mortar and grout mix designs
- I. Wood I Joists
- j. Hollow Metal Doors and Frames
- k. Finish Hardware
- l. Tackable Wallboard
- m. Plastic Laminated casework
- n. Carpeting and base materials
- o. Ceramic Tile Floor, Walls
- p. Suspended Ceiling System
- q. Signage
- r. Restroom Accessories
- s. Plumbing Components
- t. Electrical Components
- u. Intercom Components
- v. Irrigation Components



17. COMPLETION

- A. The work shall be completed and all corrections shall be made before acceptance by the District.

18. UTILITY SERVICE

- A. The General Contractor shall schedule with the appropriate utility companies for the hook-up of required services. The General Contractor shall pay for any permit fees due. The District shall pay utility hook-up fees incurred directly to utility companies.

19. RECORD DRAWINGS

- A. The General Contractor shall be responsible for overseeing the preparation of two (2) sets of Record Drawings. He shall see that the Record drawings are maintained up to date and are accurately dimensioned.
- B. The Record Drawings must be signed by the General Contractor and subcontractor involved and must be turned over to the Architect as a prerequisite for final payment.

20. FINAL SUBMITTALS

- A. All guarantees, record drawings, manufacturer catalog cut sheets and operation and maintenance instructions shall be delivered to the Inspector and Architect at the job site before final acceptance of the project.

21. SLEEVING

- A. If any required sleeves not installed during initial construction of walls, the holes required for said sleeves MUST be cored. Prior to any coring, the location of holes must be approved by the Structural Engineer.

22. CONSTRUCTION FENCE

- A. As per CAL-OSHA/OSHA requirements, Contractor must install a 6' high chain link fence completely around construction areas on the site prior to starting any work of this contract. Fence must be maintained for the full period of the contract. Provide all necessary vehicle and pedestrian gates.
- B. Provide shoring where required to adequately support fencing in a vertical position.

23. PERMITS, BONDS AND LICENSES

- A. The Contractor shall secure and pay for all permits and licenses necessary for the execution of the work, excluding utility fees. Fees to the Division of the State Architect will be paid by the District.
- B. The Contractor shall secure and pay for all permits and bonds required by the City of Turlock necessary for the execution of the work on and off-site.

24. OWNERSHIP OF DRAWINGS

All drawings, specifications, and other Contract Documents and copies thereof furnished by DISTRICT are its property. They are not to be used in other work and with exception of signed contract sets are to be returned to District upon completion of the work. Contractor shall not be entitled to final payment until he/she complies with the provisions

of this article and provides District with two or more sets of "Record Drawings" drawings as specified in Article 15 of the Special Conditions.

25. DOCUMENTS ON WORK

CONTRACTOR shall keep one copy of all contract documents, including addenda, change orders, and Titles 19 and 24 of the California Code of Regulations, which is a part of Contract Documents, on job at all times. Said documents shall be kept in good order and available to Architect and his representatives. CONTRACTOR shall be acquainted with and comply with the provisions of said Titles and they relate to this project. (See particularly the duties of contractor, Title 24, Part 1, 4-343.

26. DISTRICT'S INSPECTOR

- A. An Inspector employed by DISTRICT and approved by the Architect, Structural Engineer and Division of the State Architect in accordance with requirements of Title 24 of the California Code of Regulations, will be assigned to the work. His duties are specifically defined in Section 4-342, CCR, Title 24, Part 1.
- B. All work shall be under observation of said Inspector. He shall have free access to any or all parts of work at any time. CONTRACTOR shall furnish Inspector reasonable opportunities for obtaining such information as may be necessary to keep him fully informed respecting progress and manner of work and character of materials. Inspection of work shall not relieve CONTRACTOR from any obligation to fulfill this contract. Inspector or Architect shall have authority to stop work whenever provisions of Contract Documents are not being complied with and CONTRACTOR shall instruct his employees accordingly.

27. TESTS AND INSPECTIONS

If contract, DISTRICT's instruction, laws, ordinances, or any public authority require any work to be specifically tested or approved, CONTRACTOR shall give notice in accordance with such authority of his readiness for observation or inspection at least two (2) working days prior to being tested or covered up. If inspection is by authority other than DISTRICT, CONTRACTOR shall inform DISTRICT of date fixed for such inspection. Required certificates of inspection shall be secured by CONTRACTOR. Observations by DISTRICT shall be promptly made, and where practicable at source of supply. If any work should be covered up without approval or consent of DISTRICT, it must, if required by DISTRICT, be uncovered for examination and satisfactorily reconstructed at CONTRACTOR's expense in compliance with contract. Costs of tests of any materials found to be not in compliance with contract shall be back charged to the CONTRACTOR. Other costs for tests and inspection of materials shall be paid by DISTRICT unless specifically provided otherwise.

Payment for Tests and Inspection will be made as follows:

- a. District will pay cost of all testing and inspection except the following for which the Contractor shall reimburse the District through deductive change order:
  - 1. Any retesting and sampling required due to failure of original test.

CONTRACTOR shall notify DISTRICT a sufficient time in advance of manufacture of materials to be supplied by him under contract, which must by terms of contract be tested, in order that DISTRICT may arrange for testing of same at source of supply. Any materials shipped by CONTRACTOR from source of supply prior to having satisfactorily passed

such testing and inspection, or prior to receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated in work without prior approval of DISTRICT and subsequent testing and inspection.

Reexamination of questioned work may be order by DISTRICT and if so ordered, work must be uncovered by CONTRACTOR. If such work by found in accordance with Contract Documents, DISTRICT shall pay costs of re-examination of replacement. If such work by found not in accordance with Contract Documents, DISTRICT shall pay and back charge the CONTRACTOR.

Test Reports - One copy of all test reports shall be forwarded to the Division of the State Architect by the testing agency. Such reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Titles 21 or 22 and 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with requirements.

Verification of Test Reports - Each testing agency shall submit to the Division of State Architect a verified report in duplicate covering all of the tests which are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.

28. SOILS INVESTIGATION REPORT.

When a soils investigation report obtained from test holes at site is available, such report shall not be a part of this contract. Any information obtained from such report or any information given on drawings as to subsurface soil condition or to elevations of existing grades or elevations of underlying rock is approximate only, is not guaranteed, and does not form a part of the contract CONTRACTOR is required to make a visual examination of site and must make whatever tests he deems appropriate to determine underground condition of soil. CONTRACTOR agrees that he will make no claim against DISTRICT for damages in event that during progress of work CONTRACTOR encounters subsurface of latent conditions at site materially differing from those shown on drawings or indicated in specifications, or for unknown conditions of an unusual nature which differ materially from those ordinarily encountered in the work of the character provided for in plans and specifications. Contractor shall comply with all recommendations contained within the soils investigation report.

29. BID DEPOSIT RETURN

Deposits of three or more low bidders, the number being at the discretion of the District, will be held for ninety (90) days or until posting by the successful bidder of the Bonds required and return of executed copies of the Agreement, whichever first occurs, at which time the deposits will be returned after consideration of the bids.

30. SAFETY

Contractor shall implement a safety program for the protection of all persons on the job site and in the area of the work. Contractor will indemnify District and hold District harmless against all claims caused by or contributed to, by unsafe conduct tolerated by Contractor or its subcontractors of any tier.

31. ADDENDA AND CHANGE ORDERS

All Addenda and Change Orders shall comply with the requirements of Title 24, Part 1, Article 3, Section 18, (a) and Article 5, Section 38.

Addenda and Change Orders shall be signed by Architect of Record and approved by the Division of the State Architect.

32. TESTING LABORATORY

The Owner will employ and pay for services of an independent laboratory to perform specified inspection and testing per Title 24, Part 1.

Testing Laboratory shall be approved by the Architect of Record and approved by the Division of the State Architect.

33. TEAMWORK ETHIC

The Contractor acknowledges and understands that the Contract Documents may represent imperfect data and may contain errors, omissions, conflicts, inconsistencies, code violations and improper use of materials. Such deficiencies will be corrected when identified. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Owner and Architect any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.

The Contractor shall resolve all reported deficiencies with the Architect and his/her Consultants prior to awarding any subcontracts or starting any work with the Contractor's own employees. If any deficiencies cannot be resolved by the Contractor without additional time or additional expense, the Contractor shall so inform the Owner and Architect in writing. Any work performed prior to receipt of instructions from the Architect will be done at the Contractor's risk

34. STATE WATER RESOURCES CONTROL BOARD

The State Water Resources Control Board under Orders No. 99-009DWQ and 2010-2014DWQ with amendments, requires the General Contractor prior to start of construction, to develop and implement a storm water pollution prevention plan. This plan, once established, is required to be kept on the job site for each specific project site. Notice in Intent application fees have submitted to the State. Please review the information, 23 pages, attached hereto and made a part of this Scope of Work. The development and implementation of the storm water pollution prevention plan (SWPPP) is the responsibility of the General Contractor. The erosion control measures shall be left in place, in good condition, at the completion of the project to the satisfaction of the District Project Inspector and Erosion Control Monitoring Engineer. The erosion control measures will be removed upon final development of project under a separate contract. Please see supplement, "Waste Discharge Requirement" following this section as an addition to these Special Conditions. Contractor understands and agrees that construction projects may be performed in phases involving different Prime Contractors. Contractor shall, if he/she/it is not the Contractor responsible for the entire project, deliver the original Water Pollution Prevention Plan to any subsequent Contractor and make all notices to the Division of Water Quality regarding change of responsibility for the plan and ensure smooth transition and continuation of the original plan between Contractor and any subsequent Contractor

35. PREVAILING WAGES

This project is subject to the requirements of Section 1770 et seq. of the California Labor Code requiring the payment of prevailing wages,

the training of apprentices and compliance with other applicable requirements. The Turlock Unified School District has on file at the Turlock Unified School District office at 1574 E. Canal Drive, Turlock, CA 95381 copies of the prevailing rate of per diem wages to be paid to all applicable workers. The prevailing wage rate determinations on file with the Turlock Unified School District are available to all interested parties upon reasonable request during normal business hours. Prevailing wage information may also be obtained via the internet at: <http://www.dir.ca.gov>. The requirement to pay these wage rates and rates so specified, is further detailed in the General Conditions. All documentation is to be submitted electronically to the California State Department of Industrial Relations pursuant to Labor Code section 1725.5 using their required software program. Contractors are required to enroll and register using the D.I.R. online CMU Payroll Records system and upload their Certified Payroll Records and Statements of Employer Payments through the eCPR. Questions are to be addressed to CMU at [PWC100@dir.ca.gov](mailto:PWC100@dir.ca.gov). Contractor and each sub-contractor are responsible for paying all annual fees to the D.I.R.

Effective March 1, 2015, all bidders, general and sub-contractors, must have registered with the California State Department of Industrial Relations pursuant to Labor Code section 1725.5 and Labor Code section 171.1(a) prior to submitting a bid. Furthermore, effective April 1, 2015, a constructor must be registered pursuant to Labor Code section 1725.5 before entering into a contract to work on a public project.

36. START OF CONSTRUCTION NOTIFICATION

The contractor shall complete and file with the Air Pollution Control District their Construction Notification Form a minimum of five working days prior to the start of the project in accordance with Regulation VIII - Rule 8021.

END OF DOCUMENT

SECTION 01010

SUMMARY OF WORK

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Work included.
- B. Work by Owner.
- C. Owner furnished products.
- D. Contractor use of site.
- E. Owner occupancy.

1.2 WORK INCLUDED

- A. Work under this DSA Application Number will consist of the demolition of buildings, construction of two classroom buildings, one restroom building, relocation of portable classrooms, expansion of the blacktop playground, construction of a new storm drain system, new site utilities, wet and dry, construction of a new parking lot, passenger drop off area, new metal iron fencing, chain link fencing, removal and replacement of concrete flatwork. Off-site improvements. Modifications to the irrigation and planting on the site.
- B. Alterations to Building A to create a new office area, a new teacher work room, unisex restroom. Removal of the existing storefront system on the north and south walls, infill with new wall framing, new doors and windows. Modifications to the HVAC units. Relocation of low voltage communication components and alterations to fire alarm system.
- C. Alterations to Building C for connection to and extending the electrical low voltage communication systems.
- D. **Increment No. 2**, DSA submittal of a PC DSA approved prefabricated shade structure to obtain approval, shop fabrication and site installations in location shown on drawings.

1.3 WORK BY OWNER

- A. Owner will be conducting normal school activities on the campus during the course of construction. Owner will be performing deferred maintenance work on this campus during the school breaks.

1.4 OWNER FURNISHED PRODUCTS

- A. Items noted "OFICI" (Owner-Furnished Contractor Installed) will be furnished by Owner and installed by Contractor.

1.5 CONTRACTOR USE OF SITE

- A. Contractor shall have limited use of the site and premises throughout the construction period as delineated on the drawings.
- B. Construction Operations: Limited to area indicated on drawings.

- C. Contractor shall schedule utility work outside of the construction fencing to occur during winter or spring breaks and during the Summer. Summer School will occur on this campus. Contractor will be required to coordinate their work and schedule accordingly around the school site activities.

1.6 OWNER OCCUPANCY

- A. Owner will occupy the entire site except for the areas within the construction fencing for their normal scheduled and unscheduled school activities during the construction period.

2 PART 2 PRODUCTS

Not used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01019

**CONTRACT CONSIDERATIONS**

**1 PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Schedule of Values.
- B. Application for Payment.
- C. Change procedures.

1.2 SCHEDULE OF VALUES

- A. Submit typed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered as back-up information.
- B. Submit Schedule of Values for approval in duplicate within 15 days after date of Notice of Intent to Award Contract.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance.
- D. Include in each line item, the amount of Allowances specified in this Section.
- E. Include within each line item, a directly proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, on continuation sheet, with each Application For Payment.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit six copies of each application on AIA Form G702 - Application and Certificate for Payment.

1.4 CHANGE PROCEDURES

- A. The Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by General Conditions on AIA Form G710 Architect's Supplemental Instructions.
- B. The Architect may issue a Proposal Request, which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications. Contractor will prepare and submit a detailed estimate within 14 days.
- C. The Contractor may propose a change by submitting a Change Order Request to the Architect, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.
- D. Stipulated Sum Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's Change



Order Request as approved by Architect.

- E. Construction Change Work Directive: Architect may issue a directive signed by the Owner and Architect, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum or Contract Time. Promptly execute the change.
- F. Change Order Forms: AIA G701 Change Order.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. All Changes in the plans and specifications shall be approved by the Division of the State Architect and comply with the requirements of Title 21, Article I, Subsection 38.

2 PART 2 PRODUCTS

Not used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.
- C. Pre-construction conference.
- D. Progress meetings.
- E. Pre-installation conferences.

1.2 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements with provisions for accommodating items installed later.
- B. This contractor shall prepare a master construction schedule for this project including the time frame required by the building contractor to start and complete their work. This contractor shall contact the building contractor and request in writing their schedule for the construction of the buildings for incorporation into the master construction schedule.
- B. Prepare a critical path method flow chart showing dates and time needed for each trade to complete their portion of the project. Submit six (6) copies to the Architect prior to starting work.
- C. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owners partial occupancy.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of California and acceptable to the Architect.
- B. Control datum for survey is that established by Owner provided survey. Contractor to locate and protect survey control and reference points.
- C. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- D. Submit electronic and hard copy of site drawing and certification, signed by the Contractor's retained field engineer certifying building pad elevations, Top of Slab Elevations, finish grade elevations and locations of all underground utilities and the Work are in conformance with the Contract Documents.
- E. Maintain complete and accurate log of control and survey work as Work progresses.
- F. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Replace dislocated or removed survey control stakes at no additional cost to the owner.
- G. See specification section 01720 for additional requirements.

1.4 PRECONSTRUCTION CONFERENCE

- A. Architect will schedule a conference within 15 days after Notice of Intent to Award letter.
- B. Mandatory Attendance: Owner, Owner's Resident Inspector, Owner's Testing Laboratory Representative, Architect, Contractor, Contractors Project Manager and Contractors Job Superintendent.
- C. Optional Attendance: Architect's consultants, subcontractors and utility company representatives.
- D. Architect will preside at conference, record minutes and distribute copies.
- E. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Issue Notice to Proceed.
  - 3. Submission of executed bonds and insurance certificates.
  - 4. Distribution of Contract Documents.
  - 5. Submission of list of Subcontractors, list of Products, Schedule of Values, and progress schedule.
  - 6. Designation of responsible personnel representing the parties.
  - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
  - 8. Scheduling.

1.5 PROGRESS MEETINGS

- A. Architect will schedule and administer meetings throughout progress of the Work at three to four week intervals.
- B. Architect will make arrangements for meetings, prepare agenda, preside at meetings, record minutes (Field Reports), and distribute copies.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Owner's Inspector, and Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
  - 1. Review minutes of previous meetings. (Field Reports).
  - 2. Review of Work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems which impede planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Review of off-site fabrication and delivery schedules.
  - 7. Maintenance of progress schedule.
  - 8. Corrective measures to regain projected schedules.
  - 9. Planned progress during succeeding work period.
  - 10. Coordination of projected progress.
  - 11. Maintenance of quality and work standards.
  - 12. Effect of proposed changes on progress schedule and coordination.
  - 13. Other business relating to Work.

1.6 PRE-INSTALLATION CONFERENCES

- A. When required in individual specification Section, convene a pre-installation conference prior to commencing work of the Section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific Section.
- C. Notify Architect 5 days in advance of meeting date.
- D. Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference to participants.
- E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements and limitations for cutting and patching of Work.

1.2 SUBMITTALS

- A. Submit written request in advance of cutting or alteration which affects:
1. Structural integrity of any element of Project.
  2. Integrity of weather-exposed or moisture-resistant element.
  3. Efficiency, maintenance, or safety of any operational element.
  4. Visual qualities of sight exposed elements.
  5. Work of Owner or separate contractor.
- B. Include in request:
1. Identification of Project.
  2. Location and description of affected work.
  3. Necessity for cutting or alteration.
  4. Description of proposed work, and Products to be used.
  5. Alternatives to cutting and patching.
  6. Effect on work of Owner or separate contractor.
  7. Written permission of affected separate contractor.
  8. Date and time work will be executed.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Primary Products: Those required for original installation.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- B. After uncovering existing Work, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.

3.3 CUTTING AND PATCHING

- A. Execute cutting, fitting, and patching to complete Work.
- B. Fit Products together, to integrate with other work.
- C. Uncover work to install ill-timed work.
- D. Remove and replace defective or non-conforming work.
- E. Remove samples of installed work for testing when requested.
- F. Provide openings in the Work for penetration of mechanical and electrical work.

3.4 PERFORMANCE

- A. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- B. Employ skilled and experienced installer to perform cutting and patching.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- D. Restore work with new Products in accordance with requirements of Contract Documents.
- E. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
- G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01300

**SUBMITTALS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed Products list.
- D. Substitutions.
- E. Shop drawings.
- F. Product data.
- G. Samples.
- H. Manufacturers' instructions.
- I. Manufacturers' certificates.

1.2 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect accepted form.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify Project and Architect's project number, Contractor, subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Submittals without Contractor's stamp and signature will be returned without review.
- E. Schedule submittals to expedite the Project, and deliver to F F & J Architects, Inc. at 2101 Geer Road, Suite 308, Turlock, CA 95382. Coordinate submission of related items.
- F. Make submittals in groups containing associated and related items to make sure that information is available for checking each item when it is received.
- G. Make submittals enough in advance of scheduled dates for installation to provide time for review and possible revisions and resubmission prior to approval and subsequent placement of orders.
- H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- I. Provide space for Contractor and Architect review stamps.
- J. Revise and resubmit submittals as required, identify all changes made since previous submittal.

- K. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule in duplicate within 14 days after date of Notice to Proceed for Architect review and approval.
- B. Revise and resubmit as required when progress is not in compliance with original schedule.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a horizontal bar chart with separate line for each major section of Work or operation, identifying first work day of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, 50% completion; and other major milestones, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at each submission.

1.4 PROPOSED PRODUCTS LIST

- A. Within 14 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number or each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 SUBSTITUTIONS

- A. The Contract is based on the standards of quality established in the Contract Documents.
- B. Substitutions for products specified by proprietary name will be considered in accordance with substitutions Article and of the General Conditions only when submitted on Architect's Substitution Request Form with complete data substantiating compliance of proposed substitution with Contract Documents within 35 days after date of Notice to Proceed.
- C. Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals without separate written request as stated above.
- D. Substitutions of any material, system or product that would normally be reviewed by DSA SSS, FLS or ACS sections shall be submitted to and approved by DSA prior to fabrication or sues. Such Substitutions shall be considered as change orders.



1.6 SUBSTITUTIONS

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period.
- B. Subsequent to bidding, substitutions will be considered only when a Product becomes unavailable through no fault of the Contractor.
- C. Submit requests on Architect's Substitution Request form with complete data substantiating compliance of proposed substitution with Contract Documents.

1.7 SHOP DRAWINGS

- A. Submit one sepia transparency and two blue-line prints of each drawing. Review comments will be shown on the sepia transparency, and contractor may make and distribute such copies as are required for his purposes.
- B. After review, distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Closeout.

1.8 PRODUCT DATA

- A. When specified in individual specification sections, submit number of copies of data for each product which Contractor requires, plus three copies which will be retained by Architect.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.9 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Provide materials and products specified in the full range of color, texture and pattern for selection by Architect. Range shall include standard stocked color/texture/pattern, standard color/texture/pattern not stocked, but available from manufacturer, and special color/texture/pattern available from manufacturer as advertised in product data and brochures. Unless otherwise indicated in individual specification sections, Architect may select from any range at no additional cost to Owner.
- C. Include identification on each sample, with full Project information.
- D. Submit the number of samples which Contractor requires, plus two of which will be retained by Architect.
- E. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.10 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturer's instructions and Contract Documents.

1.11 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturer's certificate to Architect for review, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

2 PART 2 PRODUCTS

Not used.

3 PART 3 EXECUTION

Not Used

END OF SECTION

SUBSTITUTION REQUEST FORM

TO: FF & J ARCHITECTS, INC.

PROJECT: \_\_\_\_\_

SPECIFIED ITEM: \_\_\_\_\_  
SECTION PAGE PARAGRAPH DESCRIPTION

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 the requests; applicable portions of the data are clearly identified.

Attached data also includes description of changes to Contract Documents which proposed substitution will require for its proper installation.

The undersigned states that the following paragraphs, unless modified on attachments, are correct:

1. The proposed substitution does not affect dimensions shown on Drawings.
2. The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the requested substitution.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally 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.

Submitted by:

Signature: \_\_\_\_\_ For use by FFJ

Firm : \_\_\_\_\_ |  | Accepted |  | Accepted as noted

Address : \_\_\_\_\_ |  | Not Accepted |  | Received too late

By \_\_\_\_\_

Date : \_\_\_\_\_ Date : \_\_\_\_\_

Telephone: \_\_\_\_\_ Remarks: \_\_\_\_\_

Attachments:

**SITE STANDARDS**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS AND PROVISIONS:**

All Contract Documents should be reviewed for applicable provisions related to the provisions in this document, including without limitation:

- A. General Conditions, including without limitation, Site Access, Conditions, and Regulations;
- B. Special Conditions;
- C. Drug-Free Workplace;
- D. Tobacco-Free Environment;
- E. Criminal Background Investigation/Fingerprinting Certification;
- F. Temporary Facilities and Controls.

**1.02 REQUIREMENTS OF THE DISTRICT:**

- A. Drug-Free Schools and Safety Requirements:
  - (1) All school sites and other District Facilities have been declared "Drug-Free Zones." No drugs, alcohol and/or smoking are allowed at any time in any buildings and/or grounds on District property. No students, staff, visitors, or contractors are to use drugs on these sites.
  - (2) Smoking and the use of tobacco products by all persons is prohibited on or in District property. District property includes school buildings, school grounds, school owned vehicles and vehicles owned by others while on District property. Contractor shall post: "Non-Smoking Area" in a highly visible location on Site. Contractor may designate a smoking area outside of District property within the public right-of-way, provided that this area remains quiet and unobtrusive to adjacent neighbors. This smoking area is to be kept clean at all times.
  - (3) Contractor shall ensure that no alcohol, firearms, weapons, or controlled substances enter or are used at the Site. Contractor shall immediately remove from the Site and terminate the employment of any employee(s) found in violation of this provision.
- B. Language: Unacceptable and/or loud language will not be tolerated, "Cat calls" or other derogatory language toward students or public will not be allowed.
- C. Disturbing the Peace (Noise and Lighting):
  - (1) Contractor shall observe the noise ordinance of the Site at all times including, without limitation, all applicable

local, city, and/or state laws, ordinances, and/or regulations regarding noise and allowable noise levels.

- (2) The use of radios, etc., shall be controlled to keep all sound at a level that cannot be heard beyond the immediate area of use. District reserves the right to prohibit the use of radios at the Site, except for handheld communication radios (e.g., Nextel phones or radios).
- (3) If portable lights are used after dark, all light must be located so as not to direct light into neighboring property.

D. Traffic:

- (1) Driving on the Premises shall be limited to periods when students and public are not present. If driving or deliveries must be made during the school hours, two (2) or more ground guides shall lead the vehicle across the area of travel. In no case shall driving take place across playgrounds or other pedestrian paths during recess, lunch, and/or class period changes. The speed limit on-the Premises shall be five (5) miles per hour (maximum) or less if conditions require.
- (2) All paths of travel for deliveries, including without limitation, material, equipment, and supply deliveries, shall be reviewed and approved by District in advance. Any damage will be repaired to the pre-damaged condition by the Contractor.
- (3) District shall designate a construction entry to the Site. If Contractor requests, District determines it is required, and to the extent possible, District shall designate a staging area so as not to interfere with the normal functioning of school facilities. Location of gates and fencing shall be approved in advance with District and at Contractor's expense.
- (4) Parking areas shall be reviewed and approved by District in advance. No parking is to occur under the drip line of trees or in areas that could otherwise be damaged.

E. All of the above shall be observed and complied with by the Contractor and all workers on the Site. Failure to follow these directives could result in individual(s) being suspended or removed from the work force at the discretion of the District. The same rules and regulations shall apply equally to delivery personnel, inspectors, consultants, and other visitors to the Site.

**PART 2 - PRODUCTS** Not Used.

**PART 3 - EXECUTION** Not Used.

END OF DOCUMENT

SECTION 01400

**QUALITY CONTROL**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Mock-up.
- E. Manufacturer's field services and reports.

1.2 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturer's instructions, including each step-in sequence.
- C. Should manufacturer's instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.3 REFERENCES

- A. Conform to reference standard by date of issue current on date for receiving bids [or date of Owner-Contractor Agreement when there are no Bids] except when a specific date is specified.
- B. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.
- C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.4 FIELD SAMPLES

- A. Install field samples at the site as required by individual specification Sections for review.

- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect.

1.5 MOCK-UP

- A. Tests will be performed under provisions identified in section 01410.
- B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals and finishes.
- C. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by Architect and/or Engineer.

1.6 MANUFACTURER'S FIELD SERVICES AND REPORTS

- A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- C. Submit report in duplicate within 15 days of observation to Architect for review.

2 PART 2 PRODUCTS

Not used.

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01410

**TESTING LABORATORY SERVICES**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Selection and payment.
- B. Contractor submittals.
- C. Laboratory responsibilities.
- D. Laboratory reports.
- E. Limits on testing laboratory authority.
- F. Contractor responsibilities.
- G. Schedule of inspections and tests.

1.2 REFERENCES

- A. ANSI/ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- B. ANSI/ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
- C. 2019 California Building Code (D.S.A.) and 2019 California Fire Code.
- D. Title 24 of the California Code of Regulations.

1.3 SELECTION AND PAYMENT

- A. Owner will employ and pay for services of an independent testing laboratory to perform specified inspection and testing as specified by Owner's testing laboratory.
- B. Contractor shall employ and pay for services of an independent testing laboratory to perform specified inspection and testing as specified by Contractor's testing laboratory.
- C. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.4 OWNER'S LABORATORY RESPONSIBILITIES

- A. Test samples of mixes submitted by Inspector.
- B. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
- C. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.



- E. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or Products.
- F. Perform additional inspections and tests required by Architect.
- G. Attend preconstruction conferences and progress meetings when requested by Architect.

1.5 LABORATORY REPORTS

- A. After each inspection and test, promptly submit one copy of laboratory report to Architect, Engineer, Owner's Resident Inspector, Division of the State Architect and to Contractor.
- B. Include:
  - 1. Date issued,
  - 2. Project title and number,
  - 3. Name of inspector,
  - 4. Date and time of sampling or inspection,
  - 5. Identification of product and Specifications section,
  - 6. Location in the Project,
  - 7. Type of inspection or test,
  - 8. Date of test,
  - 9. Results of tests,
  - 10. Conformance with Contract Documents.
- C. When requested by Architect, provide interpretation of test results.
- D. Verification of Test Reports: Each testing agency shall submit to the Architect and the Division of the State Architect a verified report in duplicate covering all of the tests which were required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time and at the completion of the project, covering all tests.

1.6 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.7 CONTRACTOR RESPONSIBILITIES

- A. Submit proposed mix designs to Architect for review in accordance with Sections 02514 and 03300.
- B. Cooperate with laboratory personnel, and provide access to the Work and to manufacturer's facilities.
- C. The Contractor shall notify the Owner's representative a sufficient time in advance of the manufacture of material to be supplied by him under the Contract Documents, which must be terms of the Contract by tested, in order that the Owner may arrange for the testing of same at the source of

supply.

- D. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required, shall not be incorporated in the job.
- E. The Owner will select and pay testing laboratory costs for all tests and inspections, but may be reimbursed by the Contractor for such costs under the Contract Documents.
- F. Notify Architect, Owner's Resident Inspector and laboratory 48 hours prior to expected time for operations requiring inspection and testing services.
  - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to the Contractor's negligence.
- G. If additional testing/inspection is required for items described in paragraph 1.8, the Testing Lab must be employed by the Owner. All costs for additional testing/inspection required will be deducted by the Owner from the Contract Sum.

1.8 SCHEDULE OF INSPECTIONS AND TESTS BY OWNER'S TESTING LABORATORY

- A. Perform tests and inspections for the following in conformance with 2019 Edition of the California Building Code, Chapter 17A, Title 24 of the California Code of Regulations and as outlined below. In addition, see DSA Form 103 "Statement of Structural Tests and Inspections".
  - 1. Soils and Foundations (Chapter 17A)
    - a. Earth fill compaction - 1705A.6; 1705A.6.1; 1803A, 1804A.5
  - 2. Concrete (Chapter 19A)
    - a. Materials
      - 1. Portland Cement Tests - 1913A.1
      - 2. Concrete Aggregates - 1903A.5, 1903A.8
      - 3. Reinforcing Bars - 1903A.8 & 1910A.2.
      - 4. Batch Plant Inspection - 1705A.3.3
      - 5. Waiver of Batch Plant Inspection and Tests - 1705A.3.3.1
    - b. Concrete Quality
      - 1. Proportions of Concrete - 1904A.
      - 2. Strength Tests of Concrete - 1910A.4.
    - c. Concrete Inspection
      - 1. Job Site Inspection - 1705A.3.
  - 3. Post Installed Anchors (Chapter 17A)
    - a. Inspection of post installed anchors - 1616A.1.19; 1705A.3;
    - b. Test post installed anchors - 1705A.3.8; 1910A.5

1.9 PROJECT INSPECTOR

- A. A Project Inspector employed by the Owner in accordance with the requirement of State of California Code of Regulations, Title 24, Part 1 will be assigned to the work. His duties are specifically defined in Section 4-333 of Title 24, Part 1.
- B. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.
- C. In addition to the Project Inspector, Special Inspectors employed by the Owner in accordance with Chapter 17A, 1701A.4 of the 2019 California Building Code will be assigned to provide inspections during construction on the types of work listed under Chapters 17A; 18A; 19A; 20A; 21A; 22A; 23A; 25A, 34A and as defined in Section 4-335 of Title 24, Part 1 of the California Building Standards Administrative Code.

1.10 INSPECTION BY THE OWNER

- A. The Owner and his representatives shall at all times have access for the purpose of inspection to all parts of the work and to the shops wherein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.
- B. The Owner shall have the right to reject materials and workmanship which are defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct same and charge the expense to the Contractor.
- C. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of the work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor.

2 PART 2 PRODUCTS  
Not Used

3 PART 3 EXECUTION  
Not Used

END OF SECTION

SECTION 01500

**CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone services, water and sanitary facilities.
- B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, existing conditions and water control.
- C. Construction Facilities: Access roads, parking, progress cleaning, project signage, and temporary buildings.

1.2 TEMPORARY ELECTRICITY

- A. Contractor to provide and pay for power service required for construction of this project required over and above 20 amps, 120 volt duplex receptacle.
- B. Provide power outlets for construction operations, with branch wiring and distribution boxes. Provide flexible power cords as required.
- C. Provide main service disconnect and over current protection at convenient locations.
- D. The existing main service may not be utilized for temporary construction power.
- E. Permanent convenience receptacles may be utilized during construction.

1.3 TEMPORARY LIGHTING

- A. Provide and maintain lighting for construction operations.
- B. Provide and maintain lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. Maintain lighting and provide routine repairs.
- E. Permanent lighting on adjacent buildings may be utilized during construction.

1.4 TELEPHONE SERVICE

- A. Provide, maintain and pay all costs for installation and operation for telephone service, internet to contractor's field office and the project inspectors office.

1.5 TEMPORARY WATER SERVICE

- A. Provide, maintain and pay for suitable quality water service required for construction operations. Contractor may obtain water from existing fire hydrants if appropriate clearances are acquired and fees paid to the City of Turlock.

- B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.6 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required temporary chemical type toilet facilities and enclosures, including hand washing stations in the appropriate quantity and located throughout the construction site.
- B. Existing restrooms on the campus will not be available for contractors use during construction.

1.7 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect adjacent properties from damage from construction operations.
- B. Provide protection for plant life and trees designated to remain and for soft and hardscape areas adjacent to work, replace damaged materials in kind.
- C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.8 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6-foot high fence around construction site; equip with vehicular and pedestrian gates with locks. Post fences and gates with no trespassing signs.
- C. Adequately support fencing to keep it in the vertical position.

1.9 WATER CONTROL AND EROSION CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Provide water barriers as required to protect site from soil erosion.

1.10 EXTERIOR ENCLOSURES

- A. Provide temporary weather-tight closure of exterior openings to accommodate acceptable working conditions and protection for materials, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.11 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- E. Prohibit traffic from landscaped areas.

- F. Public and Private Street, Curbs and Walks
  1. Protect all existing streets, curbs, walks, and other street improvements and make all necessary repairs for damage occurring thereto during the course of the work at the contractor's expense.
  2. Keep all public and private streets and ways clean of debris, spilled materials and products, and wet and dry earth at all times and clean at the end of each working day. Clean wet earth from vehicles prior to their leaving the site.
- G. Weather: Provide protection at all times against weather—rain, winds, storms, frost, or heat—so as to maintain all work, materials, apparatus, and fixtures free from injury or damage. At the end of the day's work, cover all work likely to be damaged.
- H. Water Protection: Protect excavations, trenches, and/or buildings from damage from rain water, spring water, ground water, backing up of drains or sewers, and all other water at all times. Provide pumps and equipment and enclosure necessary to provide this protection.
  1. Drainage: Construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations free of water.
  2. Cold Weather: During cold weather, protect all work from damage.

1.12 PROTECTION AT OPENINGS IN GROUND

- A. Provide and install safety barriers and guards around all openings, pits. Remove only when area is safe and secure.

1.13 FIRE PROTECTION

- A. Provide for and maintain safe guards during construction per Chapter 33 of the California Building Code.
- B. Comply with California Fire Code Chapter 33 - Fire Safety during Construction and Demolition.

1.14 SECURITY

- A. Provide security and facilities to protect Work, from unauthorized entry, vandalism, or theft.

1.15 ACCESS ROADS

- A. Arrange for temporary access to existing roads accessing public thoroughfares to serve construction area. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Existing off-site roads shall not be used for construction parking unless proper arrangements are made with the City of Turlock.
- D. Driving on the premises shall be limited to periods when no students are walking or when staff needs access to their vehicles. If deliveries must be made during school hours, the delivery times must be scheduled to occur either before or after normal school hours or arrangements need to be made ahead of time.

1.16 PARKING

- A. Arrange for temporary paved surface parking areas to accommodate construction personnel.
- B. Do not allow vehicle parking on existing pavement in areas which impact the normal school day. All vehicles shall be moved when requested by school district personnel.

1.17 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Broom clean areas of construction on a daily basis.
- C. Remove waste materials, debris, and rubbish from site periodically and dispose off-site.

1.18 STORAGE AREAS AND SHEDS

- A. Size area and sheds to meet the storage requirements for products of individual Sections. Allow for access and orderly provision for maintenance and for inspection of products.
  - 1. As required by the contractors to protect materials, construction work, and their operations from weather, vandalism, theft, and to exclude the intrusion of the public into the construction area.

1.19 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01570  
STORM WATER POLLUTION PREVENTION PLAN

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide all material, labor, equipment and services necessary to write, amend, certify, comply and implement with all conditions of the General Construction Permit.
- B. The general contractor shall retain the services of a Qualified SWPPP Developer (QSD) to write, amend and certify the Storm Water Pollution Prevention Plan in conformance with SWRCB Order No. 2009-009-DWQ and 2010-0014-DWQ with amendments.
- C. The general contractor shall retain the services of a Qualified SWPP Practitioner (QSP) to implement and monitor the SWPPP during and after construction in conformance with SWRCB Order No. 2009-009-DWQ and 2010-0014-DWQ with amendments.
- D. Implement the Best Management Practices (BMP) contained within the SWPPP or implement other practices deemed by the Contractor to better accomplish the intent of controlling the quality of runoff water from the Project Site.
- E. This section does not include the payment of filing fees. These fees will be paid by the Owner.
- F. Start construction site work, on and off site, only after acquiring a General Permit from the SWCRB.

1.2 RELATED SECTIONS

- A. The following Sections of the Project Manual contain requirements that relate to this section:
  - 1. All DIVISION 00 SPECIFICATION SECTIONS.
  - 2. ALL DIVISION 01 SPECIFICATION SECTIONS.
  - 3. Section 02050 - Demolition and Clearing
  - 4. Section 02200 - Earthwork
  - 5. Section 02514 - Portland Cement Concrete Paving

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. Any all addenda to the SWPPP.
- C. Reports required by the SWPPP.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board [CARB] and the Environmental Protection Agency [EPA]. Regulatory changes may affect the formulation, availability, or use of the specified coatings. Confirm availability of coatings to be used prior to use, and notify the Architect of any recent changes that may have occurred after the preparation of this specification section.



2. EPA Environmental Protection Agency
  3. SWCRB State Water Resources Control Board
- B. Regulatory Terms:
1. NPDES National Pollutant Discharge Elimination System Permit
  2. BMP Best Management Practices. This term will be used to reference both BAT and BCT as a part of the total term for Best Management Practices.
  3. BAT Best Available Technology Economically Achievable
  4. BCT Best Conventional Pollutant Control Technology

PART 2 - PRODUCTS

2.1 SOURCE QUALITY CONTROL

- A. Storm Water Pollution Prevention Plan
1. Outline information on the SWPPP requirements are attached as an Appendix at the end of this Project Manual.
  2. The general contractor shall retain the services of a Qualified SWPPP Developer to write, amend and certify the Storm Water Pollution Prevention Plan.
  3. The intent of the General Construction Permit is to protect the quality of receiving water of the United States by limiting the quantity of pollutants in rainfall runoff from construction sites.
    - a. In order to accomplish this goal, each construction project is required to prepare a plan that will govern work operations and activities to lessen the probability that pollutants will be present in rainfall runoff from their site.
  4. Comply with all requirements of SWRCP adopted Order no. 2009-0009-DWQ and 2010-0014-DWQ with amendments.
- B. This site will be covered by the General Construction Permit before construction begins.
1. All construction activity must comply with the conditions of the permit.
  2. A NOI to be covered by the General Construction Permit will be filed by the Owner with the SWCRB and the fees therefore will be paid by the Owner.
  3. Copies of the NOI will be provided to the Contractor to place in the appropriate Appendix of the SWPPP when the NOI is available.
- C. The Contractor, under the terms of this Contract is the **Operator** of the site.
- D. It is therefore the Contractor's responsibility to faithfully and fully implement the BMP's contained within the SWPPP.
- E. It shall also be the Contractor's responsibility to propose BMP's of its own that are equal to or better than those contained in the SWPPP, should the Contractor deem those BMP's proposed in the provided SWPPP to be inadequate to meet the requirements of the General Construction Permit.
- F. Failure to implement BMP's as required to meet the intent of the General Construction Permit and the SWPPP is a

breech of state and federal laws.

1. Punishment for breaking the law can result in fines and imprisonment.

- G. The Owner does not guarantee that the BMP's will adequately control the quality of runoff from the site.
- H. The Contractor must provide, implement, and carry out the BMP's that comply with the General Construction Permit as required under SWRCB adopted Order No. 2009-0009-DWQ and 2010-0014-DWQ with amendments.
- I. The Contractor shall bear full responsibility for reviewing the SWPPP and the BMP's contained within, ascertaining their ability to provide adequate controls, and implementing the BMP's or others deemed by the Contractor to better accomplish the intent of controlling the quality of water runoff from the Project Site.
- J. Notice of Intent
  - 1. A NOI to be covered by the General Construction Permit will be filed by the Owner with the SWCRB.
  - 2. A copy of the NOI will be provided to the Contractor.

### PART 3 - EXECUTION

#### 3.1 APPLICATION

- A. General Requirements:
  - 1. The Contractor shall comply with the conditions of the General Construction Permit.
  - 2. Under the terms of the Contract, the Contractor is the Operator of the Site and it is the Contractor's responsibility to faithfully implement and carry out the BMP's.
  - 3. Services are to be provided and maintained from commencement of Work until final acceptance and clearances by governing agencies.
  - 4. Start of Construction of site work, on and off site, shall not commence until a General Permit has been acquired from SWCRB.
- B. Best Management Practices (BMPs)
  - 1. Under the terms of this Contract, the Contractor is the Operator of the Site and it is the Contractor's responsibility to faithfully and full implement the BMPs.
  - 2. Should the Contractor deem the BMP's proposed in the SWPPP are inadequate to meet the requirements of the General Construction Permit and SWRCB adopted Order NO. 2009-0009-DWQ, the Contractor shall propose its own BMPs that are equal to or better than those contained in the SWPPP.
  - 3. Should the Contractor implement new BMPs, he shall prepare all addenda to the SWPPP required by the General Construction Permit.
  - 4. Failure to implement BMP's as required to meet the intent of the General Construction Permit and the SWPPP is a breech of state and federal laws.
    - a. Punishment for breaking the law can result in fines and imprisonment.

#### 3.2 INSTALLATION AND MAINTENANCE

- A. Install and implement the BMP's at appropriate times during construction to protect water quality at all times in accordance with the requirements of the SWPPP.

- B. Install materials and systems described in BMPs in accordance with manufacturers' requirements and instructions.
- C. Inspect and maintain BMPs' structures and controls daily, including weekends and holidays when necessary.
- D. Maintain order and cleanliness at the construction site. Comply with section 01500.
- E. Review non-storm water BMPs prior to related construction activity such as but not limited to dewatering, pavement saw cutting and weed control. Ensure BMP structures are in place before commencing with construction activity.

### 3.3 FIELD QUALITY CONTROL

- A. Monitoring of BMP's:
  - 1. Monitoring by Contractor:
    - a. Carry out the Monitoring Program required by the SWPPP.
    - b. Prepare all reports required by the SWPPP.
- B. Monitoring by Owner:
  - 1. The Owner will monitor the Contractor's implementation and maintenance of the BMPs.
  - 2. Should the Owner determine that the Contractor's efforts fail to meet the requirements of the General Construction Permit, the SWPPP, and the SWPPP amendments, the Owner reserves the right to that of the following actions:
    - a. Notify the SWCRB of the perceived failure of the Contractor to comply with the General Construction Permit and SWPPP.
    - b. Withhold an amount of money from the Contractor's Payment Request, equal to the Owner's estimate of the value of the work required to implement and maintain the required BMP's.
    - c. Hire a separate contractor to perform work required to implement and maintain the BMPs and deduct the costs thereof from the Contractor's Payment.
- C. Availability of SWPPP:
  - 1. The Contractor shall keep copies of the SWPPP and addenda thereto in the following locations:
    - a. Contractor's General Business Office.
    - b. Contractor's Project Site Field Office.
  - 2. The SWPPP shall be available for public inspection at any time during normal business hours.

### 3.4 CLEANING

- A. Removal of BMP's:
  - 1. Completely remove from the Project Site all materials used to construct and maintain the BMP's upon completion of the Project.
    - a. Under written agreement and with the approval of the Owner, the Contractor may assign maintenance and removal responsibilities to a subsequent contractor for late work phases at the Project Site.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures. See Specification Section

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's published instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. All materials shall be delivered and stored in original unopened packages with manufacturer's name and contents legibly indicated. Materials shall be stored in a dry place and protected from damage from the elements and construction activities.
- B. Store and protect products in accordance with manufacturers' published instructions.
- C. Store with seals and labels intact and legible.

- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground. Cover product to protect from the elements.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

#### 1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

#### 1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period in addition to the requirements specified in this section.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that Contractor:
  - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
  - 2. Will provide same warranty for Substitution as for specified product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
  4. Waives claims for additional costs or time extension which may subsequently become apparent.
  5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
  2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
  3. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01700

**CONTRACT CLOSEOUT**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout schedule and procedures.
- B. Final Cleaning.
- C. Adjusting.
- D. Demonstration and instructions.
- E. Project record documents.
- F. Operation and maintenance data.
- G. Warranties.
- H. Spare parts and maintenance materials.

1.2 CLOSEOUT SCHEDULE AND PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's inspection.
- B. Requirement Preparatory to Project Acceptance:
  - 1. Certifications delivered to Architect that no new materials containing asbestos have been included in the work.
  - 2. Temporary facilities shall be removed from site as specified in Section 01500, "Temporary Facilities".
  - 3. Building and site shall be thoroughly cleaned as specified in General Conditions and in Article 1.2 of this Section.
  - 4. Record drawings shall be completed, signed by Contractor and Inspector and submitted to Architect as specified in Section 01300.
  - 5. Maintenance instructions and manuals shall be submitted to Architect as specified in Section 01300.
  - 6. Guarantees and warranties shall be submitted to Architect as specified in General Conditions and Section 01300. Contractor's Final Verified Report (Form DSA-6C) and other Reports and Affidavits required by Division of the State Architect shall be submitted and uploaded to the DSA Box web site under this project application number.
  - 7. Contractor shall notify Architect when Contractor, with concurrence of Inspector, feels project is complete enough to prepare "Punch Lists". Architect will then notify Mechanical and Electrical Engineers to make their inspections and prepare "Punch Lists". Mechanical and Electrical "Punch Lists" must be completed before Architect will make his "Punch Lists".

C. Project Acceptance:

1. After requirements preparatory to project acceptance have been completed as hereinbefore specified, Contractor shall notify Architect to perform acceptance tour. Notice shall be given at least three days in advance of the time the acceptance tour is to be performed.
  2. Contractor or his principal superintendent, authorized to act in behalf of Contractor, shall accompany Architect and Inspector on acceptance tour, as well as any principal subcontractors that Architect may request to be present.
    - a. 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.
    - b. If work has been 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.
    - c. If work has not been substantially completed in accordance with Contract Documents, and several or many corrective measures are still required, Architect will recommend that Owner not accept project and not file Notice of Completion. Instead, based on information gathered from acceptance tour, Contractor will be required to complete all corrective measures and then call for another project acceptance tour following procedure outlined above. Owner will compensate Architect for additional acceptance tour and deduct amount paid from final payment to contractor.
  3. Upon acceptance of Project by Owner, Contractor shall submit his request for final payment, less retention. Retention payment will not be made by Owner until 35 days after filing of Notice of Completion.
    - a. Retention payment will not be made until Contractor has filed the required Form 6C with D.S.A. with copy to the Architect.
    - b. Should any corrective measures remain incomplete at time retention is due, Contractor shall provide Owner with Cashier's Check(s) in exchange for retention. Cashiers Check(s) shall be in an amount twice the agreed estimated cost to accomplish the corrective measures to assure that Owner will have sufficient funds to accomplish work by others should contractor not complete corrective measures in a reasonable amount of time.
- D. Provide submittals to Architect that are required by governing or other authorities.



- E. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- F. Owner will occupy all of the shade structure as specified in Section 01010.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. At completion of work, remove marks, stains, fingerprints, dust, dirt, and paint drippings resulting from work of this project.
- C. Clean site; sweep paved areas, rake clean landscaped surfaces.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.4 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work in contrasting color:
  - 1. Contract Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other Modifications to the Contract.
  - 5. Reviewed shop drawings, product data, and samples.
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each Product section in contrasting color ink, description of actual Products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Changes made by Addenda and Modifications.
- E. Contract Drawings and Shop Drawings: Legibly mark each item in contrasting color ink to record actual construction including:
  - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  - 3. Field changes of dimensions and detail.
  - 4. Details not on original Contract Drawings.
- F. Submit one complete set of the record documents along with the manuals, warranties, guarantees and other documentation necessary for the district to properly operate and maintain this facility to Architect with claim for final Application for Payment.

1.5 WARRANTIES

- A. Provide duplicate notarized copies.
- B. Execute and assemble documents from subcontractors, suppliers, and manufacturers.
- C. Provide Table of Contents and assemble in binder with durable plastic cover.
- D. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

2 PART 2 PRODUCTS

Not Used

3 PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01720  
FIELD ENGINEERING

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide such field engineering services, on and off-site, as required for proper completion of the work including, but not necessarily limited to establishing and maintaining lines and levels.
- B. Contractor shall establish and certify in writing the sub-grade elevation for the building pad. The certification is to be delivered to the Architect before the foundation work is scheduled to begin construction. A record drawing of the site plan is to be created denoting the pad elevation for each corner of building and future building pads.
- C. Contractor shall set corner stakes and batter boards for the building pad with five foot (5'-0") off sets and the finish floor elevation of the building.
- D. Related Sections:
  - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions, and sections in division 1 of these specifications.
  - 2. Additional requirements for field engineering also may be described in other sections of these specifications.
  - 3. As described in the General Conditions, the Owner will furnish a survey describing the physical characteristics, legal limitations, utility locations, and legal description of the site.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. Upon request of the Architect, submit:
  - 1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
  - 2. Documentation verifying accuracy of field engineering work.
  - 3. CERTIFICATION, signed by the contractor's retained field engineer, certifying the Bottom of Excavations, Top of Slab Elevations and locations of improvements are in conformance with requirements of the Contract Documents.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with specified requirements and the methods needed for proper performance of the work of this section.

1.4 PROCEDURES

- A. In addition to procedures directed by the Contractor for proper performance of the Contractor's responsibilities:
  - 1. Locate and protect control points before starting work on the site.
  - 2. Preserve permanent reference points before starting work on the site.
  - 3. Do not change or relocate reference points or items of the work without specific approval from the architect.
  - 4. Promptly advise the Architect when a reference point is lost or destroyed, or requires relocation because of other changes in work.
    - a. Upon direction of the Architect, require the field engineer to replace reference stakes or markers.
    - b. Locate such replacements according to the original survey control at no additional cost to the owner.
  
- B. Grade/Dimension Control:
  - 1. The contractor's Civil Engineer/Surveyor shall prepare a plan for the Contractor which shows all locations where the "As Graded" position or elevation is not within the tolerances allowed by specifications.
  
- C. The Contractor shall re-grade all areas where the "As Built" tolerances do not meet specifications.

END OF SECTION

SECTION 02020

**OFFSITE DEVELOPMENT**

1 PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Provide all material, labor, equipment and services necessary to complete the Project as indicated by the Contract Documents.
    - a. Street improvements include, but are not limited to, demolition, clearing and grubbing, pavement removal, relocating or reconstructing interfering existing utilities, constructing new utility lines, setting man-holes and utility boxes to finished grade, constructing permanent pavement, concrete curb and gutter, concrete sidewalks, valley gutter, lightoliers and traffic signs all as indicated on the plans in the specifications, and in conformance with the Local Governing Authority City Standard Plans and Specifications.
    - b. The contractor is responsible for all coordination and project scheduling with gas and electric companies, telephone company, cable television company and city public works department for sewer and water regarding their work of relocating and/or under-grounding their facilities within the street right of ways adjacent to the project site and beyond. Such responsibility shall include but not necessarily be limited to:
      - 1) The contractor establishing and maintaining communication.
    2. Construct and install all new street improvements to the local governing City standards.
- B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
1. GENERAL CONDITIONS
  2. 00800 - SPECIAL CONDITIONS
  3. 02050 - DEMOLITION AND CLEARING
  4. 02200 - EARTHWORK
  5. 02211 - ROUGH GRADING
  6. 02222 - EXCAVATING
  7. 02223 - BACKFILLING
  8. 02225 - TRENCHING
  9. 02513 - ASPHALTIC CONCRETE PAVING
  10. 02514 - PORTLAND CEMENT CONCRETE PAVING
  11. 02760 - TACTILE / DETECTABLE WARNING SURFACE TILE
  12. 02846 - ROADWAY AND PARKING SIGNS

1.2 SUBMITTALS

- A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES, DIVISION 01300.
1. Coordination Drawings:
    - a. Submit installer's coordination drawings indicating the work of this section with that of related work of other sections for proper interface of the completed work of this section. Installer shall coordinate and obtain approvals from the work of other related sections prior to submitting to the Civil Engineer.
  2. Quality Assurance/Control Submittals:
    - a. Test Reports - One for the Architect, Civil Engineer, Contractor, Owner and the Governing authorities.
      - 1) Submit five (5) copies of reports required by

- regulatory requirements.
- 2) Submit five (5) copies of testing laboratory's report.
- 3. Closeout Submittals in accordance with Specification Section 01700:
  - a. Project Record Documents in accordance with Specification Section PROJECT DOCUMENTS.

### 1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. In accordance with Specification Section REGULATORY REQUIREMENTS, and the following:
    - a. CAL/OSHA All work shall comply with the rules and regulations of the Division of Occupational Safety and Health (formally the Division of Industrial Safety), and all other local, state and federal agencies having jurisdiction. Nothing contained herein shall be construed as permitting work that is contrary to such rules, regulations and codes.
      - 1) Full compensation for all costs involved in worker protection from caving ground in excavating shall be included in the lump sum price bid for the work under this contract.
    - b. CARB Materials and equipment used for this project shall comply with the current applicable regulations of the California Air Resources (CARB) and the Environmental Protection Agency (EPA). Regulatory changes may affect the formulation, availability, or use of the specified coatings. Confirm availability of coatings to be used prior to use, and notify the Architect or any recent changes that may have occurred after the preparation of this specification section.
- B. Surveying and preservation of existing monuments:
  - 1. Surveying for offsite improvements shall be secured and paid for by the Contractor. The Contractor shall be responsible to contract for, coordinate and pay for all such services by a Civil Engineer or Land Surveyor registered in California and acceptable to the Civil Engineer.
  - 2. Carefully preserve all data and monuments set by the Owner's Civil Engineer, and if displaced or lost, the Contractor's Engineer shall immediately replace such monuments to the satisfaction of the Civil Engineer and at no additional cost to the Owner.
  - 3. See Section 01720 for additional requirements.
- C. Monitoring of Construction Site:
  - 1. The Contractor shall monitor the construction site on a regular bases during non-working hours, including weekends and holidays to ensure that no situations arising, relating to the condition of the work site, which could pose a threat to public safety. In addition the contractor shall furnish to the Owner and to the Local Governing City's or County's Public Works Division, prior to the issuance of the "Notice to Proceed", a list of persons, together with their addresses and home telephone numbers, who are authorized to act on behalf of the Contractor in an

emergency arising out of conditions at the work site after normal working hours.

2. Safe Pedestrian crossings shall be maintained at all existing crosswalks and intersections.
  - a. The Contractor shall secure the site of work at all times. Children shall not be allowed in or along the excavation, on spoil piles or at other undesirable locations within the work.
  - b. The Contractor shall provide suitable traffic and pedestrian warning devices and signs necessary at or near the work as required by safety considerations and/or jurisdictional authorities. Convenient pedestrian detours and/or flagmen and/or safe temporary bridges over excavations, complete with adequate safety rails, shall be provided as necessary.
  - c. The Contractor shall install and maintain during construction works as required for vehicle safety "K" rails and electronic message reader boards along each street where construction is occurring. Electronic message reader boards are to notify oncoming traffic in each direction of construction area. Messages to be displayed are subject to directions by Governing Authorities.

D. Compaction and compaction tests:

1. The Contractor shall be fully responsible for timely compaction and suitability of material for compaction. Where necessary, wet and pumping material shall be removed from the trench or excavations by the Contractor and replaced with suitable approved material as necessary to complete operations within the times allowed.
2. Compaction requirements for all excavations within public streets and right of ways shall be in accordance with the local jurisdiction's Encroachment Permit and in accordance with the local Standard Specifications.
3. Initial compaction testing shall be provided by the Owner. The Contractor shall file adequate notice to the Civil Engineer when he desires compaction testing. All required compaction re-testing of backfill because of failure to pass original test shall be at the expense of the Contractor.
4. Full compensation for all costs involved in meeting and satisfying the above requirements shall be included in the amount bid for the various items of work and no separate payment will be made therefore.

1.4 PROJECT CONDITIONS OR SITE CONDITIONS

A. Existing Conditions:

1. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
2. Conduct work so as not to interfere unnecessarily with adjacent roads, streets, drives and walks.
3. Before commencing excavation, the contractor shall notify all utility authorities or utility companies having possible interest in the work of the contractor's intention to excavate proximate to existing facilities and Contractor shall verify the location of any utilities within the work area.
4. The Civil Engineer has made a diligent attempt to show on the construction drawings all pertinent intersecting utilities which may affect the work. Utilities shown in

profile view are shown at their most probable locations, based upon available as-built drawings and known construction custom. The Contractor shall exercise caution while performing excavation for this project and shall protect existing utilities from damage, inasmuch as their exact location is unknown until exposed by excavation.

5. Because of the close proximity of certain existing parallel or intersecting utilities and the depth of the proposed facilities, it may be necessary for the Contractor to provide special protection for the existing utility and/or provide for its temporary and/or permanent relocation in order to construct the facilities shown on the plans. Bracing of power poles may be necessary. The Contractor shall coordinate said work and shall be responsible for complying with the requirements of the utility authority involved. Full compensation for all costs involved in such special protection and/or relations, including all appurtenances and incidentals, shall be included in the amount bid for the various bid items, and no separate payment shall be made therefore.
6. All existing utility mains and service lines shall be kept in constant service during the construction of this project. Hand excavating shall be employed where necessary to safely expose existing utilities.
7. Full compensation for all costs involved in locating, verifying, protecting, exposing, relocating, reconstruction and otherwise providing for utilities shall be included in the amount bid for the various items of work and no separate payment shall be made therefore.

B. Dust Control:

1. The Contractor shall maintain dust control about the site of work, including any haul roads to and from the site, by whatever means are necessary, such as watering, sweeping or oiling, so as to cause the least possible dust nuisance to the public. Any dust control measure ordered by the Civil Engineer, Project Inspector or the City of Eureka shall be promptly and immediately carried out.
2. If the Contractor fails to provide dust control measures so ordered within a period of 2 hours from the time ordered, the Contractor shall pay to the Owner a penalty of Fifteen (15) dollars for each one half (1/2) hour, or portion thereof, that elapses beyond the 2 hour warning period, until dust control measures ordered are completely carried out and the dust nuisance eliminated or prevented.
3. Such penalty shall be deducted from any monies owned the Contractor. In addition to the penalty as specified above, if conditions warrant, the Owner may employ other forces to eliminate or prevent the dust nuisance. The full cost thereof, in addition to the penalty as herein provided, shall be deducted from any monies owed the Contractor.
4. Full compensation for dust control shall be included in the amount bid for the various items of work and no separate payment will be made therefore.
5. Contractor shall fully implement all requirements of the Storm Water Prevention Control Plan for this project.
6. Streets shall be swept daily using acceptable street sweeping equipment.

C. Traffic Control:

1. Traffic control measures shall be fully and completely carried out at all times to the satisfaction of Project Inspector and City of Turlock. If the Contractor fails to provide satisfactory traffic control the Owner may obtain services from other sources and deduct from the contract



- the cost thereof.
2. Through traffic shall be provided for during non-working hours including, but not limited to, weekends, holidays and at night.
  3. The Contractor shall comply with all requirements of Street Encroachment Permit.

D. Protective Measures:

1. Furnish, place and maintain all supports shoring, and sheet piling which may be required for the sides of excavation or for protection of adjacent existing improvements. The adequacy of such systems shall be the complete responsibility of the Contractor.
2. Maintain all bench marks, monuments and other reference points. If disturbed or destroyed, replace as directed.
3. Forty-Eight (48) hours prior to beginning construction, the Contractor shall notify the Owners of all properties adjacent to the proposed construction. The Contractor shall also provide the property owners with an estimate of the length of time that their properties will be affected by construction activities.
4. Furnish, place and maintain all necessary steel traffic weight plates over open trenches where traffic will pass over the trench during non-construction hours. Plates shall be of adequate size and thickness to accommodate all traffic.

E. Permits:

1. The Contractor shall secure and pay for all permits required for work under this contract including, but not limited to, the Local Encroachment Permit.
2. All costs associated with obtaining permits as required by construction and as indicated herein shall be included in the price bid for the various items of work and no separate payment will be made therefore.
3. The Contractor shall pay all inspection fees required by governmental agencies.
4. The Contractor shall obtain a permit from the Division of Occupational Safety and Health of the State of California prior to the commencement of construction. Full compensation for said permit shall be included in the price bid for the various items of work and no separate payment will be made therefore.
5. The Contractor shall also be responsible to secure and pay for the local Street Encroachment Permit, as well as all required bonds, trench deposits and insurance required by local governing agencies.
6. All references made the "General Notes for Street Construction" to the "Developer" shall be interpreted to mean "Contractor" except "The Owner shall pay for all initial compaction tests". Contractor shall pay for all required re-tests.

1.5 WARRANTY

- A. In accordance with Specification Section 01700.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials incorporated in street construction shall conform with the Local Standard Plans and Specifications.

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Site Verification of Conditions:
  - 1. Prior to the execution of the work under this specification section, inspect the installed work executed under other specification sections of this Project Manual which affect the execution of work under this specification section.
  - 2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
  - 3. Execution of work under this specification section shall constitute acceptance of existing conditions.

#### 3.2 PREPARATION

- A. Coordination:
  - 1. Coordinate work under this specification section with work specified under other specification sections to ensure proper and adequate interface of work specified under this section.
- B. Protection:
  - 1. Protect all adjacent surfaces from drips, spray, air pollution of surrounding environment, and other damage from work under this specification section.
- C. Surface Preparation:
  - 1. Prepare surface in accordance with manufacturer's instructions and recommendations.

#### 3.3 CONSTRUCTION

- A. Interface with other work:
  - 1. Construction of street facilities shall be performed in accordance with the Local Standard Plans and Specifications.
  - 2. The Contractor shall be responsible to protect all other existing and proposed utilities and improvements affected by the work.
  - 3. The Contractor shall cooperate with all other contractors on the job to insure that his activities do not delay or hinder the construction activities of others.
  - 4. All excess earth from trenching and off-site grading may be deposited within the boundaries of the school site at a location specified by the Civil Engineer for incorporation in site grading activities. All such earth shall be free of organic material, large rocks, hardpan asphalt paving and other deleterious materials. Material is subject to acceptance of the Soils Engineer.
  - 5. The Contractor shall be aware that the work of this contract is a portion of the total work required for the construction of the project site. The Contractor shall coordinate his work and his schedule fully with other forces performing work relating to the construction of the above stated project. Included in these "other forces" are gas and electric, telephone, the forces constructing on-site improvements for the above stated project and any other forces performing work within the project area which requires coordination with the work of this contract. The Contractor shall coordinate his efforts with other forces performing on-site work.

### 3.4 FIELD QUALITY CONTROL

- A. Site Tests:
  - 1. As required by regulatory requirements.
  
- B. Inspection:
  - 1. As required by regulatory requirements.
  - 2. Schedule inspections and notify the Architect, Owner's Inspector and any other regulatory agencies of the time at least 48 hours prior to the inspection.
  - 3. No work shall be without the inspections required by regulatory requirements.

END OF SECTION

DEMOLITION AND CLEARING

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Perform all work and provide all related materials, labor, services, and equipment to execute the clearing and demolition as shown on the drawings and specified herein and as necessary for proper completion.
- B. Work included: (Principal items but not necessarily a complete list).
  - 1. The term "Demolition and Clearing" as used herein includes but is not limited to the following: Removal of existing building, streets, trees and root balls, fences, curbs and gutters, signs, piles of debris, shrubbery, sewer, septic tanks, wells, surface and shallow piping, footings, foundations, floor slabs, masonry, concrete walls, etc. All items shall be removed from the site and disposed of in a legal manner leaving cleaned ground in a smooth surface. All well and septic abandonment shall be per Stanislaus County and City of Turlock requirements.
  - 2. Furnish all labor, materials, and equipment and perform all operations in connection with the "Demolition and Clearing" indicated or implied on the Drawings and Specified herein as well as all work normally performed under this Section.
  - 3. Notification: To all companies owning conduits, wires, or pipes running to the property, arrangement for any required removal and/or capping where required.
  - 4. Protection and Maintenance: Of all conduits, drains, sewers pipe's, and wires that are to remain on the property.
  - 5. Shoring: Erect and maintain required shoring, bracing, and protection.
  - 6. Protection: For all walks, street, driveways, adjacent buildings and equipment off the site and in adjacent streets.
  - 7. Replace any bench marks, monuments, or other reference points to the satisfaction of the Architect.
  - 8. Salvage and stockpile as designated on site area, all items so noted.
  - 9. Salvage and deliver to the Owner all Owner property required to be retained by the Owner.
  - 10. Obtain and pay for all permits.
  - 11. File all required documentation with the San Joaquin Air Quality Management District and pay all required fees.

1.2 REGULATORY REQUIREMENTS

- A. Conform to local code for disposal of debris.
- B. City of Turlock Dust Control Ordinance.
- C. C.B.C. - California Building Code (2019); Chapter 70.
- D. CCR - California Code of Regulations, Title 24, Chapter 29.
- E. San Joaquin Air Quality Management District.

1.3 GENERAL REQUIREMENTS

- A. It is the contractor's responsibility to establish the extent of work under this Section in accordance with the pertinent provisions of Division 0 and Division 1.
- B. Field Conditions: Verify drawing dimensions with actual field conditions. Inspect related work and adjacent features and report to Architect all conditions which prevent proper execution of this work.
- C. Contractor shall comply with California State Construction Safety Orders as enforced by California State Division of Industrial Safety. In addition, the Contractor shall comply with the requirements of the Health Department for extermination of rodents.
- D. Payment: Payment will be as set forth in the bidder proposal.

1.4 RELATED WORK SPECIFIED IN OTHER SECTION

- A. Except as described in this Section, the required "Demolition and Clearing" of objects below existing ground level is specified in Section 02200 "Earthwork."

1.5 UNDERGROUND PIPELINE AND UTILITY MARKING SERVICE

- A. Call Underground Service Alert of California service, dial toll free:
  - 1. (800) 227-2600, Monday through Friday 7:00 a.m. to 5:00 p.m.
- B. Two (2) working days required before you dig.
- C. The Contractor shall be responsible for notification of utility companies. Notifying Underground Service alert of California does not relieve the Contractor from responsibility of notifying all utilities.

1.6 PRODUCT HANDLING

- A. Take all means necessary to protect objects designated to be preserved. In the event of damage immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.
- B. Schedule and execute all work in a careful manner with all necessary consideration for neighbors and the public and to prevent injury to all persons and property. Avoid interference with the use of, and passage to and from adjoining buildings and facilities.

- C. Take all means necessary to prevent the spread of dust during demolition and clearing operations. Wet down all masonry walls just prior to, and during demolition and thoroughly moisten all ground surfaces as often as required to prevent dust being a nuisance to the public, neighbors, and the current performance of other work on the site.

## 2 PART 2 PRODUCTS

### 2.1 SAFETY BARRICADES

- A. The Contractor shall assume total responsibility for the safety of workers and people in and around the construction area, including street, traffic and pedestrians. The Contractor is responsible for obtaining, placing, and inspecting safety barricades and all other items required to maintain safety. All safety barricades described in Part 3 of this Section shall be of sufficient strength and design to block access and furnish protection for the workmen and the public and shall meet the requirements of the governing Building and Public Works Departments.

### 2.2 PROTECTION

- A. Provide and erect all planking, covered passageways, bridges, fences, bracing, shoring, lights, and warning signs necessary for the protection of the street, sidewalks, curbs, adjacent property and the public.
- B. Trees, shrubs, or other planting, either on or off the site, power poles and lines, adjacent property, shall be protected throughout demolition operations.
- C. At completion of demolition, all protection shall be left in place unless removal is authorized, in writing, by the Architect.

### 2.3 RODENT EXTERMINATION

- A. The materials used for rodent extermination shall be those found locally successful and only those that meet the approval of the Health Department.

### 2.4 OTHER MATERIALS

- A. All other materials not specifically described but required for proper completion of demolition and clearing, shall be as selected by the Contractor subject to the approval of the Architect.

## 3 PART 3 EXECUTION

### 3.1 EXISTING CONDITIONS

- A. Prior to any work of this Section and before submitting proposals, carefully inspect the entire site and all objects to be demolished, cleared, and left intact, and determine the requirements for disconnection and capping. Locate all active utility lines traversing the site and determine the requirements for protection or demolition. In the event of unforeseen conditions, immediately notify the Architect and proceed as he directs.

### 3.2 SAFETY

- A. Barricades: Furnish and install necessary barricade to

protect the public or workman during demolition. Barricades in demolition areas shall be left in place until they are no longer required for protection and authorized for removal by inspector.

- B. Warning Signs: Adequate warning signs, lighting, etc., for vehicular and public protection shall be provided and maintained during the period of work as required by applicable Safety Ordinances.
- C. Contractor Inspection: Inspect all safety devices and measures periodically and at the end of each work day. It shall be the Contractor's responsibility to maintain the site in safe order.

### 3.3 DISCONNECTION AND PROTECTION OF UTILITIES

- A. Before starting demolition, disconnect or arrange for the disconnection of all interfering utility services such as water, gas, steam, electricity, and telephone, performing all such work in accordance with the requirements of the utilities concerned.
- B. Preserve, in operating condition, all active utilities traversing the site. Protect all property including, but not necessarily limited to mains, manholes, catch basins, valve boxes, poles, guys, and other appurtenances.
- C. Utility connections and demolition shall be phased so as to provide minimum interruption of service. Whenever possible, utility interruptions shall occur at times other than normal work hours.
- D. Arrange with utility companies furnishing gas, water, telephone, electrical or sewer service to remove equipment or to remove, disconnect, cap or plug or relocate their services to facilitate construction operations.

### 3.4 DEMOLITION OPERATIONS

- A. Dust Control: At all times during the work, effective measures to prevent intrusion of dust, dirt, or fumes shall be maintained by the Contractor. This shall include sprinkling or suitable chemical treatment of debris and removal of materials.
- B. Materials are not permitted to accumulate, but must be promptly removed from the site to a legal dump or otherwise disposed of in accordance with the governing authorities.
- C. Street and Sidewalks kept reasonably clean during working hours and machine swept at the end of each day. Comply with the City of Eureka Ordinances and Regulations.
- D. Debris: Sprinkled with water to prevent annoyance from dust.
- E. Salvage of Materials: Contractor shall deliver to Owner all meters, street lights, and other items which are required to be salvaged. All other material on the site becomes the property of the Contractor.
- F. Trees: Remove trees which are so noted on the drawings. Remove trees together with the bulk of the roots to a minimum depth of 18 inches below the existing or finish grade, whichever is lower, and within a radius of 5' beyond the perimeter of trunk at ground line. Fill resulting

holes with compacted earth. Fill to the level of the adjacent grades as described in earthwork.

- G. Bench Marks: Contractor shall replace all bench marks, monuments, or other reference points that have been removed or displaced during demolition operations. All bench marks, etc., shall be replaced at the Contractor's expense. The Contractor shall hire the services of a licensed surveyor or Civil Engineer.
- H. Maintaining Traffic: Do not close or obstruct streets and sidewalks without permit. Conduct operations with minimum interference thereto. Provide, erect and maintain lights, barriers and the like required by local ordinances.

### 3.5 BARRICADES OF RETAINED OBJECTS

- A. Where miscellaneous objects on site are designed to be preserved, construct barricades as required by the Architect.

### 3.6 BARRICADES

- A. Construction barricades as required at new construction and as required by the Architect.

### 3.7 REPAIR DAMAGE

- A. Contractor shall repair any and all damages to public property resulting from the execution of this job whether directly or indirectly caused.
- B. Debris, masonry, broken concrete, dirt, etc., which is not required on the project, is to be removed to a legal dump or otherwise disposed of in accordance with requirements of the governing authorities.
- C. Equipment, barriers, etc., not specifically indicated to remain, shall be removed from the site.

### 3.8 CLEAN-UP

- A. Contractor shall maintain cleanliness on roadways and other public areas used by equipment. Contractor will be held responsible for immediate removal of all spillage on these paved areas or sidewalks.
- B. All debris resulting from the work of this Section, together with all the tools, equipment, and appliances used shall be completely removed from the site upon completion of the work.

**END OF SECTION**



SECTION 02070

**HAZARDOUS MATERIALS ABATEMENT**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Remove designated building materials.
- B. Removal of debris from job site.
- C. Patching as necessary to match existing.
- D. Construct temporary plywood closures at all openings where materials are removed as a part of the abatement process to secure the building from unlawful entry.
- E. Hazardous Materials Report as prepared by Bovee Environmental Management, Inc. See Appendix B of these specifications.

1.2 SUBMITTALS

- A. Submit demolition and removal procedures and schedule under provisions of Section 01300 and as outlined in the specification sections prepared by BOVEE Environmental Management, Inc., Report No. 20-41945, dated February 4, 2020.

1.3 EXISTING CONDITIONS

- A. Conduct abatement and demolition to minimize interference with adjacent building areas. Maintain protected egress and access at all times.
- B. Provide, erect, and maintain temporary barriers and security devices.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are certified and completely familiar with the specified requirements and the methods needed for proper performance of this portion of the work.
- B. Field conditions: Take into consideration as necessary work, all obvious existing conditions, and installations on the site as though they were completely shown or described. Accept the site of the work as it exists and clear obstructions to the work indicate.
- C. Examine the site and all conditions and limitations thereon and thereabouts. All proposals shall take into account all such conditions and limitations whether or not the same are specifically shown or mentioned in any of the Contract Documents and every proposal shall be construed as including whatever sums are needed to complete the work in every part as shown, described

or reasonably required or implied, and attain the completed conditions contemplated by the Contract.

- D. Unforeseen conditions: Include as part of this Work miscellaneous cutting and patching necessitated as a result of unforeseen conditions and the reworking of abutting surfaces as required to make new Work join and match existing surfaces to remain. No extra payments based on the plea of unforeseen conditions will be allowed.
- E. Barriers: Erect temporary barriers of plywood or other approved material which will positively prevent passage of debris and dust. Seal entire perimeter and all joints.
- F. Glass: Provide such protection as may be required to prevent glass breakage. At no additional cost, replace in kind all broken glass.
- G. Lowering material: Provide hoists and chutes as required to lower removed material. Throwing, dropping or permitting the free fall of material and debris from heights which would cause damage to work to remain, undue noise or nuisance, or excessive dust is expressly prohibited.
- H. Protection of personnel: Erect signs, barricades and such other forms of warning as may be required to prevent personnel from putting themselves in the way of injury.
- I. Existing work to remain: Provide such forms of protection as may be necessary to prevent damage to existing work and equipment to remain.
- J. Items to be reused: Exercise and greatest possible care when removing items scheduled for reuse. Use only mechanics skilled in the appropriate trades. Identify point of reuse, store and protect at locations directed.
- K. Take careful note of the fact that the premises and activities will be open to "business-as-usual" during the life of this Contract. No interruption of traffic-flow, utilities services or District's usual activities will be permitted without previous scheduling with the District.
- L. Phasing of the work: Confer with the District and general contractor as to the sequencing and phasing of the performance of various parts of the work. Cooperate fully to the end that certain facilities and services are maintained in operation until immediately before their removal is required to permit installation of the work.
- M. Noise control: Carry on all work in a manner which will produce the least amount of noise. Instruct all workmen in noise control procedures.

## 2 PART 2 PRODUCTS

- A. Remove hazardous materials per specifications prepared by and

all OSHA and EPA requirements.

### 3 PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Erect and maintain weatherproof closures for exterior openings as specified in Section 01500.
- B. Erect and maintain temporary partitions to prevent spread of dust, fumes, noise, and smoke to provide for District occupancy as specified in Section 01010.
- C. Protect existing items which are not indicated to be altered.

#### 3.2 EXECUTION

- A. Abate materials in an orderly and careful manner. Protect existing supporting structural members and finishes to remain.
- B. Except where noted otherwise, immediately remove demolished materials from site.
- C. Temporary partitions for the protection of the existing facility, contents and any new work of this Contract against dust, weather, damage and noise are to be in place and maintained. Relocate temporary partitions from time to time as work progresses.
- D. Do not allow materials and debris generated by demolition activities to accumulate. Remove daily and dispose of it in a legal manner.
- E. Leave all spaces broom clean with all ledges and corners properly cleaned.
- F. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.
- G. Do not burn or bury materials on site.
- H. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.

#### 3.3 PATCHING

- A. Unless otherwise indicated, patch and finish surfaces as necessary to match existing.
- B. All mastic left exposed on the floors shall be sealed prior to the completion of the project to encapsulate the material per specifications prepared by .
- C. The building shall be fully secured prior to the acceptance of the project by the District.

END OF SECTION

SECTION 02072

**MINOR DEMOLITION FOR REMODELING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Remove designated building equipment and fixtures.
- B. Remove designated partitions and components.
- C. Cap and identify utilities.
- D. Removal, storage, protection and reinstallation of items to be reused.
- E. Design and installation of Temporary Shoring as required to support roof structure and walls during removal and replacement of structural components.
- F. Removal of debris from job site.
- G. Patching as necessary to match existing.
- H. Comply with the requirements of the Asbestos Survey report as prepared by Bovee Environmental, Inc. Project No. , dated. See Appendix B.

1.2 SUBMITTALS

- A. Submit demolition and removal procedures and schedule under provisions of Section 01300.
- B. Submit record drawings under provisions of Section 01700.

1.3 EXISTING CONDITIONS

- A. Conduct demolition to minimize interference with adjacent building areas. Maintain protected egress and access at all times.
- B. Provide, erect, and maintain temporary barriers and security devices.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of this portion of the work.
- B. Field conditions: Take into consideration as necessary work, all obvious existing conditions, and installations on the site as though they were completely shown or described. Accept the site of the work as it exists and clear obstructions to the work indicate.
- C. Examine the site and all conditions and limitations thereon and thereabouts. All proposals shall take into account all such conditions and limitations whether or not the same are specifically shown or mentioned in any of the Contract Documents and every proposal shall be construed as including whatever sums are needed to complete the work in every part as shown, described or reasonably required or implied, and attain the completed conditions contemplated by the Contract.

- D. Unforeseen conditions: Include as part of this Work miscellaneous cutting and patching necessitated as a result of unforeseen conditions and the reworking of abutting surfaces as required to make new Work join and match existing surfaces to remain. No extra payments based on the plea of unforeseen conditions will be allowed.
- E. Dust barriers: Erect temporary dust barriers of plywood or other approved material which will positively prevent passage of debris and dust. Seal entire perimeter and all joints.
- F. Glass: Provide such protection as may be required to prevent glass breakage. At no additional cost, replace in kind all broken glass.
- G. Lowering material: Provide hoists and chutes as required to lower removed material. Throwing, dropping or permitting the free fall of material and debris from heights which would cause damage to work to remain, undue noise or nuisance, or excessive dust is expressly prohibited.
- H. Protection of personnel: Erect signs, barricades and such other forms of warning as may be required to prevent personnel from putting themselves in the way of injury.
- I. Existing work to remain: Provide such forms of protection as may be necessary to prevent damage to existing work and equipment to remain.
- J. Items to be reused: Exercise and greatest possible care when removing items scheduled for reuse. Use only mechanics skilled in the appropriate trades. Identify point of reuse, store and protect at locations directed.
- K. Take careful note of the fact that the premises and activities will be open to "business-as-usual" during the life of this Contract. No interruption of traffic-flow, utilities services or Owner's usual activities will be permitted without previous scheduling with the Owner.
- L. Phasing of the work: Confer with the Owner as to the sequencing and phasing of the performance of various parts of the work. Cooperate fully to the end that certain facilities and services are maintained in operation until immediately before their removal is required to permit installation of the work.
- M. Noise control: Carry on all work in a manner which will produce the least amount of noise. Instruct all workmen in noise control procedures.

## 2 PART 2 PRODUCTS

- A. Partitions: Remove partition finish, studs, plates and sills. Where only a partial run is removed, cut back finish material to the center line on the next adjacent support to remain. Leave remaining material with a clean terminal line with no loose material adhering.
- B. Concrete, asphalt paving, and masonry: Saw cut not less than 4 inches at lines of removal. Break out sections to be removed. Chip back face behind saw cut line.
- C. Plaster: Cut back to sound plaster on straight lines, and back-bevel edges of remaining plaster. Trim and prepare existing lath for tying new lath.

- D. Roofing: Remove only to the extent necessary for new required roof penetrations.
- E. Miscellaneous materials: Cut to straight lines or joints.

### 3 PART 3 EXECUTION

#### 3.1 PREPARATION

- A. Erect and maintain weatherproof closures for exterior openings as specified in Section 01500.
- B. Erect and maintain temporary partitions to prevent spread of dust, fumes, noise, and smoke to provide for Owner occupancy as specified in Section 01010.
- C. Protect existing items which are not indicated to be altered.
- D. Disconnect, remove, and cap designated utility services within demolition areas.
- E. Mark location of disconnected utilities. Identify and indicate capping locations on Project Record Documents.
- F. Protect existing vegetation around each of the buildings.

#### 3.2 EXECUTION

- A. Demolish in an orderly and careful manner. Protect existing supporting structural members and finishes to remain.
- B. Except where noted otherwise, immediately remove demolished materials from site.
- C. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect under provisions of Section 01500.
- D. Check drawings carefully and thoroughly investigate existing building construction.
  - 1. Furnish and install all shoring and bracing required or implied to positively protect and structural elements of the building. Material used shall be adequate to support anticipated loads with a properly calculated margin of safety.
  - 2. Where shoring is required on framed floor and roof slabs, provide for transfer of stresses to successively lower construction. Leaving shoring and bracing in place until new construction is capable of supporting imposed loads.
  - 3. Remove all shoring and bracing when new construction is safely in place.
- E. Where openings are cut over-size or in improper location, the excess removed material shall be replaced with new.
  - 1. Such repair work may entail the installation of new dowels and/or the installation of new concrete, masonry, or other materials as may be required.
- F. Holes through existing concrete and masonry construction to accommodate new conduit and/or piping shall be neatly cored, not jack hammered, to satisfy location and size requirements of respective trades. Coordinate work with other trades to assure the proper sequence, limits, methods and time of performance.

1. Schedule work so as to impose a minimum of hardship on the present operation of the facilities and the performance of the work of other trades.
- G. Temporary partitions for the protection of the existing facility, contents and any new work of this Contract against dust, weather, damage and noise are to be in place and maintained. Relocate temporary partitions from time to time as work progresses.
- H. Items of existing work indicated to remain upon completion of the Contract, but which require removal to complete the work, shall be carefully removed and replaced upon completion. The replaced work shall match its condition at the start of the work unless required by the Drawings, elsewhere herein, or in the various sections affected, to be done otherwise.
- I. Do not allow materials and debris generated by demolition activities to accumulate. Remove daily and dispose of it in a legal manner.
- J. Do not allow materials and debris generated by demolition activities to accumulate. Remove daily and dispose of it in a legal manner.
- K. Leave all spaces broom clean with all ledges and corners properly cleaned.
- L. Remove and promptly dispose of contaminated, vermin infested, or dangerous materials encountered.
- M. Do not burn or bury materials on site.
- N. Remove demolished materials from site as work progresses. Upon completion of work, leave areas of work in clean condition.

### 3.3 PATCHING

- A. Unless otherwise indicated, patch and finish surfaces as necessary to match existing, and in accord with the requirements of the various Specification Sections.

END OF SECTION



SECTION 02200

**EARTHWORK**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Site rough grading.
- B. Imported clean fill dirt.
- C. Utility trenches, backfill and compaction.
- D. Subgrade preparation for parking lots, driveways.
- E. Subgrade preparation for new concrete flatwork.
- F. Subgrade preparation for new building pads.
- G. Subgrade preparation for placement of relocatable classrooms.
- F. Finish grading.

1.2 REFERENCES

- A. C.B.C. - California Building Code (2019)
- B. CCR - California Code of Regulations, Title 24, Chapter 18.
- C. Stanislaus County Code.
- D. City of Turlock Dust Control Ordinance.
- E. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- F. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- G. ANSI/ASTM D2937 - Test method for density of soil in place by the drive - cylinder method.
- H. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18-inch Drop.

1.3 SUBMITTALS

- A. Submit samples under provisions of Section 01300.
- B. Submit 10 lb. sample of each type of fill to testing laboratory in air-tight containers.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01700.
- B. Accurately record location of utilities remaining, rerouted utilities, new utilities by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

- A. Comply with the California Building Code.
- B. Comply with CCR, Chapter 18.

- C. Comply with Stanislaus County Code.
- D. Comply with City of Turlock Dust Control Ordinance.
- E. Comply with the San Joaquin Air Quality Management District.
- F. Comply with the requirements of the geotechnical report for this site as found in Appendix A of the project manual.

#### 1.6 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the work areas are as indicated.

#### 1.7 PROTECTION

- A. Protect trees, shrubs, lawns, and other features remaining as portion of final landscaping.
- B. Protect bench marks, existing structures, fences, roads, sidewalks and paving and curbs.
- C. Protect above or below grade utilities, which are to remain.
- D. Repair or replace all damage to existing utilities and improvements.

## 2 PART 2 PRODUCTS

### 2.1 FILL MATERIALS

- A. Stockpiled Subsoil: Excavated materials, graded free of lumps and rocks larger than 4 inches.
- B. Imported Subsoil (Engineered Fill): Non-expansive, non-organic predominantly granular soils such as a silty sand, free of lumps and rocks less than 3-inches in maximum dimension, and debris. Plasticity index less than 12, an R value of 30 and not more than 40 percent passing the No. 200 sieve. Materials shall contain sufficient fines (binder) to result in a stable subgrade. See geotechnical report for additional requirements. All imported materials shall be subject to the approval of the Architect and geotechnical engineer. All imported soil shall be tested by the district testing laboratory to confirm it is free of any hazardous materials or chemicals in accordance with all laws and regulations.
- C. Stockpiled Topsoil: Excavated material, graded free of roots, rocks larger than one inch, subsoil, debris and large weeds.
- D. Imported Topsoil: Friable loam, free of subsoil, roots, grass, excessive amounts of weeds, stones and foreign matter; acidity range (ph) of 5.5 to 7.5; containing an amount of organic matter normal to the region.
- E. Sand: Natural river or bank sand: Free of silt, clay, loam, friable or soluble materials or organic matter all passing the No. 4 sieve and only 5% passing the No. 200 sieve.
- F. Pea Gravel: Natural Stone; washed, free of clay, slate, organic matter, graded in accordance with ANSI/ASTM C136, 1/4 inch to 5/8 inch.
- G. Concrete: Structural concrete conforming to Section 03300 with a compressive strength of 2,000 psi for fill to correct over-excavation.

- H. Materials (existing and import) are subject to the approval of the Soils Engineer for use in the project.

### 3 PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Verify site conditions and note irregularities affecting work of this Section.
- B. Beginning work of this Section constitutes acceptance of existing conditions.

#### 3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Identify known below grade utilities. Stake and flag locations.
- C. Identify and flag above grade utilities.
- D. Maintain and protect existing utilities remaining which pass through work area.
- E. Notify utility company and pay all costs to remove and relocate utilities.
- F. Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Architect.

#### 3.3 EXCAVATION

- A. STRIPPING AND SCARIFICATION: The site preparation and grading operations for the proposed areas to receive buildings, pavements, and other permanent structural improvements should commence with the removal of vegetation and the stripping of organic soil. Removal of vegetation should extend a minimum of 5 feet beyond the limits of the proposed improvements. Surface vegetation and roots are present in the upper 6 to 12 inches due to prior agriculture activities. Any organic laden material which is free from debris may be stockpiled for later use in non-structural areas where approved by the owner, but such material should not be used for engineered fill. Mixing the upper 6 to 12 inches of soil with the lower 12 to 36 inches, after stripping of grasses and vegetation, should yield soils that have sufficiently low organic content.
- B. OVEREXCAVATION FOR BUILDING PADS: Following site stripping and any required grubbing and/or over excavation, all areas to receive engineered fill to support new site-built structures are to be over-excavated a minimum of 5'-0" beyond the perimeter of each new building wall, except where the pad occurs adjacent to an existing building wall/footing. The exposed areas are to be over-excavated to a depth of at least two (2) feet below the current grade. The exposed over-excavated surface area should then be scarified to a depth of approximately 12 inches and recompacted to 90 percent relative compaction per ASTM D1557 at moisture content of at least optimum moisture content. Engineered fill is to be placed in approximately 8-inch loose lifts, moisture conditioned to at least optimum moisture content and recompacted to a minimum of 90 percent per ASTM F1557.
  - 1. Where over-excavation work occurs adjacent to an existing building footing contractor is to perform work in sections to not impact the existing building footing and wall. Coordinate work with geotechnical engineer.

- C. OVEREXCAVATION FOR PARKING AND CONCRETE FLATWORK AND ASPHALTIC PAVEMENT AREAS: Following site stripping and any required grubbing and/or over excavation, all areas to receive engineered fill to support new concrete flatwork and asphaltic pavement are to be over-excavated to a depth of at least twelve (12) inches below the current grade. The exposed over-excavated surface area should then be scarified to a depth of approximately 12 inches and recompacted to 95 percent relative compaction per ASTM D1557 at moisture content of at least optimum moisture content. Engineered fill is to be placed in approximately 8-inch loose lifts, moisture conditioned to at least optimum moisture content and recompacted to a minimum of 95 percent per ASTM F1557.
- D. SUBGRADE: Prior to the placement of imported fill soil, aggregate base, asphalt concrete paving or Portland cement concrete, the exposed subgrade shall be scarified to a depth of 12 inches and compacted to 95 percent of the maximum dry density as determined by the ASTM D-1557 test method.
- E. IMPORTED SOILS: Imported soils shall be placed in maximum 8-inch lifts and compacted to 90 percent of the maximum dry density as determined by the ASTM D-1557 test method.
- F. Underpin adjacent structures which may be damaged by excavation work, including utilities and pipe chases.
- G. Excavate subsoil required to accommodate storm sewer, sanitary sewer, water, gas piping and electrical conduits to municipal utilities.
- H. Excavate subsoil required to accommodate building foundation, slabs-on-grade, paving, landscaping, site structures and construction operations.
- I. Machine slope banks to angle of repose or less, until shored.
- J. Excavation cut not to interfere with normal 45 degree bearing splay of foundation.
- K. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- L. Hand trim excavation. Remove loose matter.
- M. Remove lumped subsoil, boulders and rock up to 1/3 cu yd measured by volume.
- N. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- O. Correct unauthorized excavation at no extra cost to Owner.
- P. Stockpile excavated material in designated on-site area and remove excess material not being reused, from the site to the Districts property at the southwest corner of Mountain View and Christofferson Parkway in Turlock, CA. Coordinate delivery and drop areas with the districts project manager.

#### 3.4 BEDDING

- A. Support pipe and conduit during placement and compaction of bedding fill.

#### 3.5 BACKFILLING

- A. Backfill to contours and elevations as shown on the drawings.

- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Soil Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.
- D. Employ a placement method that does not disturb or damage foundation perimeter drainage utilities in trenches.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Backfill against supported foundation walls.
- G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- H. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.
- I. Make changes gradual. Blend slope into level areas.
- J. Remove surplus backfill materials from site.
- K. Trench backfill shall be native on-site material free of organics and rocks. The compaction requirement shall be 85 percent around the pipe to 6 inches over the pipe, 90 percent to finish grade in concrete walk areas, 90 percent to 6 inches below subgrade in paved areas and 90 percent to pavement subgrade. All compaction shall be in accordance with the manufacturer's recommendations.

### 3.6 SUBSOIL PREPARATION

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, all in excess of one inch in size. Remove subsoil contaminated with petroleum products.
- B. Scarify subgrade to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

### 3.7 PLACING TOPSOIL

- A. Place topsoil in areas where sodding is scheduled.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
- D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
- E. Manually spread topsoil around trees, plants, building and site structures to prevent damage.
- F. Lightly compact placed topsoil
- G. Remove surplus subsoil and topsoil from site.
- H. Leave stockpile area and site clean and raked, ready to receive landscaping.

### 3.8 SCHEDULE OF LOCATIONS

- A. The following paragraphs identify compacted topsoil thicknesses for various locations.
- B. Seeded Grass: 6 inches.
- C. Sod: 4 inches.
- D. Shrub Beds: 18 inches.
- E. Flower Beds: 12 inches.
- F. Planter Boxes: To within 3 inches of box rim.

### 3.9 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.
- B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D1557 and with Section 01410.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1557 and with Section 01410.
- D. If tests indicate Work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

### 3.10 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01500.
- B. Re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 02218

**LANDSCAPE GRADING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish grade subsoil and proof roll all planting and turf areas.
- B. Place, level, and compact topsoil.
- C. Finish grade all landscape areas to drain towards catch basins, drain inlets or low points. Planter areas shall be finish grades level.

1.2 SAMPLES

- A. Submit samples under provisions of Section 01300.
- B. Submit 10 lb. sample of imported fill to testing laboratory, in air-tight containers.
- C. Disregard sample submission if recent test results are available for type of fill.

1.3 PROTECTION

- A. Protect landscaping and other features remaining as final work.
- B. Protect existing structures, fences, roads, sidewalks, paving, and curbs.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Topsoil: Reused.
- B. Topsoil: Imported, friable loam; free of subsoil, roots, grass, excessive amount of weeds, stone, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing an amount of organic matter normal to the region.

3 PART 3 EXECUTION

3.1 INSPECTION

- A. Verify site conditions and note irregularities affecting work of this Section.
- B. Beginning of work of this Section means acceptance of existing conditions.

3.2 SUBSOIL PREPARATION

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, all in excess of one inch in size. Remove subsoil contaminated with petroleum products.
- B. Scarify subgrade to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

### 3.3 PLACING TOPSOIL

- A. Place topsoil in areas where seeding, sodding, planting is scheduled.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
- D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
- E. Manually spread topsoil around trees, plants, building and site structures to prevent damage.
- F. Lightly compact placed topsoil.
- G. Remove surplus subsoil and topsoil from site.
- H. Leave stockpile area and site clean and raked, ready to receive landscaping.

### 3.4 TOLERANCES

- A. Top of Topsoil: Plus or minus 1/2 inch.

### 3.5 SCHEDULE OF LOCATIONS

- A. The following paragraphs identify compacted topsoil thicknesses for various locations.
- B. Seeded Grass: 6 inches.
- C. Sod: 4 inches.
- D. Shrub Beds: 18 inches.
- E. Flower Beds: 12 inches.
- F. Planter Boxes: To within 3 inches of box rim.

END OF SECTION



SECTION 02222

**EXCAVATION**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavation for footings, slabs-on-grade, paving, and landscaping.
- B. Excavation for site structures.

1.2 REFERENCES

- A. California Building Code: Chapter 18.

1.3 QUALITY ASSURANCE

- A. Comply with Chapter 29 of the California Building Code.

1.4 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the Work are as indicated.

2 PART 2 PRODUCTS

Not Used.

3 PART 3 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum.

3.2 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work, including utilities and pipe chases.
- B. Excavate subsoil required to accommodate slabs-on-grade, paving and site structures and construction operations.
- C. Machine slope banks to angle of repose or less, until shored.
- D. Excavation cut not to interfere with normal 45 degree bearing splay of foundation.
- E. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- F. Hand trim excavation. Remove loose matter.
- G. Remove lumped subsoil, boulders, and rock up to 1/3 cu. yd. measured by volume.
- H. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- I. Correct unauthorized excavation at no extra cost to Owner.
- J. Stockpile excavated material in area designated on site and remove excess material not being reused, from site.

3.3 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01410.
- B. Provide for visual inspection of bearing surfaces.

3.4 PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation, from freezing.

END OF SECTION

SECTION 02223

**BACKFILLING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Backfilling to subgrade elevations.
- B. Site filling and backfilling.
- C. Consolidation and compaction.
- D. Fill for over-excavation.

1.2 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18-inch Drop.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Samples: Submit 10 lb. sample of each type of fill to testing laboratory in air-tight containers.

2 PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Stockpiled Subsoil: Excavated material, graded free of lumps and rocks larger than 3 inches.
- B. Imported Subsoil: Non-expansive predominantly granular soils, such as a silty sand, free of lumps and rocks larger than 6 inches, and debris. Expansion index less than 35, and no more than 50% of the material shall pass a No. 200 sieve. Material shall contain sufficient fines (binder) to result in a stable subgrade. All imported materials shall be subject to the approval of the Architect and geotechnical engineer. All imported soil must be tested to confirm it is free of any hazardous materials or chemicals.
- C. Sand: Natural River or Bank Sand: Free of silt, clay, loam, friable or soluble materials or organic matter all passing the No. 4 sieve and only 5% passing the No. 200 sieve.
- D. Pea Gravel: Natural Stone; washed, free of clay, slate, organic matter, graded in accordance with ANSI/ASTM C136, 1/4 inch to 5/8 inch.
- E. Concrete: Structural concrete conforming to Section 02514 with a compressive strength of 3,000 psi for fill to correct over-excavation.

- F. Materials (existing and import) are subject to the approval of the Soils Engineer for use in the project.

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify fill materials to be reused are acceptable.
- B. Verify areas to be backfilled are free of debris or water.

#### 3.2 PREPARATION

- A. Generally, compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of insitu compaction. Backfill with subsoil fill and compact to density equal to or greater than requirements for subsequent backfill material.
- C. Prior to placement of aggregate base course material at paved areas, compact subsoil to 95 percent of its maximum dry density in accordance with ANSI/ASTM D1557.

#### 3.3 BACKFILLING

- A. Backfill areas to contours and elevations.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Soil Fill: Place and compact material in continuous layers not exceeding 6 inches compacted depth.
- D. Employ a placement method that does not disturb or damage foundation perimeter drainage utilities in trenches.
- E. Maintain optimum moisture content of backfill materials to attain required compaction density.
- F. Backfill against supported foundation walls.
- G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- H. Slope grade away from building minimum 2 inches in 10 ft., unless noted otherwise.
- I. Make changes gradual. Blend slope into level areas.
- J. Remove surplus backfill materials from site.

#### 3.4 TOLERANCES

- A. Top Surface of Backfilling: Plus or minus one inch from required elevations.

### 3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.
- B. Tests and analysis of fill material will be performed in accordance ANSI/ASTM D1557 and with Section 01410.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1557 and with Section 01410.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

### 3.6 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01500.
- B. Re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 02225

**TRENCHING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavate trenches for utilities.
- B. Compacted bedding under fill over utilities.
- C. Backfilling and compaction.

1.2 REFERENCES

- A. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Samples: Submit 10 lb. sample of each type of fill to testing laboratory in air-tight containers.

1.4 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the work are as indicated.

2 PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Types specified in Section 02223.

2.2 BED MATERIALS

- A. Subsoil: As specified in Section 02223.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify fill materials to be reused are acceptable.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Cut out soft areas of subgrade not capable of specified compaction. Backfill with subsoil and compact to density equal to or greater than the requirements for subsequent backfill material.

### 3.3 EXCAVATION

- A. Excavate subsoil required for storm sewer, and electrical conduits.
- B. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.
- C. Excavation shall not interfere with normal 45 degree bearing splay of foundations.
- D. Hand trim excavation. Remove loose matter.
- E. Remove lumped subsoil, boulders, and rock.
- F. Correct unauthorized excavation at no cost to Owner.
- G. Correct areas over-excavated by error in accordance with Section 02222.
- H. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

### 3.4 BEDDING

- A. Support pipe and conduit during placement and compaction of bedding fill.

### 3.5 BACKFILLING

- A. Backfill trenches to contours and elevations.
- B. Systematically backfill to allow the maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Soil Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth.
- D. Maintain optimum moisture content of backfill materials to attain required compaction density.
- E. Remove surplus backfill materials from site.

### 3.6 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus one inch from required elevations.

### 3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.
- B. Tests and analysis of fill material will be performed in accordance with ANSI/ASTM D1557 and with Section 01410.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1557 and with Section 01410.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

3.8 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01500.
- B. Re-compact fills subjected to vehicular traffic.

END OF SECTION



## SECTION 02446

### HORIZONTAL DIRECTIONAL DRILLING

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. The work specified in this section consists of furnishing and installing underground utilities using the directional boring (horizontal directional drilling, HDD) method of installation, also commonly referred to as guided horizontal boring. The work shall include all services, equipment, materials, and labor for a complete and proper installation, testing, restoration of underground utilities and environmental protection and restoration.
2. The contractor shall provide all investigation, planning, equipment, labor, etc. necessary to properly install the directional bores as indicated on the drawings.
3. Pipe material shall match those indicated on the drawings.
4. See Specification Sections 220000 and 260000 for additional requirements.

###### B. Related Sections:

1. Section 02020- Off-Site Development
2. Section 02315 - Excavation and Fill.
3. Section 02320 - Backfill.
4. Section 02324 - Trenching.
5. Section 02660 - Water Distribution.
6. Section 02630 - Storm Drainage.
7. Section 03300 - Cast-in-Place Concrete.
8. Section 220000 - Plumbing
9. Section 260000 - Electrical

##### 1.2 REFERENCES

- A. AASHTO M133 - American Association State Highway and Transportation Officials) - Creosote.
- B. AASHTO T180 - (American Association State Highway and Transportation Officials) - Moisture-Density Relations of Soils Using 10 lb (4.54 kg) Rammer and 18-inch (457 mm) Drop.
- C. ASTM D1557 - Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>(2,700 kN-m/m<sup>3</sup>)).
- D. ASTM D2922 - Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- E. ASTM D3017 - Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

- F. AWWA C1 (American Wood Preservers Association) - All Timber Products Preservative Treatment by Pressure Process.
- G. AWWA C3 (American Wood Preservers Association) - Piles - Preservative Treatment by Pressure Process.
- H. NUCA (National Utility Contractors Association) - Trenchless Construction Methods and Soil Conditions Manual.
- I. NUCA (National Utility Contractors Association) - A guide to Pipe Jacking and Micro-tunneling Design.

### 1.3 DESIGN REQUIREMENTS

- A. Street Crossings: Design for earth and or other pressure loads present plus AASHTO H20 live loading.
- B. Design bracing, backstops, and use jacks of sufficient rating for continuous jacking without stoppage, except for adding pipe sections and as conditions permit, to minimize tendency of ground material to "freeze" around casing pipe.

### 1.4 QUALITY ASSURANCE

- A. The requirements set forth in this section specify a wide range of procedural precautions necessary to ensure that the very basic, essential aspects of a proper directional bore installation are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this specification. Adherence to the specifications contained herein, or the engineer's approval of any aspect of any directional bore operation covered by this specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the work authorized under the Contract.
- B. When boring, jacking or tunneling under Municipality streets, make application for and obtain encroachment permit.

### 1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Prepare scaled shop Drawings to supplement Contract Drawings, signed and sealed by Professional Engineer.
  - 1. Include details of casing, jacking head, sheeting, and other falsework for trenches and pits, and support for facility, field sketches, and other details, to complete the Work.
  - 2. Show relation of proposed installation to facility, existing known utility lines, and streets over installation, angle of installation, right-of-way lines and general layout of built facilities.
  - 3. Show cross section or sections from field survey, showing installation in relation to actual profile of ground and adjacent site improvements and existing structures.

- C. Design Data: Submit tunnel liner design calculations and manufacturer's data on tunnel liner plate showing sizes, shapes, methods of attachment and connection details, and details of grout holes, signed and sealed by Professional Engineer.
- D. Submit history of previous work completed of equivalent nature and scope. Include qualification and experience of key personnel.
- E. Installation Plan: Submit description of proposed construction plan, dewatering plan, and plan to establish and maintain vertical and horizontal alignment.
- F. Submit Public Work's occupancy permit for installations under public thoroughways and lands. Cost to be paid for by contractor to the public agency having jurisdiction.
- G. Submit emergency response procedures to handle situations when conduit is compromised and jeopardizes integrity of installation or safety.
- H. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of casing or tunnel liner, carrier pipe, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

#### 1.7 QUALIFICATIONS

- A. Installer: Company specializing in performing work of this section with minimum 5 years documented experience.
  - 1. Work Experience: Include projects of similar magnitude and conditions.
  - 2. Furnish list of references upon request.
- B. Design pipe jacking installation and load bearing falsework under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of California.

#### 1.8 PRE-INSTALLATION CONFERENCE

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

- C. Protect piping system pieces from entry of foreign materials and water by temporary covers, completing sections of work, and isolating parts of completed system.
- D. Accept system components on site in manufacturer's original containers or configuration. Inspect for damage.
- E. Use wooden shipping braces between layers of stacked pipe. Stack piping lengths no more than 3 layers high.
- F. Store field joint materials indoors in dry area in original shipping containers. Maintain storage temperature of 60 to 85 degrees F (18 to 29 degrees C).
- G. Support casing and carrier pipes with nylon slings during handling.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Conduct operations so as not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

#### 1.11 FIELD MEASUREMENTS

- A. Verify invert elevations of existing work prior to excavation and installation of casing.

#### 1.12 COORDINATION

- A. Section 01300 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with Public Works Department, school district and utilities within construction area.

### PART 2 PRODUCTS

#### 2.1 POLYVINYL CHLORIDE PIPE (PVC) FOR HORIZONTAL DIRECTIONAL DRILLING – ELECTRICAL CONDUIT PATHWAYS

- A. Manufacturers:
  1. Products delivered under this specification shall be manufactured only from water distribution pipe and couplings conforming to AWWA C900 or AWWA C905, as appropriate for the size of the conduit indicated on the plans.
  2. Pipe and couplings shall be made from un-plasticized PVC compounds having a minimum cell classification of 12454-B, as defined in ASTM D1784. Pipe, couplings, and locking splines shall be completely non-metallic. The compound shall qualify for a Hydrostatic Design Basis (HDB) of 4000 psi for water at 73.4 ° F, in accordance with ASTM D2837.
  3. Pipe shall be jointed using non-metallic couplings to form an integral system for maximum reliability and interchangeability. High-strength, flexible thermoplastic

splines shall be inserted into mating, precision-machined grooves in the pipe and coupling to provide full 360° restraint with evenly distributed loading.

4. Couplings shall be designed for use at or above the rated pressures of the pipe with which they are utilized and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F477. Joints shall be designed to meet the leakage test requirements of ASTM D3139.
5. Approved manufacturer includes C900/RJ<sup>™</sup> PVC restrained-joint pipe from CertainTeed Corporation or an equivalent manufacturer.

B. Products delivered under this specification shall be manufactured only from one source.

## 2.2 GROUT AND COVER MATERIALS

- A. Soil Backfill for Trench Approaches and Pits to Finish Grade: as specified in Section 02320. Subsoil with no rocks over 1.5 inches (150 mm) in diameter, frozen earth or foreign matter.
- B. Fill and Seal Grout at Pipe Ends: Concrete grout fill as specified in Section 03300.
- C. Pressure Grout Mix: One-part Portland cement, and 6 parts mortar sand mixed with water to consistency applicable for pressure grouting.
- D. Mortar Sand: ASTM C33.
- E. Portland Cement: ASTM C150, Type V

## 2.3 ACCESSORIES

- A. Supports and Insulators:
  1. Timber:
    - a. Construction: Cross-sectional size to allow placement of carrier pipe in casing and to support barrel of carrier pipe. Provide notches to accommodate fastening. Treat notches at time of pipe installation.
    - b. Wood Preservative or Pressure Treatment: AASHTO M133, Creosote AWWA C1, AWWA C3, or Chromated Copper Arsenate.
  2. Steel and Plastic: 14 gage (2.9 mm) stainless steel band, 5/16 inch (8 mm) stainless steel flange bolts, heavy duty PVC liner, polyethylene or phenolic skids.
  3. Plastic: Polyethylene casing insulator band and skids with stainless steel bolts.
- B. Steel Strapping: ASTM A36.
- C. Tunnel Liner Zinc Coating: AREA Specification for Corrugated Structural Plate Pipe, Pipe Arches and Arches.
- D. Tunnel Liner Bituminous Coating: AREA Specification for Bituminous Coated Corrugated Metal Pipe and Arches.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify connection to conduit pathway system, size, location, and invert elevations are in accordance with Drawings.

### 3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities indicated to remain from damage.
- C. Notify District representative at least four working days prior to starting.
- D. Protect plant life, lawns and other features remaining as portion of final landscaping.
- E. Protect benchmarks, survey control points, existing structures, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Establish elevations of casing with not less than **ten (10) ft** of cover.
- G. Establish minimum separation of two feet from other services, sanitary sewer piping, water, gas and other piping in accordance with code requirements.

### 3.3 DEWATERING

- A. Intercept and divert surface drainage precipitation and groundwater away from excavation through use of dikes, curb walls, ditches, pipes, sumps or other means.
- B. Develop substantially dry subgrade for prosecution of subsequent operations.
- C. Comply with Municipality for requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

### 3.4 EXISTING WORK

- A. Maintain access to existing facility and other remaining active installations requiring access. Modify installation as necessary to maintain access.

### 3.5 PITS OR APPROACH TRENCHES

- A. Excavate approach trenches or pits in accordance with installation plan and as site conditions require.
- B. Ensure casing entrance face as near perpendicular to alignment as conditions permit.
- C. Establish vertical entrance face at least **1 foot (300 mm)** above top of casing.

- D. Install dewatering measures and excavation supports as specified in Sections 02315 and 02324.

### 3.6 CASING PIPE INSTALLATION

- A. Boring:
  - 1. Push pipe into ground with boring auger rotating within pipe to remove spoil. Do not advance cutting head ahead of casing pipe except for distance necessary to permit cutting teeth to cut clearance for pipe. Arrange machine bore and cutting head to be removable from within pipe. Arrange face of cutting head to provide barrier to free flow of soft material.
  - 2. When unstable soil is encountered during boring retract cutting head into casing to permit balance between pushing pressure and ratio of pipe advancement to quantity of soil.
  - 3. When voids develop greater than outside diameter of pipe by approximately **one inch (25 mm)**, grout to fill voids.
  - 4. When boring is obstructed, relocate, jack, or tunnel as directed by Architect/Engineer.
- B. Jacking
  - 1. Construct adequate thrust wall normal to proposed line of thrust.
  - 2. Impart thrust load to pipe through suitable thrust ring sufficiently rigid to ensure uniform distribution of thrust load on full pipe circumference.
- C. Drilling and Jacking
  - 1. Use oil field type rock roller bit or plate bit made up of individual roller cutter units solidly welded to pipe which is turned and pushed for its entire length by drilling machine to give bit necessary cutting action.
  - 2. Inject high density slurry (oil field drilling mud) to head as cutter lubricant. Inject slurry at rear of cutter units to prevent jetting action ahead of pipe.
- D. Mining and Jacking: Utilize manual hand mining excavation from within casing pipe as casing is advanced with jacks, allowing minimum ground standup time ahead of casing pipe.

### 3.7 PRESSURE GROUTING

- A. Pressure grout annular space between casing pipe and surrounding earth.

### 3.8 CARRIER PIPE INSTALLATION

- A. Clean, inspect, and handle pipe in accordance with Section 16000.
- B. Place conduit in accordance with Section 16000. Exercise care to prevent damage to joints when conduit is placed.
- C. Support conduit within casing so no external loads are transmitted to carrier pipe. Attach supports to barrel of carrier pipe; do not rest carrier pipe on bells.
- D. Grout ends of casing to seal.

### 3.9 TOLERANCES

- A. Do not over cut excavation by more than **1 inch (25 mm)** greater than outside diameter of casing pipe.
- B. Install casing pipe to vertical and horizontal alignment on Drawings within plus or minus **3 inches (75 mm)** prior to installation of carrier pipe.
- C. Install pipe bells with minimum **1/2-inch (13 mm)** clearance to casing.

### 3.10 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction Testing: As specified in Section 02320.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

### 3.11 MANUFACTURER'S FIELD SERVICES

- A. Section 01400 - Quality Requirements: Requirements for manufacturer's field services.
- B. Furnish field technical assistance during following periods of installation:
  - 1. Unloading of materials and components.
  - 2. Prior to commencing excavation and during excavation as requested.

### 3.12 REMOVAL OF FACILITIES AND CONTROLS

- A. Remove temporary facilities for conduit installation and boring operations in accordance with Section 01500.
- B. Remove all spoils from the site.
- C. Leave areas clean and level with the adjacent surfaces.

END OF SECTION



SECTION 02513

**ASPHALT CONCRETE PAVING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Weed killer.
- B. Prepared base.
- C. Asphaltic concrete paving.
- D. Sealers
- E. Pavement striping.
- F. Concrete wheel stops.

1.2 REFERENCES

- A. California Building Code, Latest Edition.
- B. Standard Specification, State of California, Department of Transportation (Cal Trans). SS-CDOT, Latest Edition.
- C. The Asphalt Institute - ES-13 - Asphalt Surface Treatments - specifications.
- D. ASTM D946 - Asphalt Cement for Use in Pavement Construction.
- E. Redwood Inspection Service - Standard Specifications for Grades of California Redwood Lumber.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with Standard Specifications for Public Works Construction.
- B. Mixing Plant: Conform to State of California standards.
- C. Obtain materials from same source throughout.
- D. Allowable Tolerances: Install surfacing within 0.05 feet of indicated grade and locations.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable City or County standards for paving work on public property.

1.5 TESTS

- A. Testing and analysis of asphaltic mix will be performed under provisions of Section 01410.
- B. Submit proposed mix design for review prior to commencement of work.

1.6 SUBMITTALS

- A. Submit product data for asphalt under provisions of Section 01300.
- B. Submit manufacturer's instructions for weed killer under provisions of Section 01300.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not place asphalt when base surface temperature is less than 40 degrees F.
- B. Dust Control: Perform work in a manner as to minimize the spread of dust and flying particles. Thoroughly moisten all surfaces to as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of other on-site work.
- C. Burning: No burning will be allowed on -site.
- D. Rain: Work under this section shall not be started or maintained under threat of rain unless work is not affected by the rain.
- E. Temperature: Actual selection of Asphaltic Concrete by the applicator depends on the time of the year for the application and whether or not High or Low temperature Asphaltic Concrete is used. Verify anticipated temperature ranges and verify with the Architect prior to selection.

## 1.8 EXISTING CONDITIONS

- A. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
- B. Conduct work so as not to interfere unnecessarily with adjacent roads, streets, drives and walks.
- C. Conduct work so as not to interfere unnecessarily with the normal operations of the school site.

## 2 PART 2 PRODUCTS

### 2.1 AGGREGATES

- A. Provide aggregates consisting of crushed stone, gravel, sand, or other sound, durable mineral materials processed and blended, and naturally combined.
- B. Sub-Base Aggregate Maximum Size: 1-1/2 inches.
- C. Granular Base Aggregate Maximum Size:
  - 1. Base courses over 6" thick: 1-1/2", Class 2
  - 2. Other base courses: 3/4", Class 2
  - 3. In accordance with Section 26, "Aggregate Bases", SS-CDOT.
- D. Aggregates For Asphaltic Concrete Paving: In accordance with Section 26, "Aggregate Bases", SS-CDOT.

### 2.2 WEED KILLER

- A. To be applied in accordance with the manufacturer's recommendations, soluble in water, and capable of being spread dry or in solution.
- B. Commercial chemical for weed control, registered by Environmental Protection Agency (EPA). Provide granular, liquid, or wettable powder form.

C. Acceptable Products:

1. "Treflan E.C., Monterey AgResources, Fresno, CA (559) 499-2100
2. "Alligare SFM 75", (334) 741-9393.
3. Substitution: See specification section 01300.

2.3 HEADERS AND STAKES

- A. Headers: "Standard Specifications for Grades of California Redwood Lumber", construction heart grade, per paragraph 114.
- B. Stakes: Redwood of grade specified for headers.
- C. Nails: Common, galvanized, 12d minimum.

2.4 ASPHALTS

- A. Comply with provisions of Section 39, "Asphalt Concrete" SS-CDOT:
  1. Paving Asphalt: AR 4000 in cold weather, 75 degrees and below
  2. Paving Asphalt: AR 8000 in hot weather, 76 degrees and above.
  3. Prime Coat : Liquid Asphalt, SC250
  4. Tack Coat : Emulsified asphalt, SS-1h.
  5. Provide one-half (1/2") aggregate, Type B.
- B. Compaction equipment in accordance with Section 39, 'Asphalt Concrete', SS-CDOT. At small difficult areas, equipment may be approved by the Architect and the Geotechnical Engineer.
- C. Asphaltic Emulsions in accordance with Section 94, "Asphaltic Emulsions", SS-CDOT.

2.5 ASPHALTIC PAVING MIX

- A. Provide hot plant mixed asphaltic concrete paving materials in accordance with Section 37, "Asphalt Concrete", SS-CDOT.
  1. Base Course Mix :Type II, B, AR 8000/AR 4000
  2. Parking and Drive Area Mix :Type II, B, AR 8000/AR 4000
  3. Hardscape Play Area Mix :Type II, B, AR 8000/AR 4000

2.6 SEALERS

- A. In accordance with Section 37, "Bituminous Seals", SS-CDOT.
- B. Sealer for on-site parking lots and driveways:
  1. "Sureseal" by Asphalt Coatings Engineering.
- C. Sealer for play courts, tennis courts and basketball courts, walkways, playgrounds:
  1. "Ace Seal" by Asphalt Coatings Engineering.
- D. Substitutions; Accordance with Specification Section 01300.

2.8 CONCRETE WHEEL STOPS

- A. Prefabricated 5-1/2" high x 7-1/2" wide x 48" long, 3,500 psi concrete wheel stop.

## 2.9 PAVEMENT STRIPING PAINT

- A. Provide chlorinated rubber-alkyd type, white color, except at accessible parking spaces, blue color.
- B. In accordance with Section 84, "Traffic Stripes and Pavement Markings", SS-CDOT, and California Air Resources Board requirements where the project is located.

## 3 PART 3 EXECUTION

### 3.1 INSPECTION

- A. Verify compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Beginning of installation means acceptance of substrate.

### 3.2 PREPARATION

- A. Apply weed killer to entire area to be paved. Follow manufacturer's application directions.

### 3.3 PLACEMENT OF BASE COURSE.

- A. Base:
  - 4. Spread the granular base material to a thickness providing the compacted thickness shown on the Drawings.
  - 5. Compact per soil per requirements shown on the Drawings.
- B. Thickness Tolerance: Minus 0.0 inch to plus 0.5 inch.
- C. Smoothness Tolerance: 3/8" in ten feet.
  - 1. Deviations: Correct by removing materials, replacing with new materials, and reworking or re-compacting as required.
- D. Moisture content: Only the amount needed to achieve the specified compaction.

### 3.4 PLACEMENT OF ASPHALTIC CONCRETE PAVING

- A. Install headers and stakes to achieve arrangement of paving shown on the Drawings.
- B. Verify the concrete flatwork edging is complete and ready for paving work to commence.
- C. Remove all loose materials from compacted base.
- D. Apply prime coat, and tack coat where required, and allow to dry.
- E. Adjust frames and covers, if so required, to meet final grades.
- F. Spreading Asphaltic Concrete Materials:
  - 1. Spread material in a manner which requires the least handling.
  - 2. Where thickness of finished paving will be 3 inches or less, spread in one layer unless otherwise indicated.

G. Rolling:

1. After material has been spread to proper depth, roll until the surface is hard, smooth, unyielding, and true to the thickness and elevations shown.
2. Roll in at least two directions until no roller marks are visible.
3. Finished paving smoothness tolerance:
  - a. Free from birdbaths.
  - b. No deviations greater than 1/8 inch in six feet.

3.5 SEALERS

- A. Allow asphaltic concrete to cure for twenty-one days (21) minimum.
- B. Broom clean asphaltic concrete.
- C. Apply two coats of sealer for the type of application indicated in article 2.6.
- D. The total application rate shall be a minimum of 35 to 45 gallons of undiluted product per 1,000 square feet, as directed by the Architect.
- E. If the manufacturer indicates that the product may be diluted, it may be diluted with no more than 20 percent by volume clean fresh water with the prior approval of the Architect.
- F. The finish surface shall be smooth and uniform in appearance.
- G. If existing depressions are such that the aggregate still protrudes after the second coat of asphalt based sealer has been applied, the Contractor shall apply a third coat when so directed by the Architect and the Civil Engineer.
- H. Seal Coat (for new or existing pavement) - a minimum of 20 gallons of undiluted product per 1,000 square feet, per coat as directed by the Architect and the Civil Engineer.
- I. Apply sufficient coats of sealer to cover and hide any existing striping or signage on existing asphalt, such as but limited to existing accessible parking stalls. Where necessary grind off the old paint prior to applying the seal coat.

3.6 PAVEMENT STRIPING and MARKINGS

- A. Once the sealer coats have sufficiently cured (time for curing as recommended by the manufacturer) so that bleeding of the paint striping and markings does not occur, provide and install a lane and parking stall division striping, accessible parking, directional symbols and playground markings as required by codes and as shown.
- B. Layout line markings and other painting in accordance with Drawings. Lines shall be 4 inches wide unless noted otherwise.
- C. Clean surfaces to be painted. Apply paint in accordance with manufacturer's directions only when weather conditions permit proper application. Machine apply the paint in as many coats as are required to provide opaque markings.

3.7 CONCRETE WHEEL STOPS

- A. Place wheel stops at all parking stalls as indicated.
- B. Anchor permanently in place with two #4 steel rods 12 inches long.

3.8 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.

3.9 PROTECTION

- A. Immediately after placement, protect pavement under provisions of Section 01500 from mechanical injury for 2 days.

END OF SECTION

SECTION 02514

**PORTLAND CEMENT CONCRETE PAVING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete walks, curbs, gutters, trench drains, mow strips, parking areas.

1.2 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

- A. Section 02720 - Storm Drainage Systems: Drainage grilles and frames.
- B. Section 033000 - Building foundations and slab on grade, Site retaining, curb walls and footings.

1.3 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete for Buildings.
- B. ACI 304 - Recommended Practice for Measuring, Mixing and Placing Concrete.
- C. ACI 318 - Building Code Requirements for Reinforced Concrete.
- D. ACI 305 - Recommended Practice for Hot Weather Concreting.
- E. ACI 306.1 - Standard Specification for Cold Weather Concreting.
- F. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- G. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- H. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
- I. ASTM C33 - Concrete Aggregates.
- J. ASTM C94 - Ready Mixed Concrete.
- K. ASTM C150 - Portland Cement.
- L. ASTM C260 - Air Entraining Admixtures for Concrete.
- M. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Obtain materials from same source throughout.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for paving work on public property.

1.6 TESTS

- A. Testing and analysis will be performed under provisions of Section 01410.

- B. Submit proposed mix design to testing laboratory for review prior to commencement of work.
- C. Owner's Inspector or Testing firm will take cylinders and perform slump tests in accordance with ACI 301.

1.7 SUBMITTALS

- A. Submit product data for under provisions of Section 01300.
- B. Include data on joint filler and curing compounds.
- C. Submit manufacturer's instructions under provisions of Section 01300.

2 PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150 Normal-Type I Portland type, gray color.
- B. Fine and Coarse Aggregates: ASTM C33. Provide from a single source for exposed concrete.
- C. Water: Clean and not detrimental to concrete.

2.2 FORM MATERIALS

- A. Conform to ACI 301.
- B. Joint Filler: ANSI/ASTM D1751, ¼-inch thick, manufactured by J & P Petroleum Products, Inc., or Progress Unlimited, Inc.

2.3 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615; 40 ksi yield grade; deformed billet steel bars, uncoated finish.
- B. Welded Steel Wire Fabric: Plain type, ANSI/ASTM A185; in flat sheets; uncoated finish. Wire mesh to be W1.0 x W1.0 WWF unless noted otherwise on the drawings.
- C. Tie Wire: Annealed steel, minimum 16 gage size.
- D. Dowels: ASTM A615; 40 ksi yield grade, plain steel, uncoated finish.

2.4 ACCESSORIES

- A. Curing Compound: ASTM C309, type 1-D.
- B. Preformed Joint: ASTM D1751, 1/4" thick.

2.5 ADMIXTURES

- A. Air Entrainment: ASTM C260.

2.6 CONCRETE MIX

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete of the following characteristics:
  - 1. Driveways, Aprons, Approaches and Trench Drains: Compromise strength of 3,000 psi at 28 days.
  - 2. Sidewalks, Curbs, Gutters, utility pole footings and



Utility Slabs: Compressive Strength of 2,500 psi at 28 days.

- C. Add air entraining agent to concrete mix for concrete work exposed to exterior.

### 3 PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Verify compacted sub grade is ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Beginning of installation means acceptance of existing conditions.

#### 3.2 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concreting operations.
- B. Notify Architect a minimum of 24 hours prior to commencement of concreting operations.
- C. Handle concrete from mixer to place of final deposit as rapidly as practical by methods, which shall prevent the separation or loss of the ingredients in accordance with ACI, 318, and CBC Section 1910A.1.
- D. Surface Preparation:
  - 1. Construction Joints: Clean and roughen all construction joint surfaces by removing all surface laitance and exposing sound aggregate. Sandblasting and bush hammering are acceptable methods.
  - 2. Remove all water from excavation. Divert flow of water through drains using methods to avoid washing over freshly deposited concrete. Cover drains with filter fabric.
  - 3. Remove hardened concrete, wood chips, shavings and other debris from interior of forms and from reinforcing by vacuum process.
  - 4. Provide runways or other approved means for wheeled equipment. Do not wheel equipment over reinforcing or formwork.

#### 3.3 FORMING

- A. Place and secure forms to correct location, dimension, and profile.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.
- D. Form new curbs which abut existing to match the profile of the existing adjacent curb.

#### 3.4 REINFORCEMENT

- A. Place reinforcement at mid-height of slabs-on-grade.
- B. Interrupt reinforcement at joints.

- C. Place reinforcement to achieve slab and curb alignment as detailed.

### 3.5 FORMED JOINTS

- A. Place expansion joints at maximum 24-foot intervals to correct elevation and profile. Align curb, gutter, and sidewalk joints. When concrete has taken initial set, the edge of concrete surface shall be rounded by tooling to top of expansion filler.
- B. Place joint filler between paving components and all buildings or other appurtenances.
- C. Provide soft cut scored control joints as indicated on site drawings, not to exceed 10 feet on center in either direction, unless specifically noted otherwise.
- D. All control joints are to be straight and true with no spalling of edges on either side of the joint.

### 3.6 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Hot Weather Placement: ACI 301.
- C. Cold Weather Placement: ACI 301.
- D. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- E. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- F. Place concrete to pattern indicated. Saw cut contraction joints 3/16-inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.
- G. The concrete shall be mixed and placed as specified for concrete in this Section. The surfaces shall be finished in the manner specified in Article 3.8. Joint and edges shall be tooled.
- H. Exterior concrete slabs and paving shall be poured in panels approximately 400 sq. ft. in area.
- I. Lift wire mesh prior to and while the concrete is being poured to keep within the middle of the slab. Use hooks to lift mesh.
- J. The sub-surface shall be moisture conditioned per the recommendations within the soils report prior to placement of any concrete.
- K. Time saw cutting of control joints to allow sufficient curing of concrete to prevent raveled or broken edges.

### 3.7 EXPANSION AND CONTROL JOINTS

- A. Sidewalks and covered passage slabs shall be built with expansion joints where shown on drawings, or as follows: Expansion joints for sidewalks shall be spaced approximately every 40 lineal feet in each direction, maximum. Expansion joints shall be provided at all covered passage intersections, passages with each other and with other concrete, at all corners of buildings and walks.
- B. Expansion joint material shall be of durable elastic compound so prepared that it will retain its required form during the placing of concrete. When compressed to half its thickness it shall

return to 70% of its original thickness. Expansion joints shall extend entirely through the slab and be in one piece for the width of the slab. Install continuous self-leveling sealant in all joints and adjacent to all buildings. See Specification Section 07900 for joint sealant material.

- C. Control Joints: provide 1-1/2" deep saw cut 16 to 20 hours after pour, centered between expansion joints or as shown on plans. See Specification Section 07900 for joint sealant material. Unless noted otherwise control joints shall be cut no more than 10 lineal feet apart or equally between expansion joints whichever is less.

### 3.8 FINISHING

- A. Sidewalk Paving: Medium broom finish at surfaces less than 5% slope and slip resistant heavy broom finish for slopes greater than 5%. Radius and trowel joint edges.
- B. Curbs and Gutters: Medium broom finish at surfaces less than 5% slope and slip resistant heavy broom finish for slopes greater than 5%. Radius and trowel joint edges.
- C. At joints and markings, round off top edge of the slab with 1/4-inch edging tool.
- D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.
- E. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In cold, keep concrete from freezing. In hot, dry and/or windy weather protect concrete from rapid moisture loss before, during and after finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- F. Start initial curing as soon as free water has disappeared from the concrete surfaces after placing and finishing. Keep slab continuously moist for not less than ten (10) consecutive days.
- G. Formed surfaces: Wet forms immediately after pouring. Keep forms and exposed surfaces wet until forms are removed. Keep all surfaces wet after forms are removed for ten (10) consecutive days after placement of concrete.
- H. Maintain surface flatness with a maximum variation of 1/8 inch in 10 feet.
- I. Align all joints, soft cuts, control and expansion joints to not vary from a straight line of ¼ inch in 200 feet.
- J. In area of catch basins slope surfaces uniformly to drains.

### 3.9 REPAIR/RESTORATION

- A. Architect will have the final determination as to whether the repair is a minor defect or a serious defect.
- B. Minor Defects:
  - 1. Immediately after removing forms, inspect all concrete surfaces. Make repairs to any pour joints, voids, rock pockets, tie holes, etc., as soon as possible, but not until the defect has been examined by the Architect or his representative.
  - 2. Fill tie holes solid with mortar after cleaning and thoroughly

wetting. Fill through holes by means of a plunger-type-grease gun.

3. Remove fins and rough surfaces from all exposed concrete.

C. Serious Defects:

1. Defects of cracks, broken sections and spalled edges will be considered serious defects.
2. Repair defects by complete removal of concrete and replacement of the entire section from original joint lines for slabs on grade or footings if below grade.
3. Defect shall not be repaired until examined by the Architect and repair shall be in accordance with Architect's instruction.

4. Rock Pockets:

- a. Cut out to full solid surface and form key.
- b. Thoroughly wet before casting mortar
- c. Where the Architect deems rock pocket too large for satisfactory mortar patching as described cut out defective section to solid surface, key and pack solid with concrete to produce a firm bond and match adjacent surface.

D. Patches with mortar mixed with a bonding agent is not an acceptable repair or restoration for minor or serious defects.

E. Cost of repairing shall be borne by the Contractor.

3.10 CLEANING

- A. Insure removal of bituminous materials, form release agents, bond breakers, curing compounds if permitted and other materials employed in work of concreting which would otherwise prevent proper applications of sealants, liquid waterproofing, and other delayed finishes and treatments.
- B. Where cleaning is required take care not to damage surrounding surfaces or leave residue from cleaning agents.
- C. The top of all concrete foundations receiving concrete masonry units shall be washed free of all laitance and loose concrete,

3.11 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.

3.12 PROTECTION

- A. Immediately after placement, protect concrete under provisions of Section 01500 from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION

SECTION 02551

NATURAL GAS DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. The installation of a new gas line from the existing PG&E gas meter location on the site to the new buildings including the connection to the building and extend as shown on the drawings.
- B. Section includes pipe and fittings for natural gas distribution, isolation valves, valve boxes, and site utility shut off cocks.
- C. The installation of a DSA certified earthquake shut off valve with an isolation valve at the meter.
- D. Related Sections:
  - 1. Section 02223 - Backfill.
  - 2. Section 02225 - Trenching.
  - 3. Section 09900 - Paints and Coatings.
  - 4. Section 23000 - Plumbing.

1.2 REFERENCES

- A. ANSI B16.3 - Malleable Iron Threaded Fittings.
- B. ANSI B16.11 - Forged Steel Fittings, Socket Welding and Threaded.
- C. ANSI B31.2 - Fuel Gas Piping.
- D. ANSI B31.8 - Gas Transmission and Distribution Piping Systems.
- E. ASME B16.18 (American Society of Mechanical Engineers) - Cast Copper Alloy Solder Joint Pressure Fittings.
- F. ASME B16.22 (American Society of Mechanical Engineers) - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- G. ASME B16.26 (American Society of Mechanical Engineers) - Cast Copper Alloy Fittings for Flared Copper Tubes.
- H. ASME BPVC SEC. IX (American Society of Mechanical Engineers) - Welding and Brazing Qualifications.
- I. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless.
- J. ASTM A234 - Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
- K. ASTM B32 - Solder Metal

- L. ASTM D2513 - Thermoplastic Gas Pressure Pipe, Tubing and Fittings.
- M. ASTM D2683 - Socket Type Polyethylene Fittings For Outside Diameter Controlled Polyethylene Pipe and Tubing.
- N. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- O. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.
- P. ASTM F678 - Polyethylene Gas Pressure Pipe, Tubing and Fittings.
- Q. AWS A5.8 - (American Welding Society) Brazing Filler Metal.
- R. NFPA 54 (National Fire Protection Association) - National Fuel Gas Code.

### 1.3 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on pipe materials, pipe fittings, valves and accessories.

### 1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of pipe mains, valves, connections, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
- D. Operation and Maintenance Data: Procedures for submittals.

### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with California Plumbing Code, latest edition.
- B. Welding Materials and Procedures: Conform to ASME Boiler and Pressure Vessel Code and applicable state regulation.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.1 PIPE MATERIALS

- A. Outside of Building - Above grade: Schedule 40 black steel pipe, ASTM A120. 150 psi black malleable iron screwed fittings, ANSI B16.3, ANSI B31.8. Galvanized pipe and fittings shall not be used. Flexible connections shall be convoluted brass with dielectric couplings, AGA approved. Outside building flexible connections shall be convoluted stainless steel with dielectric couplings, AGA approved. Prime and paint all piping.
- B. Outside of Building-Below grade: Approved PE pipe or same as above grade with protective coating of ferrous pipe.
- C. Valves and Specialties:
  - 1. Plug Valve: Eccentric bronze plug. Nickel chromium alloy iron body. Bronze bushings. Buna -N O rings. UL approved for gas distribution. 175 psi WOG. DeZurick Series 400.
  - 2. Gas Valves: 2" and smaller, Milwaukee BB2-100; 2-1/2" and larger, Rockwell #142 or equivalent.
  - 3. Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi.
  - 4. Dielectric Coupling: Insulating coupling rated for 250 psig. EPCO.
  - 5. Pipe Sleeves: 24 gage galvanized steel. Adjust-to Crete #10 with #99 thimble for floors. #100 for walls
  - 6. DSA approved line size automatic gas shut off valve.
- B. Wall Plates: All pipes passing through finished walls shall be fitted with stainless steel wall plates. Seal around pipe penetration moisture tight.
- C. Pipe Sleeves: Where pipes pass through concrete floors or footings, install galvanized metal or plastic sleeves having not less than 1/2" or more than 1" clearance around all sides of the pipe or pipe covering for the full thickness of the concrete. Sleeves shall be "Adjustcrete", Sperzel "Crete-Sleeve", or equal.
  - 1. These sleeves shall be secured to metal or wood forms in such a manner that they will not become displaced during pouring of concrete. Sleeves on decks shall be filled with sand. After forms have been removed from concrete, sleeves shall be removed from the openings.
  - 2. The space between pipe and sleeves shall be caulked with oakum and mastic for openings through floors or walls below grade and made watertight.
  - 3. Sleeves for pipe sizes 1/2" to 3" shall be 26-gauge. Sleeves for pipe sizes 3-1/2" or larger shall be 24-gauge.
- E. Unions:
  - 1. Unions shall be furnished and installed at each threaded or soldered connection to all equipment, tanks, valves, etc.

2. Unions shall be located so that piping can easily be disconnected and shall be of type specified in the following schedule:
  - Steel pipelines, 150 lb screwed malleable ground joint  
2" and smaller brass to iron seat  
black for black pipelines,  
galvanized for galvanized lines.
  - Screwed black or Galvanized, 135 lb. cast iron screwed flanged sizes union, flat faced full faced gasket, 2-1/2" & larger black for black pipe lines, galvanized for galvanized lines.

F. Valves:

1. Provide all valves shown and all other valves necessary to segregate line. Valves shall be full size of line in which installed.
2. Furnish discs suitable for service intended. Furnish a brass tag with identification or service controlled for each valve. All valves shall be properly packed and lubricated. Unions shall be placed adjacent to each threaded valve. Install valves with stems vertical wherever possible. Stems shall not be placed below the horizontal. All shut off valves in water lines shall be gate valves unless otherwise shown.
3. Valves shall be full size of pipe, Crane Co., Walworth, Nibco-Scott, or approved equal.
  - a. Gate Valves: Crane 438, 2" and under. Crane 461 2-1/2" and over.
  - b. Solder - Joints valves in copper lines. Crane 1324 or 438 with adapters.
  - c. Cocks: Crane 252. Provide level handle at gas connection to equipment.

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Unless otherwise required by trade custom or specified under another section of the Specifications, cutting and patching will be done by the appropriate trade; but each Contractor shall furnish sketches showing the location and size of all openings, chases, etc., required for the installation of his work.
- B. Each Contractor shall furnish and locate all sleeves and inserts required before the floors and walls are built, or shall be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers.
- C. No structural members shall be cut without the approval of the Architect, and all such cutting shall be done in a manner directed by him.

3.2 DAMAGE TO PREMISES



- A. Contractor shall be responsible for all damage to any part of the premises caused by leaks, breaks in work, storage of materials, or from any other cause as a result of his work in connection with this contract. The responsibility shall extend for a period of one year (1) after acceptance by the Architect.

### 3.3 PIPING INSTALLATION

- A. Piping Layout: Piping shall be run below grade unless otherwise noted. All exposed piping shall be primed and painted to match building. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow.
- B. Route piping in straight line.
- C. Install piping to conserve space and not interfere with use of site space.
- D. Install piping to allow for expansion and contraction without stressing pipe or joints.
- E. Where piping is routed under concrete flatwork or a covered walkway the gas line shall be installed within a PVC sleeve per NFPA 54:7.1.6 and CPC 1210.1.6. The sleeve shall extend to an accessible portion above the building roof line and, at the point where sleeve exits the building the space between the sleeve and the gas piping shall be sealed to prevent the possible entrance of moisture. The sleeve shall extend a minimum of 4-inches beyond the outside of the building, be vented outdoors above finished ground level, and be installed to prevent the entrance of water and insects. See drawings for more specific requirements. Vent shall be a minimum of three feet horizontally from any window, door or vent opening into the building.
- F. Install cocks and other fittings.
- G. Establish elevations of buried piping with not less than 18 inches of cover in non-traveled areas for up to 2-1/2" pipe, 30 inches of cover for pipe 3" and larger and 24 inches of cover in driveways and parking areas for all piping regardless of size.
- H. When conflicts with any new piping or conduits the new gas line shall be routed below the conflicting piping or conduits to maintain the minimum coverage required.
- I. Lay pipe on a sand bedding.
- J. Wrap couplings and fittings of steel pipe with polyethylene tape and heat shrink over pipe.

- K. Install trace wire continuous over top of pipe. All gas piping below grade shall have a continuous caution tape installed 12 inches above the gas line.
- L. Polyethylene pipe and fittings shall be joined in accordance with manufacturer's recommendations. Pipe fitter shall be certified by the manufacturer to weld the pipe.
- M. Backfill trench in accordance with Section 02225.
- N. Center and plumb valve box over valve. Set box cover flush with finished ground surface. Prevent shock or stress from being transmitted through valve box to valve.
- O. Wrap valve and valve box with polyethylene tape and heat shrink. Paint valves and valve boxes with rust inhibitive primer and one coat of epoxy paint.
- P. Joints
  - 1. Threaded pipe shall be cut square, and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
  - 2. Welded or Brazed: Filler rod shall be of the same suitable alloy as the pipe. Welding or brazing shall be performed in accordance with requirements of recognized published standards of practice and by licensed or otherwise qualified mechanics. Welder shall be a person who specialized in welding of pipes and holds a recognized certificate of competency from a recognized testing laboratory, based on the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.
  - 3. Other: joints other than threaded or welded shall be installed in accordance with manufacturer's recommendations.
  - 4. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
  - 5. Electrical Equipment: Joints shall be avoided over electrical conduits.
- P. Fittings
  - 1. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
  - 2. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
  - 3. Unions: A union shall be installed on the leaving side of each valve, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
  - 4. Valves: All valves shall be full line size. At equipment connections, valves shall be full size of upstream piping.
- Q. Welding:

1. General: Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer to conform to the Contract Documents.
2. Welding: The Contractor shall be responsible for the quality of welding done. The quality of the welding procedures and the quality of the welding shall be determined by testing and the welder's ability to make sound welds, under standard working conditions with the equipment to be used in the work on this project, all in conformance with ANSI Standard B31.8 and American Welding Society Standard B3.0.
3. Qualification of Welders: Each welder shall be qualified in accordance with the applicable portions of the American Petroleum Institute Standard A.P.I. Std. 1104 and ST 5L and American Welding Society Standard Institute, Inc. Welders shall hold a valid certificate of competency from a recognized testing laboratory based on the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.
4. Inspection of Welding: All welds shall be inspected visually in accordance with the requirements of ANSI Standard B.31.8. Defective welds shall be removed and replaced at no additional cost to the Owner. Repairing of defective welds by adding new material over the defects or by peening will not be permitted.
5. Welded Joints: Changes in direction of piping shall be made with welded fittings or forged branch connection fittings. Mitering or notching pipe to form elbows and tees, or other similar fittings, will not be permitted.
6. Beveling: Field and shop bevels shall be in accordance with the recognized standards and shall be done by mechanical means or flame cutting. Where beveling is done by flame cutting, surfaces shall be cleaned of scale and oxidation prior to welding.
7. Alignment: Before welding, the component parts to be welded shall be aligned so that no strain is placed on the weld when finally positioned. Height shall be so aligned that no part of the pipe wall is offset by more than 20 percent of the wall thickness. Flanges and branches shall be set true. This alignment shall be preserved during the welding operation. If tack welds are used, welds shall be of the same procedure as the completed weld. Otherwise, tack welds shall be removed after the welding operation.
8. Erection: Where the temperature of the component parts being welded reaches 32 Degrees F or lower, the pipe shall be heated to approximately 100 Degrees F before welding, and the weld shall be finished before the material cools to 32 Degrees F.
9. Electrodes shall be stored in a dry heated area and shall be kept free of moisture or dampness during fabrication operations. Electrodes that have lost part of their coating will be discarded.

R. Steel Pipe Joints and Connections:

1. Shall have ends reamed to full inside diameter and beveled before being made up into fittings.
2. All changes in direction to be made with proper fittings.
3. All screwed connections to be metal to metal tight.

4. Joints between pipe and fittings to be made with threads fully coated with Key's Thread Paste. Paste is to be applied to male thread.
5. Unions to be placed adjacent to all screwed valves, check valves, or equipment which has no union connections. Unions on water pipes on fixtures side of traps may be slip flange joints with soft rubber or lead gaskets.

#### 3.4 TEST OF PIPING

- A. All piping shall be tested at completion of roughing in, in accordance with the following schedule and should show no loss in pressure or visible leaks after a minimum duration of four hours at the test pressures indicated.
- B. Testing equipment, materials and labor shall be furnished by this Contractor.
- C. Section 01400 - Quality Requirements: Testing and inspection services
- D. The Project Inspector shall witness all tests. Work to be concealed shall not be enclosed until prescribed tests are made and accepted. Should any work be enclosed or covered before such tests are conducted, the contractor shall at his own expense uncover, test and repair his work and that of other contractors to original conditions. Leaks and defects shown by tests shall be repaired and the entire work retested. Tests may be made in sections, however, all connections between sections previously tested and new sections shall be included in the new test. New sections shall be isolated from existing sections for testing purposes. There shall be no drop in pressure during the test except that due to ambient temperature changes. All components of the system not rated for test pressure shall be isolated from system before the test is made.
- E. Installed Gas piping system shall maintain 60-psig air pressure for a minimum duration of 2 hours.

#### 3.5 CLOSING IN OF UNINSPECTED WORK

- A. This Contractor shall not allow or cause any of the work installed by him to be covered up or enclosed before it has been inspected, tested and approved.
- B. Should any of the work be enclosed or covered up before it has been approved, he shall, at his expense, uncover the work. After it has been tested, inspected, and approved, he shall make all repairs necessary to restore the work of other Contractors to the condition in which it was found at the time of cutting.

3.6 SERVICE CONNECTIONS

- A. Install riser pipe to prevent undue stress upon service pipe. For plastic service pipe, use steel pipe riser from below ground to point of connection.
- B. Install earthquake valve on house side of meter.

3.7 PAINTING AND IDENTIFICATION

- A. Identification of pipe systems shall conform to the latest edition of the American National Standard A13.1.
  - 1. All exposed piping and insulated piping systems furnished and installed under this work shall be completely painted and identified with the direction of flow and type of material indicated by means of legends and flow arrows, all as specified herein. The markings shall be applied after all painting, priming and cleaning of the piping and insulation is completed. Identification markers shall be applied at 20' (twenty foot) intervals and at valve locations.
  - 2. Paint: All exposed piping and insulated piping shall be provided with two coats consisting of Rustolem paint with Federal safety coatings as scheduled below.
  - 3. Piping painting schedule, legend and paint type:

Marker	Black	Tentative	
Legend		Letters/Code	Color
Vents		V/V4	Green
Natural Gas		G/N1	Yellow

- B. The size, in inches, of the lettering and flow arrows shall be per American National Standard A13.1, and shall be set mark pipe markers.

3.8 CARE AND CLEANING

- A. All broken, damaged, or otherwise defective parts of this work shall be repaired or replaced by this Contractor, at his expense, and the entire work left in a condition satisfactory to the Architect. At completion this Contractor shall carefully clean and adjust all regulators which are installed as part of his work and the systems and equipment left in satisfactory operating condition.

END OF SECTION

SECTION 02660

**WATER DISTRIBUTION**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water main extensions, branch lines, valves, fittings, and accessories with all required fittings.
- B. Fire Hydrants.
- C. Connection to existing domestic and fire water lines.
- D. Thrust blocks.

1.2 REFERENCES

- A. AWWA C104 - American National Standard for Cement-Mortar Lining for Ductile-Iron and Gray Iron Pipe and Fittings for Water.
- B. AWWA C110 - American National Standard for Gray-Iron and Ductile-Iron Fittings, 3 inch through 48 inch for Water and Other Liquids.
- C. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
- D. AWWA C151 - American National Standard for Ductile-Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids.
- E. AWWA C300 - AWWA Standard for Reinforced Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids.
- F. AWWA C600 - AWWA Standard for Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances.
- G. AWWA C900 - AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch for Water.
- H. ASTM D1785 - Polyvinyl Chloride Plastic Pipe, schedule 40.
- I. ASTM B88 - Seamless Copper Water Tube.
- J. ACPA - Concrete Pipe Handbook.
- K. DIPRA - Handbook of Ductile Iron Pipe.
- L. DIPRA - A Guide for the Installation of Ductile Iron Pipe.
- M. NFPA 24 - Fire service lines.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for materials and installation of the Work of this Section.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01700.
- B. Accurately record location of pipe runs, connections, and depths.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

## 2 PART 2 PRODUCTS

### 2.1 PIPE AND PIPE FITTINGS

- A. General: Piping materials, valves and fittings shall be stamped and manufactured in "U.S." and factory-fabricated. Provided piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in potable water systems. Where more than one type of material or product is indicated, selection is Installer's option.
- B. Piping: Provide pipes of one of the following materials, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.
- C. Copper Tube: ASTM B88; Type L hard drawn - 3-1/2" & smaller.
- D. Ductile-Iron Pipe: AWWA C151, with cement mortar lining complying with AWWA C104; Class 51 unless otherwise indicated - 3-1/2" & smaller.
  - 1. Fittings: Ductile-iron, AWWA C110; cement lined, AWWA C104; and rubber-gasket joins, AWWA C111.
- E. Concrete Pipe: Reinforced steel cylinder type, AWWA C300.
  - 1. Fittings: Reinforced concrete pipe fittings.
- F. Polyvinyl Chloride (PVC) Pipe: AWWA C900, Class 150 - 4" & larger.
  - 1. Fittings: Fittings shall be ductile iron conforming to AWWA standards C110 and C-111/A21.11 for rubber gasket joints.
- G. Polyvinyl Chloride (PVC) Pipe: ASTM D-1785 schedule 40 NSF listed - 3-1/2" and smaller.
  - 1. Fittings: Integral wall (thickened bell end) plain end and bell end.
- H. Valves and Fittings: Conform to AWWA Specifications. All valves and fittings shall be designed for an operating pressure larger than the design pressure of lines on which they are installed. Fittings shall be appropriate for connecting to transite pipe. Field verify conditions.
- I. Gate Valves: Resilient wedge AWWA C509 with mechanical joint ends. Bolts are to comply with Article 2.1.A. Provide rising stems where U.L. Listing is required and at backflow devices.

### 2.2 PIPE ACCESSORIES

- A. Thrust Blocking: Construct on water lines at bends, tees and fire hydrants. Use 2,500 psi concrete as specified in Section 03300. Locate and place in accordance with detail on drawings and City of Turlock Standards.
- B. Access Boxes: Unless otherwise specified in accordance with Section 15400.

### 2.3 FILL MATERIAL

- A. Sand: Type specified in Section 02200.

## 3 PART 3 PRODUCTS

### 3.1 EXAMINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.
- B. Beginning of installation means acceptance of existing conditions.

### 3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material of sand.
- B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

### 3.3 INSTALLATION - PIPE AND FITTINGS

- A. Copper Tube: Install in accordance with CDA "Copper Tube Handbook".
- B. Ductile-Iron Pipe: Install in accordance with AWWA C600 "Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances."
- C. Concrete Pipe: Install in accordance with ACPA "Concrete Pipe Handbook".
- D. Polyvinyl Chloride Pipe: Install in accordance with manufacturer's installation instructions.
- E. Water Main Connection: Arrange and pay for taps in water main, of size and in location as indicated, from water Purveyor. Comply with City Standards.
- F. All lines shall be installed with a No. 12 gage TW solid coated tracer wire.
- G. All lines shall have a minimum of 36" of cover over underground piping.
- H. After installation, apply a full coat of asphalt or other acceptable corrosion-retarding material to all surfaces of ferrous anchorages.
- I. Installation of fire service lines and accessories shall be in accordance with the requirements of NFPA 24.

### 3.4 INSTALLATION OF VALVES

- A. General: Install valves as indicated with stems pointing up.
- B. All valve box rims and lids shall be painted a semi-gloss enamel, color black.
- C. The top of the stem is to be set 6 inches below the top of the lid with the new yard box set flush to the new concrete flatwork.



### 3.5 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests after installation of piping, thrust blocks have sufficiently hardened and prior to the backfilling of trenches the entire length of each line shall be subjected to a hydrostatic pressure of not less than One Hundred Fifty (150) pounds per square inch for a period of not less than 30 minutes. Use only potable water for fire service lines. Hydrostatic pressure of not less than two hundred (200) pounds per square inch for two hours per NFPA.
- B. The Contractor shall permanently stop all leaks. All pipe or joints which prove defective shall be replaced and the lines on which such defects occur shall be tested again to determine final acceptability of the installation. Test pump and instruments shall be furnished by the Contractor.
- C. Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline 24 hours prior to testing, and apply test pressure to stabilize system. Use only potable water.

### 3.6 ADJUSTING AND CLEANING

- A. Disinfection of Potable Water System: Flush pipe system with outlet. Fill system with water-chlorine solution containing at least 50 ppm of chlorine. Valve off system and let stand for 24 hours minimum. Flush with clean potable water until no chlorine remains in water coming from system. System shall be sterilized before connection to existing water main on site. If sterilization is not completed and acceptable before connection to existing main then entire water system on site, new and existing, to water meter shall be sterilized.
- B. Sterilization:

Disinfection of all domestic hot and cold water piping systems within each building and on the site will be performed by the Site General Contractor in accordance with AWWA Standard C651, "AWWA Standard for Disinfecting Water Mains". Notify Site Contractor when the buildings are ready for testing. All buildings will be disinfected and tested at one time.

  - 1. The line shall be flushed thoroughly prior to chlorination to remove dirt, etc.
  - 2. Injection shall start only when all fixtures are connected up and ready for operation.
  - 3. A service cock or riser shall be provided by the Plumbing Contractor and located a water service entrance. The disinfecting agent shall be injected into and through the system from these cocks or risers only.
  - 4. Chlorine, either gas or liquid, must be used as disinfecting agent. Calcium or Sodium Hypochlorite (liquid or powdered) - or as approved in Federal and AMWWA procedures - may be used.
  - 5. The disinfecting agent shall be injected by a proportioning pump or device through the service cock or riser slowly and continuously at even rate.
  - 6. All outlets must be fully opened at least twice during injection and the residual checked with orthotolidine solution.
  - 7. When the chlorine residual concentration indicates not less than 50 parts million at all outlets, then all fixtures and water supply valves must be closed and secured.

8. The residual shall be then retained for a period of not less than twenty-four (24) hours.
  9. After the retention, the residual upon checking at most outlets, shall not be less than ten (10) parts per million. If less, the disinfection must be repeated.
  10. If satisfactory, then all fixtures must be flushed until residual or orthotolidine tests shall not be greater than the incoming water supply.
- C. Prior Test: Concealed or insulated work shall remain uncovered until required tests have been completed.
- D. Written reports shall be submitted to the Engineer to demonstrate compliance for all testing. Final pay request will not be released without submission of this report. No exceptions.
- E. Upon satisfactory completion of this work, a "Certificate of Performance" will be required, from an independent testing lab, stating that the water system is safe to use. Furnish certification in triplicate; one copy each to Owner, Architect and Site and Building General Contractors.

END OF SECTION

SECTION 02720

**STORM DRAINAGE SYSTEMS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Storm drainage piping, fittings, and accessories.
- B. Manholes, Catch basins, paved area drainage, manhole access, site surface drainage.
- C. Horizontal French drainage collection system.
- D. Area Drains and downspout extensions.

1.2 REFERENCES

- A. ANSI/ASTM A74 - Cast Iron Soil Pipe and Fittings.
- B. ANSI/ASTM C12 - Practice for Installing Vitrified Clay Pipe Lines.
- C. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- D. ANSI/ASTM C700 - Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated.
- E. ANSI/ASTM D3034 - Type PSM polyvinyl chloride (PVC) sewer and pipe fittings.
- F. ANSI/ASTM F477 - Elastomer seals (gaskets) for joining plastic pipe.
- G. ANSI/ASTM F810-85 - Smooth wall polyethylene pipe.
- H. ANSI/ASTM F892-89 - Polyethylene (PE) corrugated pipe with a smooth interior and fittings.
- I. ANSI/ASTM F894-89 - Polyethylene (PE) large diameter profile wall sewer and drain pipe.
- J. Corrugated Metal Pipe (CMP): CALTRANS STD. Specification Sections 66 and 70. AASHTO Bridge Section 12, M-36 and M-218. ASTM A796, A929 and A760

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for materials and installation of the Work of this Section.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Submit product data indicating pipe, pipe accessories and drainage structure.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01700.

- B. Accurately record location of pipe runs, connections, catch basins, manholes, cleanouts, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

## 2 PART 2 PRODUCTS

### 2.1 STORM DRAIN PIPE MATERIALS

- A. Cast Iron Pipe: ANSI/ASTM A74; service type; bell and spigot end joints.
- B. Vitrified Clay Pipe: ANSI/ASTM C700; standard strength, unperforated; bell and spigot end joints.
- C. Reinforced Concrete Pipe: ANSI/ASTM C76, Class II with Wall Type B; mesh reinforcement; bell and spigot end joints.
- D. PVC Pipe: ANSI/ASTM - D3034, type PSM polyvinyl chloride (PVC) material, SDR 35; bell and spigot end joints. Solvent sealed end joints.
- E. Polyethylene Corrugated Pipe: ANSI/ASTM - F892; Type III, Class C, (PE) material perforated. Fittings are to be gasket type to meet the requirements of ASTM F477.
- F. PVC Perforated Pipe: ANSI/ASTM - D3034, type PSM polyvinyl chloride (PVC) material, SDR 35 prior to perforations; bell and spigot end joints. Solvent seal end joints. Perforations to consist of two rows of ½ inch diameter holes spaced 5 inches apart center to center. The rows are to be 120 degrees apart at the 10 and 2 o'clock positions. Install pipe with holes to the top.
  - 1. Install geotextile "Drain Guard" filter fabric around pipe as detailed on the drawings.
  - 2. SDR 35 4-inch to 8-inch pipe with solvent weld joints. SDR 35 for all pipe sizes over 8-inch with gasket joints.
- G. Corrugated Metal Pipe (CMP): See 1.2.J.

### 2.2 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.
- B. Concrete for inlets and other structures shall meet the requirements of Section 02514 of these specifications.
- C. Cement mortar for use in structure patching shall be composed on one part Portland cement and two parts of clean, well-graded sand of such size that it will pass a No. 8 sieve. An admixture of hydrated lime, fire clay or diatomaceous earth may be used in the mortar to facilitate workability, and the amount of such material used will be limited as ordered by the Architect. Quick setting cement may be used when the Architect determines that conditions so warrant. No mortar shall be used in which water has been added to the dry ingredients for a period of over 30 minutes.

### 2.3 CATCH BASINS

- A. Basin Lid and Frame: Cast iron construction, hinged lid, linear grill lid design; nominal lid and frame size as indicated.

- B. Base Pad: Cast-in-place concrete of type specified in Section 03300; leveled top surface sleeved to receive storm drain pipe sections.

#### 2.4 AREA DRAINS

- A. Area Drain Lid and Frame: Cast iron construction, linear grill lid design; nominal lid and frame size as indicated.
- B. Base Pad: Cast-in-place concrete of type specified in Section 03300; leveled top surface sleeved to receive storm drain pipe sections.

#### 2.5 MANHOLES AND CLEANOUTS

- A. Lid and Frame: Cast iron construction, removable lid, lid design; nominal lid and frame diameter as indicated.
- B. Shaft Construction and Concentric Code Top Section: Reinforced precast concrete pipe sections, lipped male/female joints; nominal shaft diameter as indicated.
- C. Base Pad: Cast-in-place concrete of type specified in Section 03300; leveled top surface to receive concrete shaft sections, sleeved to receive sewer pipe sections.

#### 2.4 FILL MATERIAL

- A. Sand: Type specified in Section 02223.

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.
- B. Beginning of installation means acceptance of existing conditions.

#### 3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material of sand.
- B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

#### 3.3 INSTALLATION - PIPE

- A. Install pipe, fittings and accessories in accordance with manufacturer's instructions. Seal joints watertight.
- B. Place pipe on minimum 4-inch deep bed of sand.
- C. Lay pipe to slope gradients noted on drawings, with maximum variation from true slope of 1/8 inch in 10 feet. Use of blocks to support the pipe is prohibited. Each joint of pipe must be fully pressed into place so that there will be no unevenness or settlement of one length of pipe with the other at the joint.
- D. Construct horizontal French drain in accordance to the drawings.
- E. Construction of all storm drain pipelines shall proceed upstream with the spigot end of the pipe in the direction of flow, unless otherwise approved in writing by the Architect.

- F. The open ends of all lines being installed must be covered to keep out animal life, etc., wherever the line is left unattended for any length of time, such as overnight.
- G. Install coarse sand at sides and over top of pipe. Provide top cover to minimum compacted thickness of 12 inches, except at perforated pipe in trench drains.
- H. Place sand in maximum 6-inch lifts, consolidating each lift.
- I. Increase compaction of each successive lift. Do not displace or damage pipe when compacting.

#### 3.4 INSTALLATION - CATCH BASINS, AREA DRAINS, MANHOLES, AND CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevations.
- B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.
- D. Mount lid and frame in grout, secured to top cone section to elevation indicated.
- E. All manhole and clean out rims and lids shall be painted a semi gloss enamel, color black.

#### 3.5 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01410.

#### 3.6 PROTECTION

- A. Protect finished installation under provisions of Section 01500.
- B. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 02730

**SANITARY SEWAGE SYSTEMS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sanitary drainage piping, fittings, and accessories.
- B. Connection of new sanitary drainage system to the existing sanitary sewer system on site.
- C. Connection of new sanitary drainage system to the City sewer main per City Standards.
- D. Manhole access and cleanout access.
- E. Provide all necessary fittings and attachment methods to join new piping with existing piping. Field verification of each connection will be required to determine the appropriate materials to use.

1.2 REFERENCES

- A. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- B. ASTM C12 - Practice for Installing Vitrified Clay Pipe Lines.
- C. ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- D. ASTM C425 - Compression Joints for Vitrified Clay Pipe and Fittings.
- E. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- F. ASTM C700 - Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated.
- G. ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
- H. ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
- I. ASTM D2774 - Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.
- J. ASTM D3034 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.3 REGULATORY REQUIREMENTS

- A. Conform to applicable code for materials and installation of the Work of this Section.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01700.
- B. Accurately record location of pipe runs, connections, manholes, cleanouts, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

## 2 PART 2 PRODUCTS

### 2.1 SEWER PIPE MATERIALS

- A. Cast Iron Pipe: ASTM A74; service type; bell and spigot end joints.
- B. Vitrified Clay Pipe: ASTM C700; extra strength, un-perforated; plain end joints.
- C. Vitrified Clay Pipe Joint Device: ASTM C425, compression gasket joint.
- D. Plastic Pipe: ASTM D3034, Type PSM, polyvinyl chloride (PVC) material; bell and spigot style solvent sealed end joints. SDR 35 for 4-inch to 8-inch pipe with solvent weld joints. SDR 35 for all pipe sizes over 8-inches with gasket joints.

### 2.2 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.
- B. Concrete for inlets and other structures shall meet the requirements of Section 03300 of these specifications.
- C. Cement mortar for use in structure patching shall be composed on one part Portland cement and two parts of clean, well-graded sand of such size that it will pass a No. 8 sieve. An admixture of hydrated lime, fire clay or diatomaceous earth may be used in the mortar to facilitate workability, and the amount of such material used will be limited as ordered by the Architect. Quick setting cement may be used when the Architect determines that conditions so warrant. No mortar shall be used in which water has been added to the dry ingredients for a period of over 30 minutes.

### 2.3 CLEANOUTS

- A. Lid and Frame: Cast iron construction, removable lid, closed lid design; nominal lid and frame diameter as indicated.

### 2.4 FILL MATERIAL

- A. Sand: Type specified in Section 02200.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.
- B. Beginning of installation means acceptance of existing conditions.

### 3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material of sand.
- B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.



### 3.3 INSTALLATION - PIPE

- A. Install pipe, fittings and accessories in accordance with ASTM and manufacturer's instructions. Seal joints watertight.
- B. Place pipe on minimum 4 inch deep bed of sand.
- C. Lay pipe to slope gradients noted on Drawings, with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Install sand at sides and over top of pipe. Provide top cover to minimum compacted thickness of 12 inches.
- E. Place filter aggregate in maximum 6 inch lifts, consolidating each lift.
- F. Increase compaction of each successive lift. Refer to Section 02223 for compaction requirements. Do not displace or damage pipe when compacting.
- G. Connect to building sewer outlet and municipal sewer system.

### 3.4 INSTALLATION - CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place clean outs, with provision for storm sewer pipe end sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated.
- D. All manhole and clean out rims and lids shall be painted a semi gloss enamel, color black.

### 3.5 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01410.

### 3.6 PROTECTION

- A. Protect pipe from damage or displacement until backfilling operation is in progress.

END OF SECTION

## SECTION 02750

### LANDSCAPE IRRIGATION

Requirements of Contract Documents and Division 1 apply to work of this Section.

#### 1. PART 1 GENERAL

##### 1.1 SCOPE OF WORK

- A. Modifications to the existing irrigation system, the expansion of and repairs to the existing irrigation system damaged by the new work, as indicated on the drawings and include, but is not necessarily limited to:
  - 1. The furnishing of all labor, tools, materials, appliances, tests, permits taxes, etc., necessary for this installation of a landscape sprinkler system as herein specified and to restore the irrigation system to full operation and the removal of all debris from the site.
  - 2. The furnishing of all labor, tools, materials, appliances, tests, permits taxes, etc., necessary for the installation of the new landscape sprinkler system expansion as herein specified
  - 3. Removal and replacement of all existing irrigation valve controllers and valve boxes along with the reconnection to the existing irrigation control system.
- B. Workmanship shall be first class, competent and to the best of the Contractor's ability.
- C. Coordinate with other trades as needed to complete work.
- D. No record drawings existing for the existing irrigation system on this site. The landscape contractor prior to the start of work shall conduct a field investigation to determine the location of all existing irrigation control valves and sprinkler heads to remain and to be removed from existing zones that will be remaining but have to be modified. This investigation shall be conducted prior to the start of any work on the site by any sub-contractor of the prime general contractor.
- E. The system shall efficiently and evenly irrigate all areas and be complete in every respect and shall be left ready for operation to the satisfaction of the Architect.
- F. Program the controller to adjust run times for the new work.

##### 1.2 INTENT OF DRAWINGS and SPECIFICATIONS

- A. It is the intention of the Drawings and Specifications is to describe the materials and methods required for the modifications to the existing irrigation system and the new work required for this installation of an efficiently operating sprinkler system free from defects in materials and workmanship in accordance with the manufacturers recommendations, and all applicable codes and ordinances.
- B. In the event of any discrepancies between the plans and the specifications, the final decision as to which shall be

- followed shall be made by the Architect.
- C. All existing systems and improvements are shown in their approximate locations. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and shall report any variations to the Owner's Representative.
  - D. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc, which may be required. The Contractor shall carefully investigate the existing conditions and new conditions affecting all their work, and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between sprinkler systems, planting, utilities, and architectural features will be avoided. Locate pipe, valves and other equipment in planting areas unless specifically noted otherwise.
  - E. All work called for on the drawings by notes shall be furnished and installed whether or not specifically mentioned in the specifications.
  - F. Contractor shall field verify location of controller serving areas of new work and confirm there are spare zones available. If not contractor shall furnish and install all required expansion modules necessary to support the new zones.
  - G. Contractor shall field verify routing and number of spare conductors available to serve the new control valves. Where required multiple control valves may need to be connected to the same zone. Control valves shall serve similar areas so the run times will be compatible with the plant materials watering requirements.

### 1.3 SUBMITTALS

- A. Product data: Within 7 calendar days after award of the Contract, submit the following to the Architect:
  - 1. A complete list of all materials proposed to be furnished and installed under this Section, including nozzle sizes.
  - 2. All materials shall be new and of size and type as called out on the Drawings. All materials of like-kind shall be one manufacturer.
  - 3. Manufacturers' specifications, catalog cuts, operating instructions and other data required to demonstrate compliance with the specified requirements. Outline each item used in red ink.
  - 4. Manufacturers' recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used in work.
- B. Submit product data under provisions of Section 01300.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.

1.4 EXISTING CONDITIONS

- A. The Contractor shall not willfully install the irrigation facilities as indicated on the drawings when it is obvious in the field that unknown obstructions might not have been considered in the engineering. Such obstructions or differences should be immediately brought to the attention of the Owner's Representative.
- B. The project includes an existing irrigation system. The Contractor and the Owner's Representative shall verify the operational condition of that portion of the existing irrigation system pertaining to the proposed planting areas prior to the start of the proposed work. The Contractor shall notify the Owner and the Owner's Representative of any repairs and/or corrections necessary for proper functioning and coverage in the area of work. The repairs and/or corrections shall be completed before any plant material is planted. Failure to verify the existing system's operational status and to provide notification prior to the start of this work will make the Contractor liable for any and all repairs and/or corrections necessary for proper functioning and coverage of the system, as well as any required plant replacement, without any additional cost to the Owner.
- C. The Contractor ensure that the irrigation system outside the area of work shall remain continuously operational except for brief periods where the Contractor is making connections or modification to the existing system. Notify the Owner's Representative at least 48 hours in advance of any scheduled shut off.

1.5 QUALITY ASSURANCE

- A. Qualifications of manufacturers: When not specified available, use products produced by manufacturers regularly engaged in manufacture of similar items with a history of successful production.
- B. Qualifications of installers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts.
- C. Provide Bi-Lingual speaking foreman on site during working hours.

1.6 EXAMINATION OF Drawings and SITE

- A. Before submitting a bid, carefully examine the Drawings and specifications relating thereto; also visit the site and fully inform oneself as to all existing conditions and limitations applying to the work.

1.7 ORDINANCES AND REGULATIONS

- A. All local, municipal and state laws and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these Specifications.

1.8 GUARANTEE

- A. Guarantee the entire sprinkler system against all defects and faults of material and workmanship and keep in perfect working order for one (1) year from date of completion by

the Contractor without expense to the Owner.

- B. All materials used shall carry a minimum one (1) year manufacturer's guarantee.
- C. After the system has been completed, the Contractor shall instruct the Owner in the operation and maintenance of the system.
- D. If, within one (1) year from the date of completion, settlement occurs and adjustments in pipes, valves, sprinkler heads planting or paving is necessary, the Contractor shall bring the system, planting or paving to the proper level of the permanent grades. The Contractor, as part of the work under this Contract, shall make all adjustments without extra cost to the Owner.

1.9 NOTICE OF COMPLETION

- A. The completion of the Contract will be accepted and Notice of Completion recorded, only when the entire Contract is completed.
- B. Manuals: Upon completion of the work of this Section, and as a condition of its acceptance, deliver to the Architect, two copies of the manuals for all equipment shown on the Drawings and described in these Specifications.

2. PART 2 PRODUCTS

2.1 PRODUCT HANDLING

- A. Protection: Use means necessary to protect the work and materials of other trades.
- B. Delivery and storage:
  - 1. Deliver the products to the job site in their original unopened container with labels intact and legible at time of use.
  - 2. Store products in accordance with the manufacturers' recommendations.

2.2 PRODUCTS

- A. Water pressure reducing valve: Shall be of size and type called out on Drawings, complete with stainer provided by manufacturer.
- B. Backflow Preventer: Shall be of size and type called out on the Drawings, complete with gate valves and test cocks provided by manufacturer.
- C. Shut-off valves: (Except when a part of the backflow preventer) to be 200 lb. w.o.g. bronze gate valves, non-rising stem, hand wheel, teflon impregnated packing gland, solid wedge disc.
  - 1. Buried valves equipped with AWWA 2" operating nuts shall be operated with a T-handled extension wrench.
- D. Remote control valves: Shall be of construction as called out on the Drawings. Filters for drip irrigation lines provide a 150 mesh filter. Furnish and install on each side of each control valve a union joint.

- E. Check valves: Anti drain valves; shall be PVC, and installed as required per plans.
- F. Quick coupler valves: Shall be 150 lb. two piece cast brass body, self-closing metal cover with yellow vinyl protective caps, locking types.
- G. Valve boxes: Manufacturer shall be Brooks. Provide rectangle boxes for control valves and round boxes for gate and ball valves.
- H. Ball Valves: Provide brass ball valves at mainline to valve manifolds for each grouping.
- I. Pipe:
  - 1. PVC pipe: All pipe shall be permanently and continuously marked with manufacturer's name, pipe size, schedule, SDR number (class-pipe only), ASTM (D1785-68 for schedule pipe), manufacturer's lot number and NSF approval.
  - 2. PVC mainline: : ½" through 2" use schedule 40, solvent weld type. 2-1/2" and over, use schedule 40, solvent weld type.
  - 3. PVC laterals (non-pressure piping): Shall be schedule 40 PVC, solvent weld type. Lateral pipe, beneath paving, shall be schedule 40 PVC.
  - 4. Galvanized steel pipe: Steel pipe shall be galvanized, standard weight (Schedule 40) complying with the requirements of ASTM A120. Steel pipe shall be jointed with galvanized, threaded, standard weight malleable iron fittings and couplings.
  - 5. Brass pipe fittings and connections: Standard 126 pound class 85% red brass fittings and connections.
  - 6. Sleeves: Shall be schedule 40 PVC for under paving and for controller wiring. See plan for installation and sizes.
- J. Low Pressure/Low Volume Systems:
  - 1. Drip Hose: Manufactured of flexible polyvinyl chloride (PVC) compound in accordance with ASTM D1248, Type 1, Class C, Category 4, P14 and ASTM D3350 for PE 122111C.
  - 2. Fittings
    - a. Type and make recommended by manufacturer
    - b. Joint cement and Primer and recommended by manufacturer of pipe and fittings
  - 3. Check Valves: KBI spring check valve. Line Size.
    - a. Install as necessary along laterals anywhere slopes may create low head drainage.
  - 4. Drip Valve Assembly: As detailed having the following:
    - a. Control Valve: Size and type shown on the drawings.

- b. Pressure Regulator: Size and type shown on the drawings.
- c. In-line Filter: Size and type shown on the drawings.
- d. Ball Valve:
  - 1. The ball valve shall be constructed with a durable Sch 80 PVC body and ABS handle.
  - 2. The valve shall have rapid 1/4-turn on/off control and drip-tight shutoff.
  - 3. The valve shall have EPDM seals.
  - 4. The valve shall have one blocked end and a built in union to allow disassembly of downstream side with valve under pressure.
- 5. Emitters and Bubblers: Size and type shown on the drawings and specified herein.
- 6. Ball Valves: Size and type shown on the drawings.
- K. Fittings - PVC: For make-up shall be of same chemical compound as pipe on which it is installed. Use schedule 40 medium-wall fittings for any "all socket" connections.
- L. Risers, nipples: Shall be schedule 80, type 1, 3-inch minimum length, except where detailed on Drawings.
- M. Pipe compound - PVC joints: Threaded connections, including PVC to steel make-up, shall be best grade teflon tape.
- N. Sprinkler heads: Shall conform to make, size, type and performance as called out on the Drawings.
- O. Other Material:
  - 1. Coupler (quick coupler valves): Shall be same manufacturer as quick coupling valve, cast brass and coupler to include operating handle.
  - 2. Joint Cement and Primer:
    - a. Non-pressure plastic pipe and fittings shall be cemented using a 100 percent active solvent, blue in color.
    - b. Pressure plastic pipe and fittings shall be coated with a primer and then with a 100 percent active solvent.
    - c. Both primer and solvent shall be similar in all respects to that manufactured by Christy's or approved equal.
  - 3. Wire connectors for direct burial conductors (24 volt): Shall be 600 volt 60E Centigrade AWG-UF type, waterproof, epoxy or PVC compound filled containers.
  - 4. Di-electric isolation: Shall be provided between all connections joining ferrous and non-ferrous metals. Submit type intended for use and review.

5. Concrete: Shall be 2,000 lb. strength at 28 days. Fine aggregate may be granular sand. All rock and gravel for use in concrete shall be mechanically washed and free from injurious amounts of deleterious substances.
6. Controller charts: Provide plastic covered charts, hermetically sealed, in each automatic controller, showing only the systems controlled by that controller. Charts shall meet acceptance of the Architect before insertion in plastic.
7. Items furnished: At time of final acceptance, Contractor shall deliver to the Owner:
  - a. Two special wrenches suitable for operating each type of shut-off valve installed under this Contract.
  - b. Two tools for disassembly and assembly or adjustment, of each type equipment used in this installation requiring such special tools.
  - c. Two valve box keys for every 12 lock lid valve boxes used in this installation.
  - d. One key to unlock each 6 locking cover quick coupler valves used in this installation. Minimum of 2 keys.
  - e. Three copies each of Operating instructions and parts lists, as printed by each manufacturer of each type of equipment included in this Contract. Refer to Part 2, 2.2 Products of the specifications and legend on Drawings.
  - f. Four (4) of each type of sprinkler head.

### 3. PART 2 EXCAVATION

#### 3.1 EXECUTION OF WORK

- A. General: Comply with all governing construction ordinances for all work under this Contract.
- B. Verification of dimensions: Verify all horizontal and vertical site dimensions prior to staking of heads. Do not exceed spacing's shown on Drawings for any given area. Contractor shall be responsible for installation of checking devices to prevent drainage from any sprinkler head.
- C. Drawings of record: Maintain daily records showing every change from the Contract Drawings of all locations of main lines, buried valves, conductors, quick coupler or hose bibb valves and plugged or capped outlets. Locate each item from two points of architectural performance, i.e. curbs, walls, light standards, etc.
  1. All plans shall be reproducible and prepared by a professions draftsman.
  2. Deliver records Drawings (originals and one set of prints) to the Architect.
- D. Connection to water supply (POC): Connect to water source as noted on the Drawings.
- E. Trenching: Do all excavation for installation of all work included in Contract. Mechanical trenching machines shall cut trenches with straight sides. Trenches shall be only



wide enough as may be required to lay the pipe and control wire. "Pulling" of pipe and/or control wires will not be permitted.

1. Provide for a minimum 18" of dirt cover above the pipe for all sleeves under paving.
2. Provide for a minimum of 18" of cover above the pipe for all pressure supply lines, control wiring and lateral lines under paving.
3. Provide for a minimum of 12" of cover above the pipe for all non-pressure lines.

F. Backfill: After the work has been installed, flushed, tested and proved tight in the presence of the Architect, backfill with fine materials. Allow no rocks or other objects larger than one inch in diameter to fall in the first 6" of cover. Backfill carefully and tamp properly to avoid any voids. All sandy soils shall be flooded during the backfill compaction operation.

1. After compacting backfill over lateral line to equal density of adjoining undisturbed soils and after compacting to 85 percent over main lines, remove all remaining debris caused by operation from the site and dispose of same in legal manner. All trenches shall be compacted to 95 percent. Any work covered prior to field reviews by the Architect shall be uncovered at the expense of the Contractor to allow for such reviews.
2. Trench depth and backfill materials shall be performed to comply to the details on the Drawings.

G. Laying of lines: Stake and install lines in the locations shown on the Drawings. Discrepancies between Drawings and site shall be brought to the attention of the Architect prior to trenching. Do not exceed the GPM on the pipe sizes shown. Assemble all pipes free from dirt and scale, "ream and deburr."

1. Place piping and electrical conduit under concrete prior to paving work.
2. If cutting or breaking of any paving is necessary, replace with like material at the expense of the Contractor.
3. Obtain review of Architect prior to any cutting or breaking. All lines set in place under paving shall extend 18" minimum beyond such paving and be capped hand-tight and marked clearly at finish grade. (Do not paint on A.C. paving, concrete curb, concrete walks, etc.)
4. No fittings, including couplings will be permitted under surfaces to be paved except where the length of the lines are encased in sleeves, except where shown on the Drawings, i.e., parking lots, etc.

H. Assembly of pipe:

1. PVC pipe: handle with care when loading, unloading, transporting and storing to avoid damage. Store pipe and fittings under cover before using. Rejected materials shall be immediately removed from the site

and replaced with new shipment of different batch numbers.

2. Joining by solvent weld: Use non-synthetic brush to spread primer and solvent. Cut pipe square, ream chamfer outside end. Clean and dry pipe and fittings socket. Scrub inside socket and pipe end with primer, prime inside socket. Apply solvent to pipe end and to socket, then again to pipe end. Bottom the pipe in socket and turn. Hold joint together 30 seconds. Wipe off excess solvent. Allow to set 30 minutes before moving. Snake pipe side to side in trench bottom keeping 4" horizontal clearance between two pipes in same trench. Do not lay pipe in trench containing water or at less than 32 degrees F. Center load immediately, leaving joints exposed.
3. Galvanized steel pipeline: Ends of pipe shall be cut square and reamed to full size with along taper reamer.
  - a. Threads shall be cut with clean, sharp dies and shall conform to American Standards Association Specifications B2.
  - b. Joints shall be made with a non-toxic non-hardening joint compound applied to the male threads only.
4. Installation of brass pipe: Cut brass piping by power hacksaw, circular cutting machine using an abrasive wheel or hand hacksaw. Cut no piping with metallic wheel cutter of any description. Ream and remove rough edges of burrs so smooth and unobstructed flow is obtained.
  - a. Carefully and smoothly place on male thread only. Tighten screwed joints with tongs or wrenches. Caulking is not permitted.
5. Copper pipelines: Copper pipeline shall be made with sweated solder joints.
  - a. Before jointing, the end of the pipe for the depth of the fitting, and the interior of the fitting shall be buffed to a bright finish and coated with solder flux. The assembled joint shall be made with a 50-50 tinlead solder. A continuous solder bead shall show around the joint circumference after soldering.
  - b. Copper pipe shall be joined to steel or cast iron pipe with a dielectric union.

I. Flushing of lines:

1. Mains to be flushed before attaching remote control valves, quick coupler valves, hose bibbs or pressure relief valves and with pipe center-loaded.
  - a. All water being discharged to be piped up and out of the trenches. Trenches to be kept dry for pressure tests to follow. Install all valves after acceptance of flushing.
2. Laterals to be flushed of all foreign matter before sprinkler heads are in place.

- J. Pressure tests: Perform all hydrostatic tests in presence of the Architect after flushing lines. Maintain 150 PSI on main lines for 4 hours with all air expelled from line and with all valves in place. All leaks shall be corrected in mechanical manner without use of epoxy fillers or other filler compounds. Provide all equipment for tests including force pump and pressure gauges.
- K. Valve Boxes:
1. Place Galvanized 1 x 1 wire mesh below and fill area under box with minimum of two cubic feet of three quarters inch crushed gravel before box is installed.
  2. Identification:
    - a. Attach identification tag showing valve number on each solenoid "pigtail".
    - b. Tags shall be manufactured of polyurethane Behr Desopaid, yellow in color with black letters 2-3/4 inches by 2-1/4 inches.
    - c. Tags shall be manufactured by Christy's or equal.
- L. Low Voltage Wiring:
1. Place wiring within a one inch PVC Schedule pipe in the same trench and along the same routing as the pressure supply lines unless otherwise approved.
    - a. Install wiring after main line has been installed and backfilled whenever possible.
  2. Provide a 36 inch expansion loop at each connection and directional change.
  3. Use a continuous wire between controller and remote control valves.
    - a. Except as otherwise approved, do not splice wire at any point.
    - b. All approved splices shall be enclosed in an acceptable box.
- M. Painting: Paint all ferrous valves, fittings and pipe installed above grade with one coat oil base metal primer and two coats of accepted epoxy paint using a color as accepted by the Architect. All parts shall be painted, sanded and cleaned with a degreaser fluid prior to applying the primer. Submit type and manufacturer's name of paint materials to Architect.
- N. Adjusting system: Adjust entire system prior to coverage test, and again at conclusion of maintenance period.
1. Set all shut-off valves in the system to full open position.
  2. Adjust all stationary heads to equal and uniform coverage.
  3. Adjust arcs of all adjustable arc type heads so as to prevent overspray on areas to be kept dry.
- O. Maintenance: Maintain all irrigation equipment to operate at peak performance. Replace, at no cost to the Owner, any

equipment damaged or stolen during the maintenance period.

P. Unusual field conditions:

1. Wind: The Contractor shall make such adjustments as necessary, in location of sprinkler heads, nozzle size, nozzle type, or degree of arc, as required to compensate for localized breeze or wind conditions that cause overspray or improper spray patterns.
2. Variable Pressure: The Contractor shall observe and record water pressure and available flow in gallons per minute (GPM), at point of connection, every one (1) hour for a forty-eight hour period to determine if existing water characteristics differ from the Design Pressure and available GPM data as supplied by the

Water District. The Contractor shall notify the Consultant, in wiring, immediately prior to beginning installation of irrigation system. Failure to notify the Consultant, the Contractor assumes all responsibility for corrections at no cost to the Owner.

3. Pressure Regulator: If unusually high pressures or variable pressures are evident, the Contractor shall install a pressure regulator at point of connection prior to backflow device, factory preset to design pressure.
4. Fogging: Fogging is evidence of high pressures. The Contractor shall first adjust Schrader Valve unit on the remote control valve before installing pressure regulator.
5. Pressure Compensating Nozzles: Installation of pressure compensating nozzles to prevent fogging shall be considered as a normal adjustment to the system.
6. Anti-Drain Units: Anti-drain valve units shall be installed on all heads in the system that demonstrate drain-down when the system is in the off position, and shall be considered as a normal adjustment to the system.
7. Excessive Run-Off: The Contractor shall adjust the time schedule of the automatic controller station to a lesser duration and with a maximum number of repeat cycles. Time span between watering cycles shall allow adequate time for water to penetrate soil.
  - a. Site cleaning: Clean all debris from site, remove all storage rooms and all other construction materials.

- Q. Review: In all cases where review of the sprinkler system work is required or where portions of the work are specified to be performed under the direction or review of the Architect, the Contractor shall notify the Architect at least three (3) working days in writing prior to the time such review and direction is required. Reviews will be performed by the Architect at the following times and at random visits when the reviewer may be on the site.

1. Review mainline and lateral line installation. Do not cover any work prior to review by Architect.
  2. Final review of complete installation and coverage performance. This review is to be done in conjunction with planting review at the start of the Maintenance Period.
- R. All work to meet with the acceptance of the Architect, or shall be rectified by the Contractor to a condition that does meet this acceptance, and at no additional cost to the Owner. If the Contractor calls for review, and is not ready for the review, he shall be back charged, hourly, including travel time for all members of the team of reviewers involved.

**END OF SECTION**

SECTION 02760

TACTILE/DETECTABLE WARNING SURFACE TILE

PART 1      GENERAL

1.1      SECTION INCLUDES

- A. Cast-In Place Detectable/Tactile Warning Surface Tiles on curb ramps and walking surfaces inserted into and set flush with concrete walkways where indicated on the drawings.

1.2      RELATED SECTIONS

- A. Section 01400 - Quality Requirements
- B. Section 02514 - Concrete Work

1.3      REFERENCES

- A. California Building Code, 2019
- B. American Disability Act.

1.4      SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit samples under provisions of Section 01300.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.
- D. Include installation templates.

1.5      QUALITY ASSURANCE

- A. Manufacturers Qualifications: Firm specializing in manufacturing products specified in this Section with a minimum of 5 years documented experience.
- B. Regulatory Requirements
  - 1. General: Provide DSAAC detectable warning products in accordance with the California Building Code, Section 202, Section 11B-247 and 11B-705.
- C. Vitrified Polymer Composite (VPC) Cast-In Place Detectable/Tactile Warning Surface Tiles shall be an epoxy polymer composition with an ultra violet stabilized coating employing aluminum oxide particles in the truncated domes.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle packaged products in their original containers with seals unbroken and labels intact until time of installation.
- B. Store delivered products in clean, safe, dry area.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Engineered Plastics, Inc.; phone 800-682.2525; URL: <http://www.armor-tile.com>. Product: Armor-Tile Cast-In Place Detectable/Tactile Warning Surface Tiles or approved equal by Detectable Warning Systems, Inc.
- B. Substitutions: Under provisions of Section 01300.

2.2 MATERIALS

- A. Tiles: Tiles: Vitrified Polymer Composite (VPC) cast-in place with an ultra violet stabilized coating employing aluminum oxide particles in the truncated domes. The tile shall incorporate an in-line dome pattern of truncated domes 0.2" in height, 0.9" diameter at the base, and 0.45" diameter at the top of the dome spaced center to center 2.35" to 2.40" as measured "In Line". For wheelchair safety the field area shall consist of a non-slip surface with a minimum of 40 - 90 raised points 0.045" high per square inch.
  - 1. Color: Safety Yellow, (Federal Color #33538) colorfast, UV stabilized coating.
  - 2. Size: Field Verify
- B. Performance: Tiles shall meet or exceed the following criteria:
  - 1. Water Absorption: 0.05% maximum, when tested in accordance with ASTM D570.
  - 2. Slip Resistance: 0.80 minimum combined wet/dry static coefficient of friction on top of domes and field area, when tested in accordance with ASTM C1028.
  - 3. Compressive Strength: 28,000 psi minimum, when tested in accordance with ASTM D695.
  - 4. Tensile Strength: 19,000 psi minimum, when tested in accordance with ASTM C638.
  - 5. Flexural Strength: 25,000 psi minimum, when tested in accordance with ASTM C293.
  - 6. Gardner Impact; 550 inch-pounds per inch minimum, when tested in accordance with ASTM D5420.

7. Chemical Stain Resistance: No reaction to 10% hydrochloric acid, urine, calcium chloride, stamp pad ink, hum and red aerosol paint, when tested in accordance with ASTM D543.
8. Wear Depth: 0.06" maximum, after 1000 abrasion cycles of 40 grit Norton Metallite sandpaper, when tested in accordance with ASTM D2486-Modified.
9. Flame Spread: 25 maximum, when tested in accordance with ASTM E84.
10. Accelerated Weathering: No deterioration, fading or chalking for 3000 hours, when tested in accordance with ASTM g 155-05A.
11. Tactile warning tiles adhered to concrete shall meet or exceed the following performance criteria:
  - a. Accelerated Aging and Freeze Thaw of Adhesive System: No cracking, delamination, warping, checking, blistering, color change, loosening, etc., when tested in accordance with ASTM D1037.
  - b. Salt and Spray Performance: No deterioration after 200 hours of exposure, when tested in accordance with ASTM B117.

### 2.3 ACCESSORIES

- A. Sealants: Epoxy two component sealant by Powers, Simpson or Hilti.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. During the installation, ensure adequate safety guidelines are in place and they are in accordance with the applicable industry and government standards.
- B. The concrete shall be consistent with the contract specifications while maintaining a slump range of 4-7 to permit solid placement of the Cast-In Place Detectable/Tactile Warning Surface Tile system. An overly wet mix will cause the tile to float. Under these conditions, suitable weights such as concrete blocks or sandbags (25lb) shall be placed on each tile.
- C. Set the tile true and square to the curb ramp area as detailed.
- D. Set the tile system into the concrete per the manufactures installation instructions.
- E. The factory-installed plastic sheeting must remain in place during the entire installation process to prevent the splashing of concrete onto the finished surface of the tile.



- F. When preparing to set the tile(s), it is important that no concrete be removed in the area to accept the tile. It is imperative that the installation technique eliminates any air voids under the tile. Holes in the tile perimeter allow air to escape during the installation process. Concrete is to flow through the large holes in each embedment flange on the underside of the tile. Lock the tile solidly into the cured concrete.
- G. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. The tile shall be placed true and square to the curb edge in accordance with the contract drawings. Prior to placing the tiles check the slope to verify it is in compliance.
- H. The tile(s) shall be tamped or vibrated into the fresh concrete to ensure that the field level of the tile is flush with the adjacent concrete surface. The embedment process shall not be accomplished by stepping on the tile. The field level surface of the tile(s) (base of the truncated domes) is to be set flush with the adjacent surfaces to permit proper water drainage and eliminate tripping hazards between adjacent finishes.
- I. Immediately after placement, the tile elevation is to be checked to the adjacent concrete surface to ensure the field surface of the tile(s) is set flush with the surrounding concrete and back of curb so no ponding of water is possible.
- J. While concrete is workable, a 3/8-inch radius edging tool shall be used to create a finished edge of concrete, then a steel trowel shall be used to finish the concrete around the tiles perimeter, flush to the field level of the tile.
- K. Do not allow foot traffic on the installed tiles until the concrete during and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external forces placed on the tile that may rock the tile causing a void between the underside of the tile and the concrete.
- L. Provide suitable weights of 25 lb each placed on each tile as necessary to ensure solid contact with the underside of tile to concrete.

3.2 CLEANING, PROTECTION AND MAINTENANCE

- A. Protect tiles against damage during the construction period to comply with manufacturer's specifications.
- B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.
- C. Clean tiles not more than four days prior to the date scheduled for final acceptance.

- D. Comply with manufactures maintenance manual for cleaning and maintaining tile surface.

End of Section

SECTION 02825  
ORNAMENTAL IRON FENCING

**Part 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Ornamental iron fencing and components including fence panels, posts, panel hangers, swinging gates, and accessories. All labor, materials and supplies needed for professional installation.
- B. Perforated powder coated metal panels where detailed on the drawings.
- C. Furnish lockset and deadbolt on man gates as detailed on drawings.
- D. Furnish panic hardware on exit gates as detailed on drawings.

**1.02 RELATED SECTIONS**

- A. Section 02200 - Earthwork
- B. Section 02218 - Landscape Grading
- C. Section 03300 - Cast-in-Place Concrete
- D. Section 08710 - Finish Hardware
- E. Section 09900 - Painting

**1.03 REFERENCES**

- A. ASTM A653 Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
- B. ASTM A787-96 Standard Specifications for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing

**1.04 SUBMITTALS**

- A. Shop Drawings: Elevation Drawings of Individual Fence Panels and each Gate size and type.
- B. Product Data: Manufacturer's catalog cuts including material compliance and specified options.
- C. Samples: Color selections for powder coated finishes.

**1.05 QUALITY ASSURANCE**

- A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and the materials and techniques specified.

**1.06 DELIVERY, HANDLING AND STORAGE**

- A. Deliver prefabricated fence panels, gates, posts and accessories to project site, completely assembled and pre-finished. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping. Materials shall be handled and stored properly to protect against damage and theft at job site.

## **Part 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. The ornamental iron fencing and swinging gate systems shall conform to designs and patterns as shown on the drawings. The manufacturer shall supply a total ornamental metal fencing system of the design, style, strength, and picket spacing defined herein. The system includes all material and finishes as required in the plans and specifications.

### **2.02 MATERIAL**

- A. The material for the fence framework (i.e., pickets, rails, and posts) shall be manufactured from electrically welded pre-galvanized tubing having yield strength of 50,000 psi and a tensile strength of 50,000 psi.
1. Pickets shall be minimum 3/4" square tubing with 16-gauge wall thickness, built for a 4" space between pickets. All pickets shall have black plastic caps top and bottom.
  2. Rails shall be minimum 1 1/2" square tubing with 14-gauge wall thickness, lengths as required not to exceed ten feet on center, unless noted otherwise on the drawings.
  3. Posts shall be minimum 2" square tubing with 14-gauge wall thickness, length of post as shown on the drawings. Pickets, rails and posts to be cut, pressed, and located as indicated in the shop drawings.
  4. Gate posts shall be a minimum 4-inch square with an 11-gauge wall thickness, unless noted otherwise on the drawings.
  5. Support posts within the gate assemblies shall be a minimum 2-inch square with a 14-gauge wall thickness.
  6. Top rail of cantilevered gates shall be equal to adaptrack aluminum rail sized to accommodate span of each gate opening.
  7. Provide 3/8" truss rods in each bay of gate with single or double rods as required to adequately support the gate frame.
  8. Gate frames to be 2-inch square posts with 14-gauge wall thickness.
  9. Provide hardware brackets sized to accept padlocks, locksets and deadbolts to lock gate in the closed and open positions as detailed on the drawings.
  10. Rails and pickets shall be Electro-MIG welded per the final approved shop drawings. Kit type field assembled panels are not acceptable.
  11. Posts shall have zinc plated press-on type steel caps. Base detail shall be drilled base plate, sleeve, footing or pier as indicated in the design drawings.
  12. The fence panel assembly shall be subjected to a five-stage iron phosphate pre-treatment cleaning system to remove foreign material and prepare the panel assembly for finish coat.
  13. Powder Coat: Minimum 2 - 4 mil thickness of high quality TGIC polyester resin by electrostatic spray process followed by a cure cycle of a minimum of 25 minutes at 400 degrees F (232 degrees C), metal temperature. Color as indicated in the design and shop drawings. Powder coated finish shall meet or exceed all pertinent ASTM testing standards.
  14. Fence panel sections shall be capable of supporting a 1000 lb. load applied mid-span with minimal deflection, and no permanent deformation.
  15. Provide post caps of size required to fit each post of galvanized formed steel finished to match fence coating and color. Provide one post cap for each post. Attach to posts.

16. Provide three hinges per gate leaf. Hinges are to be heavy duty 5 knuckle hinges with powder coated finish.

### **2.03 PERFORATED METAL PANELS**

- A. Equivalent to McNichols perforated galvanized and powder coated black metal panels with round holes. Galvanized metal with powder coated finish to match ornamental iron fencing. 0.062 x 0.93 round staggered pattern from 24 gauge sheets. Holes open 40%. Attach to backside (school side) of pickets.

### **2.04 SETTING MATERIAL**

- A. Concrete: as specified in section 033000.

### **2.05 LOCKSETS**

- A. Each gate leaf to be prepared to receive a lockset and dead bolt. Locksets, deadbolts and panic devices will be furnished under specification section 08710. Fencing contractor to install.

### **2.06 PANIC HARDWARE**

- A. At gate leaf detailed with panic hardware, device will be furnished under specification section 08710 and installed by the fencing contractor.

### **2.07 HINGES**

- A. Man gate hinges are to be Locinox Hydraulic 180° gate closer and hinge in one. Adjust to open with a maximum of 5 lbs of force to meet ADA requirements. Gates four feet and less require three hinges.
- B. At the pair of gate locations each gate leaf shall have four hinges equivalent to Hager Heavy Duty 1850 SPBLK. Weld to posts and gate frame. Clean welds and paint black.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Verify areas to receive fencing are completed to final grades, elevations and materials.
- B. Ensure property lines, utility routing and legal boundaries of work are clearly established.
- C. Coordinate fence installation with work of other sections listed in these specifications.

### **3.02 INSTALLATION**

- A. Install fence in accordance with manufacturers' instructions and Architect's drawings.
- B. Space posts at dimensions indicated in the shop drawings. Attach fence panels to posts using stainless steel panel hanger brackets supplied by manufacturer. Screws shall be tamper resistant, self-drilling and tapping. Do not field weld panels to posts so as not to damage factory applied finish.

- C. Step fence panels to allow for grade changes at even increments with the top horizontal rails aligning with the second top horizontal rail.
- D. Avoid unnecessary cutting, drilling and welding of prefinished fence panels.
- E. All field welds shall be ground smooth and clean of all debris before priming and painting.
- F. If necessary to cut drill, weld or otherwise modify panels due to field conditions, repair factory finish as outlined in section 3.02 G.
- G. Touch-up any necessary areas by lightly sanding; apply a zinc-rich cold galvanizing primer followed by a high quality acrylic paint to match finish. Touch up paint is available from the manufacturer.
- H. The top rail shall remain level across the entire run.
- I. The bottom rail shall be kept 4-inches clear of surface below and follow contour of finish grade.
- J. Where gates swing over a sloping finish surface the bottom rail shall be adjusted to allow for the gate to swing up to 190 degrees without binding on the finish surface and maintain a 2-inch distance between the finish surface and bottom of the gate when in the closed position.
- K. Install gates plumb, level and secure for full opening required without interference.
- L. Attach hardware by means that will prevent unauthorized removal.
- L. Adjust hardware and gates for smooth operation.
- M. Install post caps and accessories to provide a complete fence and gate installation.
- N. Install accessible lever handle latch, deadbolt or panic device assembly at each man gate. See drawings for locations and details of each condition.
- O. Attached perforated metal panels to pickets on the school side of the fence or to steel angle backing on the driveway side of the angles with galvanized truss head screws and painted black to match panels. Panels may be welded to the frame and/or pickets in lieu of screws. All welds to be treated and painted black.

### **3.03 CLEANING**

- A. Fence contractor shall remove unused material, level uneven areas due to excavations created by fence installations and clean fence of any installation related concrete, dirt or debris.

END SECTION

SECTION 02831

**CHAIN LINK FENCES AND GATES**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized fence framework, Galvanized fabric and Galvanized accessories where noted on drawings.
- B. Excavation for post bases.
- C. Concrete anchorage for posts and center drop for gates.
- D. Manual gates and related hardware.
- F. Installation of Lever handle and Deadbolt lockset for each man gate.

1.2 REFERENCES

- A. ANSI/ASTM A123 - Zinc (Hot Galvanized) Coatings of Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips.
- B. ANSI/ASTM F567 - Installation of Chain Link Fence.
- C. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.
- D. ASTM C94 - Ready-Mixed Concrete.
- E. FS RR-F-191 - Fencing, Wire and Post, Metal.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in commercial quality chain link fencing with three years of documented experience.
- B. Installation: ANSI/ASTM F567.
- C. Single Source Responsibility: Obtain chain link fences and gates, including accessories, fittings and fastenings, from a single source manufacture.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Include plan layout, grid, spacing of components, accessories, fittings, hardware, anchorages and schedule of components.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.
- D. Submit samples under provisions of Section 01300.

2 PART 2 PRODUCTS

2.1 FABRIC

- A. Selvage: Knuckled on both selvages.
- B. Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link

Fence

Manufacturers Institute (CLFMI) "Product Manual" and with requirements indicated below.

1. Mesh and Wire Size: 2-inch mesh, .148 inch diameter (9 gage).
2. Coating: ASTM A 817, Type 2, Class 1, zinc-coated (galvanized) applied after weaving.

2.2 FRAMING

- A. Round member sized are given in actual outside diameter (OD) to the nearest thousandth of inches. Round fence posts and rails are often referred to in ASTM standard specifications by nominal pipe sizes (NPS) or the equivalent trade sizes in inches. The following indicates these equivalents all measured in inches:

ACTUAL L OD	NPS SIZE	TRADE SIZE
1.315	1	1-3/8
1.660	1-1/4	1-5/8
1.900	1-1/2	2
2.375	2	2-1/2
2.875	2-1/2	3
3.500	3	3-1/2
4.000	3-1/2	4
6.625	6	6-5/8
8.625	8	8-5/8

- B. Type 1 Round Posts: Standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of the ASTM F 669, Group IA, with minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90, and weights per foot as follows:

ACTUAL L OD	Weight (lb/ft )	NPS Size
1.315	1.68	1
1.660	2.27	1-1/4
1.900	2.72	1-1/2
2.375	3.65	2
2.875	5.79	2-1/2
3.500	7.58	3
4.000	9.11	3-1/2
6.625	8.97	6
8.625	28.55	8

- C. Type 11 Round Posts: Cold-formed, electric-welded steel pipe conforming to heavy industrial requirements of ASTM F 669, Group IC, with minimum yield strength of 50,000 psi, either protective coating system below according to ASTM F 1234, and weights per foot as follows:



1. Coatings: Type B outside with a minimum of 0.9 oz. of zinc per sq. ft. after welding, a chromate conversion coating and a clear polymer overcoat. Type B inside with a minimum of 0.9 oz. of zinc per sq. ft. or Type D inside with a minimum 0.3-mil. thick, 81-percent zinc-pigmented nominal coating.
2. Coatings: Type C inside and outside with not less than 0.9 oz. of zinc-5 percent aluminum-mischmetal alloy per sq. ft.

ACTUAL L O.D.	Weight (lb/ft )	NPS Size
1.315	1.35	1
1.660	1.84	1-1/4
1.900	2.28	1-1/2
2.375	3.12	2
2.875	4.64	2-1/2
3.500	5.71	3
4.000	6.56	3-1/2

- D. Roll formed shapes will be considered for approval if they meet or exceed pipe requirements.
- E. Top Rail, Center Rail, Bottom Rail: Manufacturers longest lengths (17 to 21 feet) with sleeved couplings approximately 6 inches long. Provide bands and rail ends for attaching rails securely to each gate, corner, pull and end posts.
  1. Round Steel: 1.660-inch O.D. Type 1 or 11 steel pipe.
- F. Steel Posts:
  1. Round line or intermediate posts; 2.375 inch O.D. Type 1 or 11 steel pipe or as detailed.
  2. End, Corner and Pull Posts; 2.875 inch O.D.. Type 1 or 11 steel pipe or as detailed.
- G. Swing Gate Post; Furnish posts to support single gate leaf or one leaf of a double gate sized as follows:
  1. 2.875 inch O.D. pipe, Type 1 or 11 for gate leaves, 6 feet or less in height and opening of 5 feet or less in width.
  2. 4 inch O.D. pipe, Type 1 or 11 for gates leaves over 6 feet in height and to 12 feet in width.
  3. Size as specifically detailed on drawings.

### 2.3 FITTING AND ACCESSORIES

- A. Material: Comply with ASTM F 6.26 Mill-finished aluminum or galvanized iron or steel to suit manufacturer's standards.
  1. Steel and Iron: Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.
- B. Corner, Terminal and Gate Post Caps: Provide weathertight closure cap for each post. Each cap shall be set screw retained

or tack welded.

- C. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.
- D. Post Brace Assembly: Manufacturer's standard adjustable brace. Use materials specified below for brace, and truss to line posts with 3/8-inch diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel or cast-iron cap for each end.
  - 1. Round Steel: 1.660 inch OD Type 1 or 11 steel pipe.
- E. Center Rail and/or Bottom Rail: Provide manufacturer's standard galvanized-steel or cast-iron cap for each end.
- F. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4 inch, and a minimum of 1.2 oz. of zinc coating per sq. ft. Provided one bar for each gate and end post, and two for each corner and pull post.
- G. Tension and Brace Bands: 3/4 inch wide minimum hot dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq ft.
  - 1. Tension Bands: 0.074 inch thick (14 gage) minimum.
  - 2. Brace Bands: 0.105 inch thick (12 gage) minimum.
- H. Tension Wire: 0.177 inch diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.
  - 1. Coating Type 11 zinc in the following class as determined by ASTM A 90.
    - a. Class 3, with a minimum coating weight of 2.00 oz. per sq. ft. of uncoated wire surface.
- I. Tie Wires: 0.148 inch diameter (9 gage) galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating according to ASTM A 641, Class 3.

#### 2.4 CONCRETE

- A. Concrete: Provide concrete consisting of portland cement per ASTM C 150, aggregates per ASTM C 33, and potable water. Mix materials to obtain concrete with a minimum of 28 day compressive strength of 3000 psi. Use at least four sacks of cement per cu. yd., 1-inch maximum size aggregate, 3-inch maximum slump.

#### 2.5 GATES

- A. Fabricate perimeter frames of gates from same materials and finish as fence framework. Assemble gate frames by welding. provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frames members maximum of 8 feet apart unless otherwise indicated.
  - 1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wire.
- B. Swing Gates: Comply with ASTM F 900.

1. Steel Gates up to 8 feet wide.
  - a. Up to 6 feet high: Fabricate perimeter frames of 1.660 inch minimum OD Type 1 or 11 steel pipe.
  - b. Over 6 feet high: Fabricate perimeter frames of 1.90 inch minimum OD Type 1 or 11 steel pipe.
2. Gate Hardware: Provide galvanized hardware and accessories for each gate according to the following:
  - a. Hinges: hinges are to be Locinox Hydraulic 180° gate closer and hinge in one. Adjust to open with a maximum of 5 lbs of force to meet ADA requirements. Gates four feet and less require three hinges to permit 180 degree gate opening.
  - b. Latch: See details on the drawings.
  - c. Keeper: Where designated on plans.
  - d. Gate Stops: Provide gate stops for double gates, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking devise and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.
  - e. The maximum effort to operate gates shall not exceed 5 lbf on the pull and push side of the gates when such pull and push effort is being applied at right angles to hinged gates.

C. Locksets:

1. Locksets will be furnished under specification section 08710 and installed by fencing contractor.

3 PART 3 EXECUTION

3.1 INSTALLATION

- A. General: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.
  1. Apply fabric to outside of frame work. Install fencing on boundary lines inside of property line established by survey as required by Division 1.
- B. Excavating: Drill or hand-excavate (using post-hole digger) holes for posts to diameter and spacing indicated, in firm, undisturbed or compacted soil.
  1. Unless otherwise indicated, excavate a 12 inch hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.
- C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated.
  1. Protect portion of posts above ground from concrete splatter. Check each post for vertical and top alignment, and hold in position during placement and finishing operation.

- D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. provide expansion couplings as recommended by fencing manufacturer.
- E. Center Rails and or Bottom Rails: Install center rails in one piece between posts and flush with post on fabric side, suing rail ends and special offset fittings where necessary.
- F. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at mid-height of fabric on fences with top rail and at 1 foot below fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- G. Bottom Tension Wire: Install wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120 inch diameter (11 gage) hog rings of same material and finish as fabric wire, spaced maximum of 24 inches o.c. Use bottom tension wire unless noted specifically for a bottom rail to be used.
- H. Fabric: Pull fabric taut and tie to posts, rail and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains under tension after pulling force is released.
- I. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull and gate posts with tension bands spaced not over 15 inches o.c.
- J. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing.
- K. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends or bolts or score threads to prevent removal of nuts for added security.

### 3.2 GATE INSTALLATION

- A. Install gates plumb, level, and secure for full opening without interference. install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level, and secure.

### 3.3 ADJUSTING

- A. Gates: After repeated operation of completed installation equivalent to 3 days use by normal traffic readjust gates for optimum operating condition and safety. Lubricate operating equipment and clean exposed surfaces.

END OF SECTION

SECTION 02846

**Road and Parking Signage**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide all material, labor, equipment, and services necessary to completely install all site entry, walk, information, road and parking signage with materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.
- B. All Striping and Marking templates are to be turned over to the school district upon completion of the work.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit shop drawings listing sign styles, lettering and locations, spacing and installation method.
- C. Submit samples under provisions of Section 01300.
- D. Submit two samples illustrating full size sample sign, of type, style and color specified including method of attachment.
- E. Submit manufacturer's installation instructions under provisions of Section 01300.
- F. Include installation templates and hardware.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01500.
- B. Package signs, labeled in name groups.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesive mounted signs when ambient temperature is below 70 degrees F. Maintain this minimum during and after installation of signs.

1.5 REGULATORY REQUIREMENTS

- A. Conform to 2019 California Building Code (CBC) for all accessible parking signage. Conform to the requirements of CBC 11B-502.6, 11B-502.8 and 11B-703.5.
- B. Conform to the American Disability Act (ADA) for conformance with signage for the disabled.
- C. Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA). Regulatory changes may affect the formulation, availability, or use of the specified coatings. Confirm availability of coatings to be used prior to use, and notify the Architect of any recent changes that may have occurred after the preparation of this specification section.
- D. Traffic control signs shall comply with the State of California, Business, Transportation and Housing Agency, Department of

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Signs must be permanent and reflectorized, constructed of porcelain on steel with beaded text or approved equivalent.
- B. Sign materials shall be hot-dipped galvanized, embossed steel, with a heavy-duty baked on enamel finish.
  - 1. 16 gage steel for all signs larger than 24" x 24".
  - 2. 18 gage steel for all signs small than 24" x 24".
- C. At Accessible Parking Stalls: Each parking space reserved for accessible parking shall be identified by permanently affixed reflectorized signs. Post signs at every stall per detail on plans.
  - 1. The sign shall display the International Symbol of accessibility and border shall be white reflectorized symbol on a blue background.
  - 2. Below each sign mount a separate sign stating: "MINIMUM FINE OF \$250.00". Lettering and numbers shall be white reflectorized on a blue background.
  - 3. At Van accessible parking spaces provide a sign stating: "VAN ACCESSIBLE". Lettering shall be white reflectorized on a blue background.
- D. Accessible Entrance Signs: 9 inches high by 9 inches wide. International Symbol of Accessibility Provide and install at doors as indicated on the drawings.
- E. Accessible Gate Signs: Provide metal signage at entry gate(s) as described and shown in the drawings. Furnish with galvanized metal backing plates and machine bolts with washers and nuts for installation.
- F. Stop Signs: Standard 18-inch minimum hexagonal shape, white lettering on red background. Mount on post per detail on plans. Conform with City Standards.
- G. Directional Signs: 18-inch by 36-inch rectangular, text and locations as described on drawings per CAL TRANS standards. Mount on post per detail on plans. Mounting to conform with City Standards.
- H. Other Signs: Furnish and install at locations as shown on the drawings and directed by Architect. Mounting method to be permanent, vandal resistant and approved by the Architect.
- I. Accessories: Provide all anchors, adhesives, and accessories for a complete installation.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts existing surfaces.

### 3.2 INSTALLATION

- A. Install all signs in conformance with the latest regulatory requirements.
- B. Install in accordance with manufacturer's instructions.
- C. Install true, plumb, level and adequately secured to substrate.
- D. Install in accordance with manufacturer's instructions. Use minimum of four six head screws, one per corner.
- E. Clean and polish.

### 3.3 PROTECTION

- A. Protect work and materials of this Section and other Sections prior to and during installation of signage. Protect the installed work and adjacent material of all other trades.
- B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

### 3.4 CLEANING

- A. Clean all dust, dirt, finger marks, etc. from the signs and letters, as recommended by manufacturer.

END OF SECTION

**SECTION 02850**  
SPORTS FIELD EQUIPMENT

1      PART 1                      GENERAL

- 1.1      SECTION INCLUDES
- A.      Basketball backstops.
  - B.      Softball backstops.
  - C.      Softball bases and plates.
  - D.      Tetherball poles
- 1.2      SUBMITTALS
- A.      Submit product data and manufacturer's installation instructions for each item under provisions of Section 01300.
- 1.3      OPERATION AND MAINTENANCE DATA
- A.      Submit operation and maintenance data under provisions of Section 01700.

2      PART 2                      PRODUCTS

- 2.1      BASKETBALL BACKSTOPS
- A.      Manufacturer:
    - 1.      Porter (916) 268-0620
    - 2.      Substitutions: Under provisions of Section 01300.
  - B.      Product:
    - 1.      Furnish and Install six Model #00174-334 outdoor basketball backstop assemblies. Install per manufacturers requirements. Set in concrete footing as detailed on drawings with continuous concrete mow strip under the backstop assembly. Set the various heights as noted on the drawings.
- 2.2      SOFTBALL BACKSTOPS
- A.      Manufacturer:
    - 1.      L.A. Steel Craft  
          (714) 552-1130
    - 2.      Substitutions: Under provisions of Section 01300.
  - B.      Product:
    - 1.      Furnish and install one Model AB-62P with P-5 extensions. Install per manufacturer's requirements with concrete footings.
- 2.3      BASES AND PLATES, BASEBALL AND SOFTBALL FIELDS
- A.      Manufacturer:
    - 1.      Bolco  
          (714) 552-1130
    - 2.      Substitutions: Under provisions of Section 01300.
  - B.      Product:
    - 1.      Furnish and install at softball diamond the following:
      - Home plate. Model 300-A5
      - Pitchers plate, Model 450-C1
      - 3 Running bases, Model 120-Pro with base anchors Model 205-BA.



2.4 TETHERBALL POLES

- A. Manufacturer:
  - 1. L.A. Steel Craft  
(714) 552-1130
  - 2. Substitutions: Under provisions of Section 01300.
  
- C. Product:
  - 1. Furnish and install, Model TBPCB. Quantity as shown on the drawings. Install per manufacturer's requirements with concrete footings.

3 PART 3 EXECUTION

3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's printed instructions and as indicated on submittals.
- B. Furnish all necessary hardware, anchors, inserts, connections, concrete footings and embedded items for proper installation. Coordinate with work of other sections.
- C. Coordinate installation of work in this section with the other trades so work is performed in a sequential manner
- D. Clean all surfaces upon completion of installation and prior to acceptance by owner. All work shall be cleaned under provisions of Section 01700. Remove all debris from site.

3.2 WARRANTY AND GUARANTEE

- A. Contractor shall provide all manufacturer's warranties upon completion of work to the Architect.
- B. Contractor shall provide a one year guarantee on installation of each item in this section.

END OF SECTION

SECTION 02952

PLANTING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Complete soil preparation, soil analysis, incorporation of soil amendments, cultivation, planting, maintenance and record drawings.

1.02 REFERENCES

- A. American Association of Nurserymen, 1250 Eye Street NW., Washington, D.C. 20005, (202) 789-1900.
- B. American Standards for Nursery Stock ANSI-Z60.1.
- C. California Association of Nurserymen.

1.03 RELATED SECTIONS

- A. Irrigation: Section 02750
- B. Landscape Grading Section 02218

1.04 SUBMITTALS

- A. Comply with provisions of Section 01300, Submittals and Substitutions.
- B. Plant material sources and review: Within 30 days of award of the contract and 90 days minimum prior to commencement of work, the Contractor shall inform Landscape Architect, in writing, of the nurseries, addresses, phone numbers and representatives of each plant material type. These locations shall be available to review of plant material for conformance, size and quality by the Owner or Landscape Architect at their discretion.
- C. Substitutions: Within 20 days of award of contract, the Contractor shall in writing inform the Landscape Architect of all requested plant material substitutions. Approval or disapproval shall be at the sole discretion of the Landscape Architect. Unavailability of plant material within the immediate area shall not be considered justifiable cause for substitution. It shall be the Contractor's responsibility to secure specified plant material at the award of the contract. Non-availability at the time of construction without the above specified substitution request and approval shall be deemed the Contractor's responsibility and be grounds for contract non-conformance. All retainage amounts shall be held until the specified plant material is supplied, installed, maintained and receives final acceptance.
- D. Provide all weight tickets, delivery slips or other certified verification of all delivered amounts and volumes for all materials. Submit with each payment request. Non-submittal or incomplete

submittal shall be cause for delay of the Contractor's payment request until the submittal has been reviewed and approved.

- E. Certificates: Submit inspection certificates by state, federal and others indicating the origin and health of the plant material in duplicate. Submit affidavit that the inspection certificates refer to the plant material installed.
- F. Maintenance Data:
  - 1. Lawn and Grass: Include maintenance instructions, cutting method and maximum grass height, types, application frequency and recommended coverage of fertilizer.
  - 2. Trees, Plants and Ground Cover: Include pruning recommendations and application frequency and recommended coverage of fertilizer.

#### 1.05 GUARANTEE/QUALITY ASSURANCE

- A. Contractor shall possess a valid California Contractor License at the time his/her bid is submitted.
- B. Reviews: The Contractor shall request the following reviews, 3 days in advance, prior to proceeding with the work. Site reviews shall be conducted with the Contractor's construction superintendent and/or foreman in charge of the project for all reviews. All meeting conversation shall be in English.
  - 1. Plant Material: Plant material shall be reviewed by the Owner or Landscape Architect prior to planting. The Owner or their Authorized Representative reserves the right to refuse any plant material that is deemed unacceptable.
  - 2. Plant Material Layout: Plant material locations shall be marked prior to plant pit excavation for review and approval. All material planted prior to review may be subject to rejection and relocation at no additional cost to the Owner.
- C. Quality and Size: Quality and size shall conform with the current edition of "Horticultural Standards" for number one grade nursery stock as adopted by the American Association of Nurserymen. Only nursery grown stock shall be used unless otherwise specified on the plans.
- D. Shrub, Ground Cover and Turf Guarantee: Guarantee shrubs, ground covers and turf areas as to growth and health for 1 year after acceptance by the Owner or their Authorized Representative starting at the beginning of the maintenance period.
- E. Tree Guarantee: Guarantee trees as to growth and health for one year after acceptance by the Owner or their Authorized Representative starting at the beginning of the maintenance period.
- F. Plant Material Removal and Replacement: All plant material overgrown, root-bound, too recently canned, diseased, unhealthy, badly shaped, or with damaged rootballs are considered unacceptable and shall be removed from the project site. Plant materials that are damaged by the

Contractor during the maintenance period shall be replaced. Replace all unhealthy, dying or diseased plants, provided the Owner, on a quarterly basis, has performed adequate maintenance. Replace with materials as originally specified. Contractor shall not be held liable for acts of God, vandalism or theft after substantial completion has been awarded.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Labeling/Protection: Each tree, shrub, groundcover flat, container of fertilizer or other construction material shall be labeled by grower or manufacturer as separate items. Protect materials from deterioration at all times. Contractor shall be responsible for vandalism, theft and damage to plant material until commencement of the maintenance period.
- B. Deliveries: Bulk deliveries of mulch, topsoil, etc., shall be accompanied by two delivery tickets. One delivery ticket shall be provided to the Owner or their Authorized Representative. Seed and fertilizer shall be delivered in sealed waterproof containers. Materials in damaged packaging are not acceptable.

1.07 JOB CONDITIONS

- A. Conditions: The planting areas shall be free of waste or debris developed by other trades. Verify actual job conditions prior to the start of work and report any discrepancies between the plans and actual conditions immediately to the Owner or their Authorized Representative.
- B. Examination: Locate cables, conduit, piping and other obstacles prior to beginning excavation. Notify General Contractor of obstacles requiring relocation. Verify that landscape irrigation system has been properly installed and functioning.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Plants:
  - 1. General: All plants shall be the varieties and sizes shown on the Drawings. No substitutions will be permitted unless approved by the Owner or Landscape Architect. Each trees and shrub shall have a label identifying the plant material and grower. The Owner or Landscape Architect reserves the right to reject any unlabeled plant material. All plant material shall be free of disease, insect stages, burns and root bounding. Foliage, roots and stems of all plants shall be of vigorous health and normal habit or growth for its species. Do not prune or top prior to delivery.
  - 2. Trees: Trunks shall be straight and of uniform taper. Trunks shall be free of damaged bark, with all minor abrasions and cuts showing healing tissue. Trees unable to supports themselves without staking shall be rejected. Stake trees as shown on the drawings. All trees shall be of standard height and growth common for the container size specified. Newly shifted plants shall not meet the specified size requirement.

3. Shrubs, Groundcovers, and Annuals: Plants shall be healthy examples of the specified species. All plants shall be of standard height and growth common for the container size specified. Newly shifted plants shall not meet the specified size requirement.
  4. Sod: shall be healthy, freshly cut and delivered within one day of harvest. Sod mix shall be Medallion Fescue, available from Pacific Sod or an approved equal.
    - i. Lawn/Grass Seed: Premium, new crop seed, delivered to site in original, unopened containers bearing a dated guaranteed analysis. Lawn seed mixture shall be as follows:
  5. Sports Turf Mix by Seed Research or approved equal
 

40%	Perennial Ryegrass	(SR4200 or approved equal)
40%	Perennial Ryegrass	(SR4100 or approved equal)
20%	Kentucky Bluegrass	(SR2100 or approved equal)
  6. Hydroseeding Material
    - Fungicide: Captan as manufactured by Stauffer Chemical Company or approved equal.
    - Wetting Agent: K-90 as manufactured by Knapp Co. or approved equal.
    - Soil Binding Agent R-Binder as manufactured by Verdyoe or approval equal.
    - Wood Fiber Mulch: As manufactured by Conwed or approved equal.
- B. Tree stakes shall be two-inch diameter by ten foot tall treated lodge poles, free of knots and cracks
  - C. Tree ties shall be rubber "Cinch Ties" manufactured of virgin flexible vinyl meeting ASTM-D-412 standards for tensile and elongation strength. Material shall be black for ultraviolet resistance. Provide a minimum of four ties per tree.
  - D. Tree Paint: Manufactured by Ortho.
  - E. Soil Amendments:
    1. WonderGrow Compost (3 cy / 1,000 sf)
    2. Gypsum (50 lbs / 1,000 sf)
    3. Fertilizers:
      - a. Best Triple Fifteen fertilizer (5 lbs/ 1,000 sf)
      - b. Best 'Best Paks'
      - c. Soil Sulfur (2 lbs / 1,000 sf)
      - d. Zinc Sulfate (1 lb / 1,000 sf)
      - e. Granubor Boron 14.3% ( 1/3 lb / 1,000 sf)
  - F. Herbicides:

1. Pre-Emergent: Shall be Ron Star or approved equal and shall be applied per manufacturer's recommendations. Conform to all national, state, county and city reporting requirements.
  2. Post-Emergent: Shall be Roundup or approved equal and shall be applied per manufacturer's recommendations. Conform to all national, state, county and city reporting requirements.
- G. Top Soil: Natural, fertile friable loam, capable of sustaining vigorous plant growth, free of subsoil, roots, grass, excessive amount of weeds, stone and foreign matter; acidity range (pH) of 5.5 to 7.5 containing a minimum of 4 % and a maximum of 35 % organic matter. Obtain approval of the Owner or their Authorized Representative prior to placement.
- H. Bark: Premium 'Walk-on' grade. Clean and free of impurities.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Locate Utilities: Locate cables, conduit piping and other obstacles prior to beginning excavation. Notify General Contractor of obstacles requiring relocation.
- B. Remove Obstructions: Remove rocks and other similar underground obstructions to depths necessary to permit proper installation of turf and planting.
- C. Irrigation System: Do not begin planting until the irrigation system is completely installed, is adjusted for full coverage and is operational.

#### 3.02 GRADING

- A. Existing Soil: Work soil in manner that does not cause excessive compaction or clods that will not break easily. Soil compacted by construction equipment or soil on compacted cut slopes or grades shall be pulverized to a minimum depth of twelve inches by disking or plowing before applying topsoil. Apply water as necessary to obtain optimum moisture content for tilling and planting.
- B. Fine Grading: Grade planting and turf areas to a minimum slope of 1/4 inch per foot to drain to catch basins. Contractor shall provide positive drainage from all structures with no pockets of standing water. Contractor shall maintain a vertical grade of 1/2-inch minimum to 1 inch maximum below all walls and paving surfaces. Laser level field areas prior to any planting or seeding.

#### 3.03 SOIL PREPARATION AND PLANTING

- A. Topsoil Preparation:
1. Scarify soil or rototill to a depth of 12 inches to provide for proper grading and drainage.
  2. Eliminate uneven areas and low spots.

3. Work topsoil in relatively dry state, during dry weather.
  4. Work soil in manner that does not cause excessive compaction or create clods that will not break easily. Apply water as necessary to obtain optimum moisture content for tilling and planting.
  5. Provide neat, smooth and uniform finish grade.
  6. Remove roots, grass, weeds, stones in excess of one half inch in size and other debris while working topsoil.
  7. Manually work topsoil around existing trees and next to buildings to prevent damage.
  8. Lightly compact (roll) placed topsoil.
  9. Remove surplus subsoil and topsoil from site.
- B. Soil Amendments and Weed Control: Contractor shall have a minimum of three (3) soil samples evaluated by a reputable soil laboratory. Contractor shall have the testing laboratory provide a complete soil fertility analysis and amendment recommendations. The results of the soil tests shall be submitted to the Owner or their Authorized Representative for their review and approval. Contractor shall bid per soil amendments/backfill mix indicated below. Contractor shall adjust amendments per testing laboratory's recommendations.
1. Cultivate entire area to be planted and add the following soil amendments into the top six (6) inches of planting areas:
    - a. WonderGrow compost at the rate of 3 cy per 1,000 sf
    - b. Gypsum at the rate of 50 lbs. per 1,000 sf
    - c. Soil Sulfur at the rate of 2 lbs. per 1,000 sf
    - d. Zinc Sulfate at the rate of 1 lb. per 1,000 sf
    - e. Granubor Boron 14.3% at the rate of 1/3 lb per 1,000 sf
    - f. 15-15-15 fertilizer at the rate of 5 lbs. per 1,000 sf
- C. PRE-PLANTING WEED CONTROL:
1. After cultivation and incorporation of soil amendments, water the site until the first weed crop is established. Spray all areas, including those to bark with Roundup herbicide or approved equal in accordance with manufacturer's recommendations.
  2. Repeat watering until a second crop is established and follow with herbicide applications per manufacturers' recommendations. Planting beds and rock areas may be established after the second spraying.
- D. Tree and Shrub Planting:
1. Water plants immediately upon arrival at site. Maintain in moist condition until planted.

2. Space plants uniformly as shown on Drawings.
3. Dig plant pits two times the size of the rootball and 8 inches deeper than the length of the rootball. Provide level bottom. Fill pits with water after excavation. Auger the bottom of holes that do not drain sufficiently to provide proper drainage within four hours. Maintain pits in wet, friable condition prior to planting.
4. Plant immediately after removal of container. Position plants so that top of rootball is no more than 1 inch above finish grade. Set plants vertical in plant pit.
5. Backfill pit with a blended mixture containing one part nitrolized humus, one part native soil, one part topsoil and one-quarter cup of iron sulfate per cubic yard of backfill. When the plant is set and the backfill has been water settled, the top of the rootball shall be flush with finish grade. Best Paks shall be placed approximately six inches below finish grade during backfilling in quantity as specified on manufacturer's original packaging for the size of plant being installed.
6. Evenly apply the following fertilizers around the drip line of the plant and work into the top 1 inch of soil:
  - a. 2/3 cup ProStart fertilizer
  - b. ¼ cup Ammonium Sulfate fertilizer
7. Water all plants immediately after planting and completely saturate.
8. Stake trees as detailed, or as directed to properly support the plant material supplied.
9. Prune each tree and shrub to preserve the natural character of the plant per American Standard for Nursery Stock, as published by the American Association of Nurserymen. Prune to remove all suckers, deadwood and broken or badly bruised branches. Paint cuts over three quarter inch in diameter and exposed cambium of bruised areas with tree paint as specified herein.
10. Maintain 1-1/2 foot radius clear zone, measured from center of tree trunk, around all trees in lawn areas. Clear zone shall be kept free of turf, weeds, and debris.
11. The trunks of Trees and Shrubs are to be located so that their branches and limbs do not project out into the accessible path of travel when they are fully developed.

E. Staking and Tying:

1. Remove all nursery stakes and ties.
2. Install two tree stakes 24 inches deep and tie to tree with a minimum of two "Cinch Ties." Install "Cinch-Ties" following manufacturer's recommendations or instructions. Place stakes



outside rootball. Install ties loose enough to avoid injuring cambium layer of tree.

3. Remove nursery ties from shrubs, vines and espaliers, and install new plastic ties in a loose manner so new plant growth will not girdle the branch or stem during the first year's growth.

F. Top Dressing:

1. After planting, top dress non-turf areas with a 3 inch thick layer of bark. Water immediately to clean leaves. Apply top dressing without covering stems, branches or trunks of plants to avoid rotting the cambium layer. Remove and replace damaged plants.

G. Pre-Emergent:

1. Shrub Areas: Apply Pre-Emergent after planting of trees and shrubs and after trees and shrubs have been thoroughly watered in. Top dress soil with bark after the Pre-Emergent has been applied. Contractor shall exercise extreme caution not to apply Pre-Emergent over the top of moist foliage. Plants that experience leaf burn from application of Pre-Emergent to the foliage shall be replaced immediately by the Contractor at no additional cost to the owner.

H. Sod Planting:

1. The Owner or their Authorized Representative shall observe and approve finish grading and irrigation system coverage prior to placement of the sod.
2. Sod shall be strongly rooted, not less than 2 years old, free of weeds and undesirable grasses. Sod rolls shall not be more than 16 inches wide by 4 feet long.
3. Evenly broadcast 5 lbs. per 1,000 square feet Best ProStart and 2.3 lbs. per 1,000 square feet Ammonium Sulfate prior to placement of any sod.
4. Insure the sod base to be smooth and firm. Lay sod in a staggered pattern with tight fitted seams. Water immediately after installation. Sod shall be wet, but not spongy. Roll the turf to eliminate irregularities and ensure good contact between the sod base and topsoil. After rolling, water thoroughly to penetrate subsoil to a depth of 8-10 inches. Repeat water at regular intervals to keep sod moist at all times until rooted.
5. Water new sod areas and adjoining existing turf areas frequently and in light amounts during the first 24 hours so as to penetrate 3 inches into the soil as required for proper root growth. Maintain moisture to this depth during the maintenance period. Do not allow sod to dry out during the growth period. Areas not conforming to this requirement shall be resodded and maintained for another full maintenance period.

6. Immediately after sodding, protect the entire sodded area against traffic or other use by erecting barricades and signs. Barricades and signs shall remain until final acceptance of work.
7. The Contractor shall maintain sodded areas until sod has achieved 95 percent coverage prior to acceptance of work by the Owner or their Authorized Representative.
8. Pesticides shall not be applied within three weeks of sod placement.

I. Hydro-Seeding:

1. Do not begin hydro-seeding until finish-grading has been checked by Architect. If work is rejected due to failure to obtain Architect's approval prior to hydro-seeding, redo rejected work at no additional cost to Owner.
2. General: Hydroseeding is an artificial planting process which provides vegetation to an area by using a mixture of soil conditioner/fertilizer, seed, fungicide, wetting agent, binder, and wood fiber mulch. This mixture should be of such character that it will disperse into a uniform slurry when mixed with water in a mechanical mixer.
3. Equipment: Use a standard hydraulic mulching machine with a continuous agitation system that keeps material in uniform suspension throughout mixing and distribution cycles and with a mixing tank capacity of 500 gallons (3,000+ sq. ft. of coverage).

4. Mix per tank:

Fertilizer	25.0 lbs.
Lawn Seed	30.0 lbs.
Fungicide	1.0 lb.
Wetting Agent	5.0 pints
Binder	5.5 lbs.
Wood Fiber Mulch	120.0 lbs.

Note: If a different capacity tank is used, submit a list of the above materials with proportional amounts to be approved by Landscape Architect.

5. Application: Spray the slurry mix, under pressure, uniformly over the soil surface in a one-step operation. Protect adjacent paving, building walls, etc.
6. Clean any overspray from surfaces at end of each day's work.
7. Permit slurry to "set" approximately twenty-four hours (24 hrs) before watering. Once watering has begun, do not allow newly hydro-seeded areas to dry out.

3.04 MAINTENANCE

"Maintenance" is defined as "the upkeep of property or equipment". Construction and installation of ALL landscape/planting components must

be substantially complete, as determined by the Owner or their Authorized Representative prior to the start of the maintenance period.

- A. General: Maintain planted areas during the progress of the Work and through the maintenance period. The maintenance period shall start when the planting operations have been inspected and the irrigation system has been accepted as substantially complete. At the time of the inspection all plants and sod must be installed, in good health, and properly staked; planters shall be free of weeds and the bark top dressing installed.
- B. Maintenance Period: The maintenance period begins when the plant and sod installation is completed and accepted by the Owner or their Authorized Representative. The Owner or their Authorized Representative shall memorialize, in writing, the acceptance of the work and shall maintainance shall begin and end. The maintenance period shall be a 90 calendar days following substantial completion as determined by the Architect to insure proper establishment of plants and sod.
- C. Maintenance Schedule: The Contractor shall provide the Owner and Architect with a type written schedule for the maintenance operations including a list of tasks to be performed at each maintenance visit. The maintenance schedule shall include the items listed below:
  - a. Maintain the irrigation system in proper operating order in accordance with Section 02810 of these specifications.
- D. Soil Surfaces: Maintain soil surfaces and supply additional topsoil where necessary, including areas affected by erosion and soil and plant settlement.
- E. Irrigation System: Maintain irrigation system in proper operating order so that the right amount of water is being applied to planting areas.
- F. Weeding: Weeding shall be performed as follows; Keep clear zones and areas between plants free of weeds. Use herbicides according to manufacturer's recommendations. Cultivate as necessary for aeration.
- G. Tree Ties: Maintain and replace ties with equal material until plant is capable of standing vertical and free, and able to resist winds and winter storms.
- H. Water deeply and slowly to establish moisture to a minimum depth of six inches.
- I. Tree and Shrub Maintenance: Prune all shrubs and young trees as required by thinning and shaping as necessary to present a natural appearance. Prune deciduous trees when dormant to promote open framework in head once every other year or as necessary. Prune evergreen trees in fall and early summer to thin out heads and shape as necessary. Contractor shall prune all existing trees, removing suckers, water spouts and low branches from finish grade to a height of eight feet to enhance visibility and define the canopy. Remove all dead and damaged branches back to point of branching on all existing trees and newly planted trees and shrubs. Paint all cuts over three quarters inch in diameter with tree wax. All pruning shall be under the

direction of the maintenance consultant and consistent with good horticultural practices.

- J. Tree and Shrub Fertilization: Apply one half cup of granular 15-15-15 fertilizer per foot of shrub height, one cup per inch of tree diameter. Apply fertilizer in 1-inch diameter holes inside the drip line once per year in early spring.
- K. Turf Mowing and Maintenance:
  - 1. Mowing equipment shall be sharp and sterilized prior to mowing operations to prevent damage and infection. Grass shall be dry and soil firm at the time of mowing. The turf shall be mowed to a height of 1-1/2 inch after it has reached a height of 2 inches. Do not cut more than 1/3 of blade height at any one mowing. Clippings shall be removed and disposed of off site.
  - 2. After first mowing, water turf to a depth of 3 to 5 inches. Do not allow any area to dry out during the first 20 days following installation. Resod areas that have been allowed to dry out. Repair damaged areas immediately.
  - 3. Fertilize the turf after the first month of growth with available nitrogen at a rate of 1/2 lb. per 1,000 square feet. After three-months of growth and prior to end of maintenance period, have a minimum of three (3) soil samples evaluated by the same testing laboratory that performed the original tests. Apply fertilizer per the soil laboratory's recommendations. The lab's recommendations shall be incorporated into a regular fertilization program and schedule.
- J. Insect and Disease Control: Spray evergreen trees, deciduous trees in leaf and shrubs with specific insecticides and fungicides as frequently as necessary to control all forms of pests and diseases. Remove all contaminated material from the site.
- K. Dead or Damaged Plant Replacement: Remove dead and damaged plants and replace with materials of equivalent size, condition and variety, subject to the approval of and purchase by the Owner or their Authorized Representative. Any plants that die due to negligence by Landscape Contractor will be replaced without charge.
- L. Damage to Irrigation System: Repair and replace any irrigation equipment or other work damaged as a result of installation operations at the Landscape Contractor's expense. Accidental damage to the irrigation system not resulting from Landscape Contractor's negligence will be reported promptly to Owner or their Authorized Representative, together with an estimate of costs for correction of the condition. This applies also to changes needed to the system.
- M. Trash and Debris Removal: Contractor shall remove and properly dispose of all debris, trash, litter and waste from the turf and planter areas at each maintenance visit whether contractor generated or not.
- N. For the first 90 days of the maintenance period, the following shall occur:

1. Maintain all planting for a ninety (90) day period after completion and prior to acceptance of all planting by Architect.
2. Maintenance for planted areas shall include regular and sustained operations of watering, weeding, trimming, edging, cultivation, fertilizing, spraying insect and pest control, and/or any other operation necessary to assure good healthy growth. Work shall occur on regularly scheduled bases. A minimum of three times per month is required during the maintenance period.
3. Apply "Grow Power Plus" fertilizer to all planted areas at a rate of 15 lbs./1,000 sq. ft. beginning 30 days after planting and subsequently every 30 days thereafter.
4. Protect all planting against damage, including erosion and trespass and provide proper safeguards as needed. Repair or replace any damaged or unacceptable plantings at the contractor's expense.

3.05 CLEANING

- A. Clean landscaped area.
- B. Remove rubbish, trash and debris resulting from the operation at the end of each workday.
- C. Wash paved surfaces dirtied by landscape Work.

3.06 PROJECT RECORD DOCUMENTS

- A. Provide "As-built Plan" accurately showing any deviations from original plan.

END OF SECTION

## SECTION 03100

### CONCRETE FORMING AND ACCESSORIES

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Section Includes: All labor, materials and equipment and all operations required to complete all formwork as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:
1. Forms, shores, bracing, removal and other operations as necessary for all cast-in-place concrete and masonry placed.
  2. Setting and securing anchor bolts and other metal items embedded in concrete into formwork, using materials and layouts furnished and delivered to jobsite as specified under other sections.
- B. Related Sections:
1. Pertinent Sections of Division 03 specifying concrete construction.
  2. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete foundations and formwork.

##### **1.02 REFERENCES**

- A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 19A Concrete.
- B. American Concrete Institute (ACI) 347 "Recommended Practice for Concrete Formwork".
- C. American Plywood Association (APA) "Concrete Forming Guide".
- D. West Coast Lumberman Inspection Bureau (WCLIB) "Standard Grading Rules for West Coast Lumber".
- E. ACI SP-066 "ACI Detailing Manual".
- F. ACI 301 "Specifications for Structural Concrete".
- G. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice".

##### **1.03 DESIGN REQUIREMENTS**

- A. Design, engineer, and construct formwork, shoring and bracing to conform to design and code requirements, resist imposed loads; resultant concrete to conform to required shape, line and dimension.

##### **1.04 SUBMITTALS**

- A. Limitation of review: Structural Engineer's review will be required only where specifically requested for general architectural applications and features only. Contractor is responsible for structural stability, load-resisting characteristics and sufficiency of form work design.

#### **1.05 QUALITY ASSURANCE**

- A. General: All form materials shall be new at start of work. Produce high quality concrete construction. Minimize defects due to joints, deflection of forms, roughness of forms, nonconforming materials, concrete or workmanship.
- B. Reuse of Forms: Plywood forms may be reused, if thoroughly cleaned of all dirt, mortar, and foreign materials, and undamaged at edges and contact face. Reuse shall be subject to permission from the Architect without exception, and issued in writing. Reuse of any panel which will produce a blemish on exposed concrete, will not be permitted.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Form Materials:
1. Non-Exposed Surface Formwork Facing: Forms for concrete which is not exposed to view, may be of plywood as specified for exposed surfaces, or square edge 1x nominal Douglas Fir, Construction Grade, S4S.
  2. Exposed Surface Formwork Facing:
    - a. Forms for all exterior and interior concrete flat surfaces unless otherwise specified as board formed shall be new Douglas Fir Plywood (APA) ply, 5/8-inch, B-B Plyform, Class 1, Exterior Type, oiled and edged and edge-sealed conforming to U.S. Product Standard PS 1 in large sheet sizes to achieve joint patterns shown.
    - b. All exposed concrete edges shall be chamfered 3/4" minimum or as noted on the drawings.
  3. Exposed Surface Formwork - Special Pattern Form Liner:
    - a. Forms for all exterior and interior concrete flat surfaces indicated shall be as designated by Architect.
- B. Earth Forms: Allowed, subject to soil standing in excavations without ravel or caving.
- C. Form Release Agent: Spray-on compound, not affecting color, bond or subsequent treatment of concrete surfaces. Maximum VOC content shall comply with local requirements and California Green Building Code.
- D. Accessories: Types recommended by manufacturers or referenced standards to suit conditions indicated;

1. Anchors, spacers, void in-fill materials: sized to resist imposed loads.
  2. Form Ties: Prefabricated rod, flat band, or wire snap ties with 1" break-back or threaded internal disconnecting type with external holding devices of adequate bearing area. Ties shall permit tightening and spreading of forms and leave no metal closer than 1" to surface.
- E. Corner Chamfers and Rustications: Filleted, wood strip or foam type; sizes and shapes as detailed, or 3/4 x 3/4 inch size minimum if not detailed; maximum possible lengths.
- F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Inspect the substrate and the conditions under which concrete formwork is to be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work indicates acceptance of substrates and conditions.
- B. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

#### **3.02 EARTH FORMS**

- A. If natural soil or compacted fill can be accurately cut and maintained, foundations and grade beams may be poured against earth without forming. Provide positive protection of trench top corners.
- B. Maintain earth forms free of water and foreign materials.

#### **3.03 ERECTION - FORMWORK**

- A. General: Construct formwork in accordance with calculations, and recommendations of Section 401 of ACI 347. Construct forms to the sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, level and plumb work in finished structure. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Use selected materials to obtain required finishes.
1. Schedule the work and notify other trades in ample time so that provisions for their work in the formwork can be made without delaying progress of the project. Install all sleeves, pipes, etc. for building services systems, or other work. Secure information about and provide for all openings, offsets, recessed nailing blocks, channel chases,



- anchors, ties, inserts, etc. in the formwork before concrete placement.
2. Deflection: Formwork and concrete with excessive deflection after concrete placement will be rejected. Excessive deflection is that which will produce visible and noticeable waves in the finished concrete.
- B. Formwork Construction: Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301. Uniform, substantial and sufficiently tight to prevent leakage of concrete paste, readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials. Tie, brace, shore, and support to ensure stability against pressures from any source, without failure of any component part and without excessive deflection. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.
- C. Provide all openings, offsets, inserts, anchorages, blocking, and other features of the work as shown or required. See INSERTS, EMBEDDED PARTS, AND OPENINGS for detailed requirements.
- D. Warped, checked, or scuffed forms will be rejected.
- E. Maintain membranes, reinforcing and other work free of damage; protect with plywood runway boards or other positive, durable means.
- F. Align joints and make watertight. Keep form joints to a minimum.
- G. Provide fillet and chamfer strips on external corners of exposed locations and as indicated to form patterns in finished work. Extend patterns around corners and into alcoves, on backs of columns and similar locations not otherwise shown.
1. Produce beveled, smooth, solid, unbroken lines, except as otherwise indicated to conform to patterns.
  2. Form corners and chamfers with 3/4 inch x 3/4 inch strips, unless otherwise indicated, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer at changes in direction.
- H. Unexposed corners may be formed either square or chamfered.
- I. Ties and Spreaders: Arrange in a pattern acceptable to the Architect when exposed. Snap-ties may be used except at joints between pours where threaded internal disconnecting type shall be used.
- J. Coordinate this section with other sections of work that require attachment of components to formwork.

- K. Reglets and Rebates: Accurately locate, size, and form all reglets and rebates required to receive work of other trades, including flashing, frames, and equipment.

### **3.04 APPLICATION - FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not allow excess form coating material to accumulate in the forms or to come into contact with reinforcement or surfaces which will be bonded to fresh concrete.
- D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork will be rejected.
- E. Leave no residue or stain on the face of the concrete, nor affect bonding of subsequent finishes or work specified in other sections.

### **3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
  - 1. Provide openings in concrete formwork to accommodate work of other sections including those under separate contracts (if any). Size and location of openings, recesses and chases shall be in accordance with the section requiring such items. Accurately place and securely support items to be built into forms.
- B. Construction Joints: Construct and locate generally as indicated on Drawings and only at locations approved by Structural Engineer, so as not to impair the strength of the structure. Form keys in all cold joints shown or required.
- C. Locate and set in place items that will be cast directly into concrete.
- D. Rough Hardware and Miscellaneous Metal: Set inserts, sleeves, bolts, anchors, angles, and other items to be embedded in concrete. Set embedded bolts and sleeves for equipment to template and approved shop drawings prepared by trades supplying equipment.
- E. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- F. Wood Inserts and Nailers: Provide approved preservative-treated lumber. Set all required nailing blocks, grounds, and

other inserts as required to produce results shown. Wood plugs shall not be used.

- G. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- H. Piping: Do not embed piping in structural concrete unless locations specifically approved by Structural Engineer.
- I. Conduit: Place conduit below slabs-on-grade and only as specifically detailed on structural drawings. Minimum clear distance between conduits shall be 3 diameters. Location shall be subject to Engineer's written approval and shall not impair the strength of the structure.
- J. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
  - 1. Provide openings for the introduction of vibrators at intervals necessary for proper placement.
  - 2. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- K. Install Form Liner inserts in accordance with manufacturer's recommendations, to produce patterns and textures indicated.
- L. Install waterstops in accordance with manufacturer's recommendations to provide continuous waterproof barrier.

### **3.06 FORM CLEANING**

- A. Clean forms as erection proceeds, remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
  - 1. Remove all dirt, chips, sawdust, rubbish, water and foreign materials detrimental to concrete.
  - 2. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

### **3.07 FOOTINGS**

- A. Verify elevations and provide final excavation required for footings prior to placing of concrete.

### **3.08 EQUIPMENT BASES**

- A. Form concrete bases for all mechanical and electrical equipment in accordance with approved shop details furnished by other sections.
- B. Sizes and locations as indicated and as required to produce results shown.

- C. Provide coved base for all equipment bases placed on concrete slabs.

### **3.09 FORMWORK TOLERANCES**

- A. Construct formwork to maintain tolerances required by ACI 301.

### **3.10 FIELD QUALITY CONTROL**

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
- B. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.
- C. Clean and repair surfaces to be re-used in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.
- D. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets.

### **3.11 FORM REMOVAL**

- A. Do not loosen or remove forms before minimum curing period has elapsed without employment of appropriate alternate curing methods, approved by the Architect in writing.
- B. Remove forms without damage to the concrete using means to ensure complete safety of the structure and without damage to exposed wall edges, chamfers and inserts. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Do not remove forms until the concrete has hardened sufficiently to permit safe removal and the concrete has attained sufficient strength to safely support imposed loads. The minimum elapsed time for removal of forms after concrete has been placed shall be as follows:
  - 1. Walls: 7 days, provided members are not subjected to overhead loads.
  - 2. Footings: 7 days minimum. If backfilled immediately, side forms may be removed 24 hours after concrete is placed.
- D. Durations listed above are minimums and are subject to extension at the sole judgment of the Architect/Engineer.
- E. Reshoring: Reshore members where and if required by Formwork Design Engineer.

- F. Do not subject concrete to superimposed loads (structure or construction) until it has attained full specified design strength, nor for a period of at least 14 days after placing.
- G. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

### **3.12 CLEANING**

- A. Remove excess material and debris associated with this work from the job site.

END OF SECTION

## SECTION 03151

### CONCRETE ANCHORING

#### **PART 1 GENERAL**

##### **1.01 SECTION INCLUDES**

- A. Requirements pertaining to post-installed anchors for materials and equipment. This section pertains to all other sections of these specifications that require post-installed anchors, unless specified otherwise.

##### **1.02 RELATED DOCUMENTS**

- A. Division 2 - Site Work
- B. Division 3 - Concrete
- C. Division 5 - Metals
- D. Division 8 - Hollow Metal
- E. Division 22 - Plumbing
- F. Division 23 - Heating, Ventilating
- G. Division 26 - Electrical
- H. Division 27 - Communications
- I. Division 28 - Fire Alarm

##### **1.03 REFERENCES**

- A. 2019 - California Building Code
- B. ACI 318 - Building Code Requirements for Structural Concrete
- C. ACI 355.2 - Standard for Evaluating the Performance of Post-Installed Mechanical Anchors in Concrete
- D. ASTM A36 - Standard Specification for Carbon Structural Steel
- E. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- F. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- H. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- I. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- J. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
- K. ASTM C881 - Standard Specification Epoxy-Resin-Based Bonding Systems for Concrete
- L. ASTM E488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
- M. ASTM E1512 - Standard Test Methods for Testing Bond Performance of Bonded Anchors
- N. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- O. Federal Specifications A-A-1922A, A-A01923A and A-A-55614 for Expansion and Shield-Type Anchors
- P. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements

- Q. ICC-ES AC58 - Acceptance Criteria for Adhesive Anchors in Masonry Elements
- R. ICC-ES AC60 - Acceptance Criteria for Anchors in Unreinforced Masonry Elements
- S. ICC-ES AC70 - Acceptance Criteria for Fasteners Power-Driven into Concrete, Steel and Masonry Elements
- T. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Concrete or Masonry Elements
- U. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements
- V. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements

#### **1.04 QUALITY ASSURANCE**

- A. Post-Installed anchors and related materials shall be listed by one or more of the following agencies, as applicable:
  - 1. ICC Evaluation Service
  - 2. Underwriters Laboratories (UL) and/or Factory Mutual (FM)

#### **1.05 SUBMITTALS**

- A. Product Data: Submit data for proprietary materials, manufacturer's specifications (including finishes and/or materials), Material Safety Data Sheets (MSDS) and installation procedures.
- B. Test Reports: ICC-ES listings and performance data that includes recommended loading for each application.
- C. Only manufacturers with an ICC-ES listing will be considered for substitution requests. The contractor shall submit for Engineer-of-Record's review, calculations that are prepared & sealed by a registered Professional Engineer demonstrating that the substituted product is capable of achieving the pertinent equivalent performance values of the specified product using the appropriate design procedure and/or standard(s) as required by the California Building Code. In addition, the calculations shall specify the diameter and embedment depth of the substituted product. Any increase in material costs for such submittal shall be the responsibility of the contractor.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to job site in manufacturer's or distributor's packaging undamaged, complete with installation instructions.
- B. Protect and handle materials in accordance with manufacturer's recommendations to prevent damage or deterioration.

### **PART 2 PRODUCTS**

#### **2.01 CRITERIA**

- A. EXPANSION ANCHORS
  - 1. Cracked Concrete Wedge Anchors: Anchors used to transmit load [i.) Between structural elements and/or ii.) From life safety-related attachments] shall be designed in accordance

with ACI 318 Appendix D, which requires post-installed mechanical anchors to be qualified according to ACI 355.2. Such anchors shall be an imperial sized, threaded stud with an integral cone expander and three-segment expansion clip. The stud shall be manufactured from carbon steel and the expansion clip shall have 2 undercutting embossments per segment and be manufactured from 316 stainless steel. Carbon steel anchors shall have an electroplated zinc finish in accordance with ASTM B633, Class SC1, Type I. Anchors shall have an evaluation report issued by ICC-ES and have been tested and qualified for performance in cracked and un-cracked concrete in accordance with ACI 355.2 and ICC-ES AC193 for all mandatory tests and including the following:

- i. Seismic tension & shear in cracked concrete

Unless otherwise noted, cracked concrete wedge anchors shall be "Strong-Bolt 2" Wedge Anchors by Simpson Strong-Tie (ICC-ES ESR-3037) or TZ Anchors by Hilti (ICC-ES-1917).

2. Wedge Anchors: Anchors shall meet the physical requirements of Federal Specification A-A-1923A, Type 4. Anchors shall be non-bottom bearing type with a single piece steel expansion clip providing 360-degree contact with the base material and shall not require oversized holes for installation. Carbon steel anchors shall have an electroplated zinc finish or shall be mechanically galvanized in accordance with ASTM B695, Class 55, Type 1, as appropriate. Stainless steel anchors shall be type 303, 304 or 316. Anchors shall have an evaluation report issued by ICC-ES and have been tested in accordance with ICC-ES AC01 for all mandatory tests and including the following:
  - i. Seismic tension & shear
  - ii. Combination of tension and shear loads
  - iii. Critical and minimum edge distance

Unless otherwise noted, wedge anchors shall be "Strong-Bolt-2" Wedge Anchors by Simpson Strong-Tie (ICC-ES ESR-3037) or "TZ" anchors by Hilti (ICC-ES-1917).

3. See detail on drawings for test loads/torques for the various sizes of anchors.

#### B. ADHESIVE ANCHORS

1. An adhesive anchors shall consist of i.) an insert, and ii.) an adhesive formula. Inserts shall meet the requirements of ASTM A307, A36, A193 Grade B7, or F1554 for threaded rods or ASTM A615 or A706 for rebar. For exterior exposure the threaded insert shall be stainless steel or zinc coated carbon steel. The zinc coating shall be either hot-dipped in accordance with ASTM A153 Class C or D; mechanically deposited in accordance with ASTM B695, Class 65, Type I; or demonstrated through tests to be equivalent to the coatings previously described. The adhesive formula shall be one of the following:



2. Cracked Concrete Epoxy Adhesives: Anchors used to transmit load [i. Between structural elements and/or ii.) From life safety-related attachments] shall be designed in accordance with ACI 318 Appendix D as amended by the specific design provisions of ICC-ES AC308. Adhesives shall be a cartridge type, two-component, high solids epoxy based system dispensed and mixed through a static mixing nozzle supplied by the manufacturer. The adhesive shall meet the minimum requirements of ASTM C-881 Type I and IV, Grade 3, Class C. Acceptable installation and performance temperature ranges shall be verified with manufacturer's literature prior to installation. Epoxy adhesives shall have an evaluation report issued by ICC-ES and have been tested and qualified for use in cracked and un-cracked concrete in accordance with ICC-ES AC308 for all mandatory tests and including the following:
- i. Seismic tension and shear in cracked concrete
  - ii. Static and cyclic cracks
  - iii. Horizontal and overhead installations
  - iv. Long term creep at elevated temperatures
  - v. Damp holes
  - vi. Freeze-thaw conditions
  - vii. Critical and minimum edge distance and spacing

Unless otherwise notes, cracked concrete epoxy adhesives shall be "HIT-RE 500-V3 by Hilti (ICC-ESR 3814) or "SET-XP" (ICC-ES ESR-2508) by Simpson Strong-Tie.

3. Epoxy Adhesives: Adhesives shall be a cartridge type, two-component, solid epoxy based system dispensed and mixed through a static mixing nozzle supplied by the manufacturer. The adhesive shall meet the minimum requirements of ASTM C-881 Type I, II, IV and V, Grade 3, Class B and C. Acceptable installation and performance temperature ranges shall be verified with manufacturer's literature prior to installation. Epoxy adhesives shall have an evaluation report issued by ICC-ES and shall have been tested in accordance with ICC-ES AC58 for all mandatory tests and including the following:
- i. Seismic tension and shear
  - ii. Long term creep at elevated temperatures
  - iii. Static loading at elevated temperatures
  - iv. Damp and water-filled holes
  - v. Freeze-thaw conditions
  - vi. Critical and minimum edge distance and spacing

Unless otherwise noted, epoxy adhesives shall be "HIT-RE 500-V3 by Hilti (ICC-ESR 3814) or "SET-XP" (ICC-ES ESR-2508) by Simpson Strong-Tie.

4. Adhesive Limitations:
- i. Installation Temperature: When the base material temperature drops below 40-degrees F (5-degrees C), only Acrylic or Encapsulated Adhesives shall be used for adhesive installations. See manufacturer's instructions for additional minimum temperature requirements.

- ii. Hollow Substrates: The adhesive manufacturer's screen tubes shall be used for adhesive installations into hollow substrate material. Encapsulated Adhesives shall not be used in hollow substrate applications.
- iii. Moisture: Encapsulated Adhesives shall not be used when moisture is present in or around hole.
- iv. Oversized Holes: Refer to manufacturer's information if drilled hole size is larger than what is recommended.
- v. Core-drilled holes: Refer to manufacturer's information if holes are drilled with a core-drill bit.

5. See detail on drawings for test loads/torques for the various sizes of anchors.

#### C. CONCRETE AND MASONRY SCREW ANCHORS

1. Cracked Concrete Screw Anchors: Anchors used to transmit load [i.) Between structural elements and/or ii) From life safety-related attachments] shall be designed in accordance with ACI 318 Appendix D as amended by the specific design provisions of ICC-ES AC193. Anchors shall be manufactured from carbon steel which is subsequently heat-treated. Anchors shall be zinc-plated in accordance with ASTM B633, Class SC1, Type I. Anchors shall have an evaluation report issued by ICC-ES and have been tested in accordance with ICC-ES AC193 for all mandatory and including the following:
- i. Seismic tension and shear
  - ii. Reliability of screw anchors against brittle failure

Unless otherwise noted, cracked concrete screw anchors shall be "Titen HD" Anchors by Simpson Strong-Tie (ICC-ES ESR-2713)

2. Masonry Screw Anchors: Anchors shall have 360-degree contact with the base material and shall not require oversized or undersized holes for installation. Anchors shall be manufactured from carbon steel which is subsequently heat-treated. Anchors shall be zinc-plated in accordance with ASTM B633 or mechanically galvanized in accordance with ASTM B695. Anchors shall have an evaluation report issued by ICC-ES and have been tested in accordance with ICC-ES AC106 for the following:
- i. Seismic tension and shear
  - ii. Static tension and shear loading
  - iii. Critical and Minimum edge distance and spacing

Unless otherwise noted, concrete and masonry screw anchors shall be "Titen HD" Anchors by Simpson Strong-Tie (ICC-ES ESR-1056).

3. High strength, heat-treated anchors are recommended for permanent dry, interior non-corrosive applications or temporary outdoor applications.
4. See detail on drawings for test loads/torques for the various sizes of anchors.

C. ANCHOR SIZES

4. The anchor size (nominal diameter and embedment depth) shall be as indicated on the drawings. If not indicated on the drawings, sizes shall be provided as required to maintain not less than the appropriate Code safety factors over manufacturer's performance load tables. If the actual concrete compressive strength is not known, the compressive strength shall be determined through testing.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Where manufacturer recommends use of special tools for installation of anchors, such tools shall be used, unless otherwise permitted specifically by the Engineer or Architect of Record.
- B. Where holes are drilled in concrete or masonry, holes shall be accurately and squarely drilled, and the holes shall be cleaned in accordance with the manufacturer's recommendations.

**3.02 FIELD QUALITY CONTROL**

- A. Special Inspection, periodic or continuous, of post-installed anchors shall be provided as required by ICC-ES evaluation reports, as required by DSA and specified by the Engineer of Record. This service shall be performed by personnel independent of the Manufacturer or Contractor so as to prevent a conflict of interest.
- B. The Engineer or Architect of Record may require pullout or shear tests, in addition to Special Inspection, to determine the adequacy of anchors. A field testing program shall be established by the independent test laboratory and/or Engineer of Record and performed in accordance with appropriate ASTM test standards. Field tests shall be non-destructive whenever possible.

END OF SECTION

## SECTION 03200

### CONCRETE REINFORCING

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Section Includes:
  - 1. Reinforcing steel work for all concrete and masonry work as indicated on the drawings and specified herein.
  - 2. Coordinate this work with other work affected by these operations, such as forms, electrical work, mechanical work, structural steel, masonry and concrete.
- B. Related Sections:
  - 1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
  - 2. Pertinent Sections of Divisions 03 specifying concrete construction.
  - 3. Pertinent Sections of Divisions 04 specifying masonry construction.
  - 4. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete work.

##### **1.02 REFERENCE STANDARDS**

- A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19A Concrete.
- B. American Concrete Institute (ACI) 301 "Specifications for Structural Concrete for Buildings".
- C. ACI 318 "Building Code Requirements for Reinforced Concrete and Commentary".
- D. ACI SP-066 "ACI Detailing Manual".
- E. ASTM A615 "Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement".
- F. ASTM A706 "Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement".
- G. American Welding Society (AWS) D1.4 - "Structural Welding Code for Reinforcing Steel".
- H. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice".

##### **1.03 SUBMITTALS**

- A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication.

- B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.
- C. Shop Drawings: Show complete fabrication and placing details of all reinforcing steel. Comply with requirements of ACI SP-66. Include:
  - 1. Bar sizes and schedules.
  - 2. Shapes of bent bars, layout and spacing of bars, location of splices.
  - 3. Stirrup spacing, arrangements and assemblies,
  - 4. References to Contract Document detail numbers and designations.
- D. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.
- E. Certificates: Submit all certifications of physical and chemical properties of steel for each heat number as manufactured, including location of material in structure as specified below in Article titled QUALITY ASSURANCE. All materials supplied shall be tagged with heat numbers matching submitted Mill Test Report analyses.
- F. Samples: Provide to the Owner's Testing laboratory as specified in Article SOURCE QUALITY CONTROL.

**1.04 QUALITY ASSURANCE**

- A. Perform work of this Section in accordance with CRSI DA4, CRSI P1, ACI 301, and ACI 318.
- B. Requirements of Regulatory Agencies, refer to pertinent Sections of Division 01 and CBC.
- C. Certification and Identification of Materials and Uses: Provide Owner's Testing Agency with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection and all material identification/test information listed below.
  - 1. Provide manufacturer's Mill Test Reports for all materials. Include chemical and physical properties of the material for each heat number manufactured. Tag all fabricated materials with heat number.
  - 2. Provide letter certifying all materials supplied are from heat numbers covered by supplied mill certificates. Include in letter the physical location of each grade of reinforcing and/or heat number in the project (i.e. foundations, walls, etc.).
  - 3. Unidentified Material Tests: Where identification of materials by heat number to mill tests cannot be made,

Owner's Testing Agency shall test unidentified materials as described below.

- D. Testing and Inspection: Tests and Inspections required by Independent Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and test reports in conformance with pertinent Sections of Division 01.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- A. Comply with pertinent requirements of Division 01.
- B. Deliver reinforcement to project site in bundles marked with durable tags indicating heat number, mill, bar size and length, proposed location in the structure and other information corresponding with markings shown on placement diagrams.
- C. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or rust.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Reinforcing Steel: Deformed billet steel bars, ASTM A706 Grade 60 or ASTM A615 Grade 60.
  - 1. Welded reinforcement shall be ASTM A706, or A615 meeting carbon requirements of AWS D1.4. Welding shall conform with AWS D1.4.
  - 2. All reinforcement to be unfinished.
- B. Tie Wire: No. 16 AWG or heavier, black annealed.
- C. Concrete Blocks: On-grade conditions only, as required to support reinforcing bars in position.
- D. Reinforcing Supports: Plastic or galvanized steel chairs, bolsters, bar supports, or spacers sized and shaped for adequate support of reinforcement and construction loads imposed during concrete placement, meeting ACI and CRSI standards.
  - 1. For use over formwork: Galvanized wire bar type supports complying with CRSI recommendations. Provide plastic tips where exposed to view or weather after removal of formwork. Do not use wood, brick, or other unacceptable materials.
- E. Reinforcement Splice Couplers: For use only where specified on drawings. Submit other locations proposed for use to Engineer for review. "L-Series Bar Lock" Coupler Systems for Splicing Reinforcement Bars, UES ER-0319, by Dayton-Superior Corporation.

#### **2.02 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4), unless specifically shown otherwise. Details not specifically shown or indicated shall conform to SP-066 and specified codes and standards.
  - 1. Accurately shop-fabricate to shapes, bends, sizes, gauges and lengths indicated or otherwise required.
  - 2. Bend bars once only. Discard bars improperly bent due to fabricating or other errors and provide new material; do not re-bend or straighten unless specifically indicated. Rebending of reinforcement in the field is not allowed.
  - 3. Do not bend reinforcement in a manner that will injure or weaken the material or the embedding concrete.
  - 4. Do not heat reinforcement for bending. Heat-bent materials will be rejected.
  
- B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the work.
  - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
  - 2. Bends or kinks not indicated on Drawings or final shop drawings.
  - 3. Bars with reduced cross-section due to rusting or other cause.
  
- C. Tag reinforcement with durable identification to facilitate sorting and placing.
  
- D. Shop Fusion Welded Stirrup/Tie/Spiral Cages
  - 1. Shop fusion welding of stirrup/tie/spiral cages is permitted to aid in fabrication and handling. The following requirements shall be met.
  - 2. All reinforcing bars receiving weld shall be ASTM A706.
  - 3. Longitudinal holding wires shall be ASTM A1064.
  - 4. Shop welding shall be performed by machines under a continuous, controlled process.
  - 5. Quality control tests shall be performed on shop-welded specimens and the test results shall be available, upon request, to the Architect/Engineer.
  - 6. Tack welding of reinforcing steel is not permitted.
  - 7. Welding of any type shall not occur at 90°, 135°, or 180° bends. Circular ties and spirals may be shop fusion welded outside of areas with 90°, 135°, or 180° hook bends.
  - 8. Longitudinal bars shall not be welded to stirrups/ties/spirals.

## **2.03 SOURCE QUALITY CONTROL**

- A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following:
  - 1. Sampling and Tests of Reinforcing Bars per CBC 1910A.2.
  - 2. Material Testing:
    - a. Identified Steel: When samples are taken from bundled steel identified by heat number, matched with accompanying mill analyses as delivered from the mill, Owner's Testing Agency will perform one tensile test and one bend test

per each ten tons or fraction thereof for each required size of reinforcing steel.

- b. Unidentified Steel: When identification of materials by heat number matched to accompanying mill analyses cannot be made, perform one tensile test and one bend test per each two and one-half tons or fraction thereof for each required size of reinforcing steel. Tests of unidentified steel shall be performed by the Owner's Testing Agency and costs for these tests shall be paid by the Contractor by deductive change order.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Inspect the conditions under which concrete reinforcement is to be placed. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Coordinate with work of other sections to avoid conflicts or interference. Bring conflicts between reinforcement and other elements to Architect's attention. Resolve conflicts before concrete is placed.
- C. Notify Architect, Structural Engineer, and Authority Having Jurisdiction for review of steel placement not less than 48 hours before placing concrete.

#### **3.02 PLACEMENT**

- A. General: Comply with the specified codes and standards, and Concrete Reinforcing Steel Institute recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean bars free of substances which are detrimental to bonding. Maintain reinforcement clean until embedded in concrete.
- C. Place reinforcement to obtain the minimum coverages for concrete protection. Do not deviate from required position. Maintain required distance, spacing and clearance between bars, forms, and ground.
- D. Location and Support: Provide metal chairs, runners, bolsters, spacers and hangers, as required.
- E. Provide additional steel reinforcement as necessary or as directed, to act as spreaders or separators to maintain proper positioning.
- F. Tying and Attachment: Securely tie at all intersections and supports with wire. Prevent dislocation or movement during placement of concrete. Direct twisted ends of wire ties away from exposed concrete surfaces.



- G. Separate reinforcing from pipes or conduits with approved non-metallic separators. Do not use wood or steel form stakes or reinforcement used as stakes as support for reinforcement.
- H. Accommodate placement of formed openings required by other sections.
- I. Obstructions:
  - 1. Where obstructions, block-outs, or penetrations (conduits, raceways, ductwork) prevent continuous placement of reinforcement as indicated, provide additional reinforcing as detailed and as directed by the Structural Engineer to supplement the indicated reinforcement around the obstruction.
  - 2. Place additional trim bars, ties, stirrups, or other elements as detailed and as directed at all opening, sleeves, pipes or other penetrations through structural elements.

### **3.03 REINFORCING SPACING AND COVERAGE**

- A. Spacing: Do not space bars closer than four (4) diameters of the largest of two adjacent bars, except at bar laps, which shall be placed such that a minimum of 2 bar diameters is clear between bars.
- B. Where reinforcing in members is placed in two layers, the distance between layers shall not be less than four bar diameters of the largest bar and the bars in the upper layers shall be placed directly above those in the bottom layer, unless otherwise detailed or dimensioned.
- C. Coverage of bars (including stirrups) shall be as follows, unless otherwise shown:
  - 1. Footings: 3 inches to any soil face, 2 inches to top.
  - 2. Slabs (on grade): 2 inches to grade face, 1-1/2 inches to top face.
  - 3. Walls: 1-1/2 inches clear to form and 2 inches clear to form at soil face.

### **3.04 DOWELS, SPLICES, OFFSETS AND BENDS**

- A. Provide standard reinforcement splices at splices, corners, and intersections by lapping ends, placing bars in contact, and tightly tying with wire at each end. Comply with details shown on structural drawings and requirements of ACI 318.
- B. Provide minimum 1-1/2 inch clearance between sets of splices. Stagger splices in horizontal bars so that adjacent splices will be 4 feet apart.
- C. Splices of reinforcement shall not be made at points of maximum stress. Provide splice lengths as noted on the structural drawings, with sufficient lap to transfer the stress between bars by bond and shear.

- D. Spacing:
  - 1. Space bars minimum distance specified and all lapped bars 2 bar diameters (minimum) clear of the next bar.
  - 2. Stagger splices of adjacent bars where possible and where required to maintain bar clearance.
  - 3. Request Architect/Engineer review prior to placement for all splices not shown on the drawings.
- E. Reinforcement Couplers: Install at all locations indicated. Install couplers in accordance with manufacturer's recommendations.

### **3.05 WELDING**

- A. No reinforcing shall be welded unless specifically indicated. No reinforcing shall be welded without prior approval of the Structural Engineer and the Authority Having Jurisdiction.
- B. Only when so approved for use as noted above, all welding shall conform to AWS D1.4, ACI 318 Section 26.6.4, and CBC 1903A.8 and the following:
  - 1. All welding performed by certified welders.
  - 2. All reinforcement requires preheat prior to welding. All preheat and welding shall be continuously inspected by the Testing Agency.

### **3.06 MISPLACED REINFORCEMENT**

- A. Notify Architect/Engineer immediately if reinforcing bars are known to be misplaced after concrete has been placed.
- B. Perform no correction or cutting without specific direction. Do not bend or kink misplaced bars.
- C. Correct misplaced reinforcing only as directed in writing by the Architect/Engineer. Bear all costs of redesign, new, or additional reinforcing required because of misplaced bars at Contractor's expense.

### **3.07 FIELD QUALITY CONTROL**

- A. The Testing Agency as specified in the Article QUALITY ASSURANCE, will inspect the work for conformance to contract documents before concrete placement.
  - 1. Inspection: Provide inspection and verification of installed reinforcement. Confirm that the surface of the rebar is free of form release oil or other coatings.
  - 2. Inspect all preheat and welding activities for steel reinforcement when these occur.
  - 3. Exception: Non-structural patios, driveways, and sidewalks do not require special inspection.

### **3.08 CLEANING**

- A. Remove excess material and debris associated with this work from the job site.

END OF SECTION

## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Section Includes: Provide all labor, materials, equipment and services to complete all concrete work required, including, but not limited to, the following:
1. Foundations, curbs, and slabs-on-grade.
  2. Installation of all bolts, inserts, sleeves, connections, etc. in the concrete.
  3. Joint devices associated with concrete work.
  4. Miscellaneous concrete elements, including, but not limited to: equipment pads, light pole bases, flagpole bases, thrust blocks, and manholes.
  5. Concrete curing.
  6. Coordination with other sections:
    - a. Make all preparations and do all work necessary to receive or adjoin other work. Install all bolts and anchors, including those furnished by other sections, into formwork and provide all required blocking.
    - b. Install all accessories embedded in the concrete and provide all holes, blockouts and similar provisions necessary for the work of other sections. Provide all patching or cutting made necessary by failure or delay in complying with this requirement at the Contractor's expense.
    - c. Coordinate with other sections for the accurate location of embedded accessories.
- B. Related Sections:
1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
  2. Pertinent Sections of Division 03 specifying concrete construction.
  3. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete.
  4. Pertinent sections of other Divisions specifying floor finishes and sealants applied to concrete substrates.

##### **1.02 REFERENCES**

- A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19A Concrete.
- B. American Concrete Institute (ACI) 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete".
- C. ACI 301 "Specifications for Structural Concrete".
- D. ACI 302.1R "Guide for Concrete Floor and Slab Construction".

- E. ACI 304R "Guide for Measuring, Mixing, Transporting, and Placing Concrete".
- F. ACI 305R "Hot Weather Concreting".
- G. ACI 306R "Cold Weather Concreting".
- H. ACI 308 "Standard Practice for Curing Concrete".
- I. ACI 318 "Building Code Requirements for Reinforced Concrete and Commentary".

**1.03 SUBMITTALS**

- A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review. Submit for review prior to fabrication.
- B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.
- C. Product Data: Submit manufacturers' data on manufactured products and other concrete related materials such as bond breakers, cure/sealer, admixtures, etc. Demonstrate compliance with specified characteristics. Provide samples of items upon request. Submit material certificates for concrete aggregates and cementitious materials. Certificates shall show compliance to applicable ASTMs, the CBC, and additional requirements stated herein.
- D. Mix Designs: Submit Mix Designs for each structural concrete type required for work per requirements of articles CONCRETE MIXES and QUALITY ASSURANCE. Resubmit revised designs for review if original designs are adjusted or changed for any reason. Non-Structural mixes need not be submitted for review by Structural Engineer.
- E. Shop Drawings: Proposed location of construction and cold joints. Proposed location of all slab construction/dowel joints, control joints, and blockouts.
- F. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.
- G. Batch Plant Certificates: Include with delivery of each load of concrete. Provide Certificates to the Testing Agency and the Architect/Engineer as separate submittals. Concrete delivered to the site without such certificate shall be rejected and returned to the plant. Each certificate shall

include all information specified in Article SOURCE QUALITY CONTROL below.

- H. Engineering Analysis: Prepared by a California-licensed Civil or Structural Engineer, justifying construction-imposed loads on slabs which exceed those allowed by CBC for the specified use.
  - 1. 2000 lbs maximum allowable construction load without analysis.
  - 2. 10,000 lbs maximum allowable construction load with analysis.
- I. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

#### **1.04 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Concrete construction verification and inspection to conform to CBC 1705A.3.
- C. Common Sourcing: Provide each of the following materials from a single source for entire project.
  - 1. Cement.
  - 2. Fly ash.
  - 3. Aggregate.
  - 4. Ground Granulated Blast Furnace Slag.
- D. Follow recommendations of ACI 305R when concreting during hot weather. Follow recommendations of ACI 306R when concreting during cold weather.
- E. Services by the Independent Testing Agency (includes "Special" Inspections) as specified in this Section and as follows:
  - 1. Perform tests and inspections specified below in articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and reports to be in conformance with pertinent Sections of Division 01.
- F. Contractor shall bear the entire cost of remediation, removal, and/or replacement of concrete determined defective or non-conforming, including Architect/Engineer fees for redesign.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Materials specified by brand name shall be delivered in unbroken packages bearing manufacturer's label and shall be brand specified or an approved equal.
- B. Delivery, Handling and Storage of other materials shall conform to the applicable sections of the current editions of the various reference standards listed in this Section.

- C. Protect materials from weather or other damage. Sort to prevent inclusion of foreign materials.
- D. Specific Requirements:
  - 1. Cement: Protect against dampness, contamination, and warehouse set. Store in weather tight enclosures.
  - 2. Aggregates: Prevent excessive segregation, or contamination with other materials or other sizes of aggregates. Use only one supply source for each aggregate stock pile.
  - 3. Admixtures:
    - a. Store to prevent contamination, evaporation, or damage.
    - b. Protect liquid admixtures from freezing and extreme temperature ranges.
    - c. Agitate emulsions prior to use.

#### **1.06 ENVIRONMENTAL REQUIREMENTS**

- A. Cold Weather (Freezing or near-freezing temperatures) per ACI 306R:
  - 1. Heat concrete materials before mixing, as necessary to deposit concrete at a temperature of at least 50°F but not more than 90°F.
  - 2. Do not place concrete during freezing, near-freezing weather, snow, rain or sleet unless protection from moisture and/or cold is provided.
  - 3. Protect from freezing and maintain at a temperature of at least 50°F for not less than seven days after placing. Take special precautions to protect transit-mixed concrete.
  - 4. No salts, chemical protection or admixture are permitted without written approval of Architect/Engineer.
  - 5. Contractor shall maintain an air temperature log for the first 7 days after placement with entry intervals not to exceed 8 hours.
- B. Hot Weather per ACI 305R:
  - 1. Cool concrete materials before mixing, or add ice in lieu of mix water as necessary to deposit concrete at a temperature below 85°F.
  - 2. Do not place concrete in hot/windy weather without Architect/ Engineer review of procedures.
  - 3. Provide sunshades and/or wind breakers to protect concrete during finishing and immediate curing operations. Do not place concrete at air temperature exceeding 90°F.
  - 4. Provide modified mix designs, adding retarders to improve initial set times and applying evaporation reducers during hot/windy weather for review by Independent Testing Agency prior to use.

#### **1.07 MOCK-UP**

- A. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish, as result of formwork.
  - 1. Panel Size: Sufficient to illustrate full range of treatment.

2. Number of Panels: 2.
  3. Locate as indicated on drawings.
- B. If requested by Architect / Engineer, cast concrete against mock-up panel. Obtain acceptance of resulting surface finish prior to erecting formwork.
- C. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.
- D. Mock-up may remain as part of the Work.

#### **1.08 SCHEDULING AND SEQUENCING**

- A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the Testing Agency.
- B. Provide schedule and sequence information to Testing Agency in writing upon request. Update information as work progresses.

### **PART 2 - PRODUCTS**

#### **2.01 FORMWORK**

- A. Comply with requirements of Section 03 100.

#### **2.02 REINFORCEMENT**

- A. Comply with requirements of Section 03 200.

#### **2.03 MATERIALS**

- A. General Requirements: All materials shall be new and best of their class or kind. All materials found defective, unsuitable, or not as specified, will be condemned and promptly removed from the premises.
- B. Cementitious Materials:
1. Portland Cement: ASTM C150, Type II, low alkali.
  2. Fly Ash (Pozzolan): ASTM C618, Class F.
  3. Ground Granulated Blast Furnace Slag: ASTM C989, Grade 100 or 120.
- C. Concrete Aggregates:
1. Coarse and Fine Aggregates: ASTM C33; Stone aggregate and sand. Specific source aggregate and/or sand or shrinkage characteristics as required for class of concrete specified.
  2. Source shall remain constant throughout the duration of the job. The exact portions of the fine aggregates and coarse aggregates to be used in the mix shall be determined by the mix design.
  3. Aggregates shall be tested for alkali reactivity per CBC section 1903A.5. Where test results exceed allowable limits, additional testing of mitigation procedures shall be provided, as outlined per CBC section 1903A.5.



- D. Water: Potable, clean, from domestic source.
- E. Admixtures: All admixtures shall be used in strict accordance with the manufacturer's recommendations. Admixtures containing calcium chlorides or other accelerators shall not be used without the approval of the Architect/Engineer and the Owner's Testing Laboratory.
1. Mid Range Water Reducing Admixtures: ASTM C494 Type A, "MasterPolyHeed" (formerly "PolyHeed") series by BASF, "WRDA" series by W.R. Grace, or equal.
  2. High Range Water-Reducing Admixtures: ASTM C494 Type F, "MasterRheoBuild 1000" (formerly "RheoBuild 1000") or "MasterGlenium" (formerly "Glenium") series by BASF or equal.
  3. Water Reducing Admixture and Retarder: ASTM C494 Type B or D, "MasterPozzolith" (formerly "Pozzolith") series or "MasterSet DELVO" (formerly "DELVO") series by BASF, "Plastiflow-R" by Nox-crete, or equal.
  4. Air Entraining Admixtures: ASTM C260, product suit condition by BASF or equal.
  5. Viscosity Modifiers: ASTM C494 Type S.
- F. Slurry: Same proportion of cement to fine aggregates used in the regular concrete mix (i.e. only coarse aggregate omitted); well mixed with water to produce a thick consistency.
- G. High Strength Grout: ASTM C1107, non-shrink, premixed compound consisting of aggregate, cement, and water reducing plasticizing agents. Minimum compressive strength  $f'c = 7000$  psi at 28 days. Non-metallic where exposed to view. BASF "MasterFlow 928" or equivalent.
- H. Dry Pack: Dry pack (used only for cosmetic concrete repairs) shall consist of:
1. One part cement to 2-1/2 parts fine aggregate (screen out all materials retained on No.4 sieve), mixed with a minimum amount of water, added in small amounts.
  2. Mix to consistency such that a ball of the mixture compressed in the hand will retain its shape, showing finger marks, but without showing any surface water.

## **2.04 ACCESSORIES**

- A. Bonding Agent: ASTM C881, Type II Grade 2 Class B or C. Do not allow epoxy to set before placing fresh concrete.
1. "MasterEmaco ADH 326" (formerly "Concresive Liquid LPL") by BASF;
  2. "Rezi-Weld 1000" by W.R. Meadows.
- B. Chemical Hardener: Fluorosilicate solution designed for densification of cured concrete slabs. "MasterKure HD 300 WB" (formerly "Lapidolith") by BASF, "LIQUI-HARD" W.R. Meadows Co, or equal.
- C. Moisture-Retaining Cover: ASTM C171, type 1, one of the following:

1. Regular Curing Paper, Type I, reinforced waterproof: Fortifiber Corporation "Orange Label Sisalkraft", "Pabcotite" paper, or equal.
  2. Polyethylene Film: ASTM D 2103, 4 mil thick, clear or white color.
  3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd.
- D. Liquid Curing Compound: ASTM C 309, Type 1, Class B, clear or translucent, 25% minimum solids, water base acrylic cure/sealer which will not discolor concrete and compatible with bonding of finishes specified in related sections. W.R. Meadows Co. "Vocomp 25" or equal. Maximum VOC content shall comply with local requirements and California Green Building Code.
- E. Under Slab Water Vapor Retarder: Vapor retarder sheet to be ASTM E1745 Class A; 15 mil, single ply extruded polyolefin; permeance no greater than 0.01 U.S. Perms per ASTM E154, ASTM E96 procedure B or ASTM F1249.
1. "Stego Wrap Vapor Barrier (15mil)" by Stego Industries LLC.
  2. "Vaporguard" by Reef Industries.
  3. Approved Equal.
- F. Evaporation Reducer: "MasterKure ER 50" (formerly Confilm), by BASF.
- G. Permeability Reducer: Use only where specifically referred to.
1. Admixture Type: Xypex Chemical Corporation "XYPEX Admix C-500". Dosage: 2-3% of cement content by weight; 15 lb/cu. yd. max. or BASF "MasterLife 300D" (formerly "Rheomac 300D"). Dosage: 2% of cement content by mass.
  2. Surface-Applied Type: Xypex Chemical Corporation "XYPEX Concentrate. Brush application: 1.25-1.50lb/sq. yd., 5 parts powder to 2 parts water. BASF "MasterSeal 500" (formerly "Tegraproof"). Slurry coat: one part water to 2.25-2.5 parts powder by volume.
  3. Approved equal.

## 2.05 JOINT DEVICES AND MATERIALS

- A. Waterstops: Resilient type, meeting Corps of Engineers CRD-C 572. Consult manufacturer for appropriate product for specific use. Submit for review. Install per manufacturers recommendation. Provide W. R. Meadows "Seal Tight" PVC waterstop, Sika "Greenstreak" PVC waterstop, or approved equal.
- B. Expansion Joint Filler: ASTM D1751, Nonextruding, resilient asphalt impregnated fiberboard or felt, 3/8 inch thick and 4 inches deep; tongue and groove profile.
1. Products: "Servicised Products", W.R. Meadows, Inc., "National Expansion Joint Company", "Celotex Corporation", or equal.
- C. Joint Filler: ASTM D944, Compressible asphalt mastic with felt facers, 1/4 inch thick and 4 inches deep.

- D. Sealant and Primer: As specified in Section 07 9000.
- E. Slab Joint Sealant: Compatible with floor finishes specified in related sections.

## 2.06 CONCRETE MIXES

- A. General requirements for mix design and submittal of structural class concrete:
  - 1. Provide Contractor submittals to Architect/Engineer not less than 15 days before placing concrete.
  - 2. Contractor shall review mix designs and proposed placing requirements prior to submittal for compatibility to ensure that the concrete as designed can be placed in accordance with the drawings and specifications.
  - 3. Changes or revisions require re-submittal: All variations to approved mix designs, including changing type and/or quantity of admixtures shall be resubmitted to the Architect/Engineer for review prior to use.
  - 4. Mix design(s) for all structural classes of concrete to be prepared by qualified person experienced in mix design. Allow for time necessary to do trial batch testing when required.
  - 5. Preparer to provide backup data and certify in writing that mix design meets:
    - a. Requirements of the specifications for concrete durability and quality
    - b. Requirements of the California Building Code and ACI 318 Section 26.4, including break histories, trial batching test results, and/or a mix designed by a California Registered Civil Engineer per ACI 318 Section 26.4.3.1(b) and bearing the Engineer's seal & signature.
  - 6. Clearly note on mix designs with specified maximum WCR if design permits addition of water on site, or clearly identify in the mix design that no water is to be added on site.
  - 7. Deviations: Clearly indicate proposed deviations, and provide written explanation explaining how the deviating mix design(s) will provide equivalent or better concrete product(s) than those specified.
  - 8. Include adjustments to reviewed mix designs to account for weather conditions and similar factors.
- B. Proportioning - General: The following provisions apply to all mix designs:
  - 1. Proportion concrete mixes to produce concrete of required average strength (as defined by ACI 318 Section 19.2.1). Select slump, aggregate sizes, shrinkage, and consistency that will allow thorough compaction without excessive puddling, spading, or vibration, and without permitting the materials to segregate, or allow free water to collect on the surface.
  - 2. Select aggregate size and type to produce dense, uniform concrete with low to moderate shrinkage, free from rock pockets, honeycomb and other irregularities.

3. Mix designs may include water reducing and retarding admixtures to meet or exceed minimum set times (time required to place and finish) and to minimize Water Cement Ratios (WCR). Minimum and maximum criteria presented in this section are guidelines and do not represent a specific mix design.
  4. Cement Content: Minimum cement content indicates minimum sacks of cementitious material. Increasing cement content to increase early strengths or to achieve specified WCR while maintaining water content is discouraged in order to minimize effects of shrinkage.
    - a. Substitution of fly ash for Portland cement on an equivalent weight basis up to 25% replacement is permitted. Replacement in excess of 25% is not permitted unless part of a specified mix design that has been submitted for review.
    - b. Substitution of slag for Portland cement on an equivalent weight basis up to 45% replacement is permitted. Replacement in excess of 45% is not permitted unless part of a specified mix design that has been submitted for review.
    - c. Such substitution requests may be denied by the Engineer.
  5. Water Content: Mix designs with a specified maximum Water Cement Ratio (WCR) may be designed with a lower WCR than specified in order to allow addition of water at the site.
  6. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301 and this section.
    - a. For trial mixtures method, employ independent testing agency acceptable to Architect/Engineer for preparing and reporting proposed mix designs.
  7. Placement Options: Mix designs may, at the Contractor's option, be designed for either pump or conventional placement with aggregate size, slumps, etc. to be maintained as specified in this section.
- C. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations and this section.
- D. Proportioning Structural Light Weight Concrete: Comply with ACI 211.2 recommendations and this section. Maximum cured weight of light weight concrete shall be 120 pounds per cubic feet. General Contractor is responsible for coordinating and providing light weight concrete density to meet the required fire assembly rating of the Construction Documents at the concrete depths provided in the structural drawings. General Contractor to notify the Structural Engineer for review if light weight concrete of the required density for the specified fire assembly rating cannot be sourced.
- E. Special mix design requirements for interior concrete floor slabs on grade:
1. Proportion concrete mixes per this specification, ACI 211.1, and the requirements below:

2. Fly Ash Type F, shall be substituted for cement on a 1 lb. per 1 lb. basis, with a minimum replacement of 25% and a maximum of 35%. Alternatively, Slag Grade 100 or 120, shall be substituted for cement on a 1 lb. per 1 lb. basis, with a minimum replacement of 30% and a maximum of 45%.
3. 200 lbs. of 3/8(-) aggregate shall be added to reduce total sand.
4. Reduce total sand to minimum practical.
5. Admixture dosage shall be per manufacturer's recommendations. Dosage may be increased for workability as long as set times are not excessive for placement and finishing.

F. Mix Design Minimum Requirements:

Concrete Class	Coarse Aggregate Size (Inches) & Fine Aggregate <sup>3</sup>	Maximum WCR or Maximum Nominal Slump & Tolerance (Inches) <sup>1,2</sup>	Minimum 28-Day Design Strength	Minimum Cement Sacks/per yd <sup>4</sup>
<b>STRUCTURAL</b>				
1) Interior Slab on Grade <sup>5</sup>	1" x #4	WCR = .45	3,000	6.1
2) Foundation (including stem walls)	1" x #4	WCR = .53	3,000	5.0

1. The tolerance is the maximum deviation allowable without rejection. The mix design shall be based on the nominal value specified and is without water reducing mixtures. Slump to be measured at the end of the hose.
2. The maximum water cement ratio (WCR) is limited at time of placement as noted. No water is to be added on site such that the specified WCR or maximum slump is exceeded without approval of the testing laboratory and the Architect/Engineer. Workability is to be achieved utilizing an acceptable mid-range to high range water reducing admixture.
3. Gradation of aggregate is per ACI 318 section 26.4.1.2 and ASTM C33.
4. Minimum cement content includes all cementitious materials.
5. See Article 2.06E for additional requirements at slabs on grade.

**2.07 MIXING CONCRETE**

- A. Batch final proportions in accordance with approved mix designs. All adjustments to approved proportions, for whatever reason, shall be reviewed by the Architect/Engineer prior to use.
- B. Batch and mix concrete in accordance with ASTM C94, at an established plant. Site mixed concrete will be rejected.

- C. Provide batch and transit equipment adequate for the work. Operate as necessary to provide concrete complying with specified requirements.
- D. Place mixed concrete in forms within 1-1/2 hours from the time of introduction of cement and water into mixer or 300 revolutions of the drum whichever comes first. Use of, re-mixing, and/or tempering mixed concrete older than 1 hour will not be permitted.
- E. Do not add water at the site to concrete mixes with a maximum specified WCR unless the water content at batch time provides for a WCR less than specified and this provision, including the quantity of water which may be added at the site, is specifically noted on the mix design and certification by the mix preparer. See ASTM C94 for additional requirements.

## **2.08 SOURCE QUALITY CONTROL**

- A. Services by independent Testing Agency:
  - 1. Where aggregate alkali reactivity testing (and, when applicable, mitigation testing) per the MATERIALS section is not available, the Testing Agency shall perform this testing to verify materials conformance to CBC section 1903A.5.
  - 2. Batch Plant inspection at automated plants to occur at commencement of concrete work each day (first truck). Batch Plant inspection at non-automated plants and when accuracy is questionable shall be continuous. Additionally, water cement ratio (WCR) is to be verified where a WCR is specified herein. The computed WCR is to be written on the Batch Plant Certificate to be taken to the job site prior to the truck leaving the plant. See requirements of CBC 1705A.3.3.
  - 3. Batch Plant Certificates: Obtain the weighmaster's Batch Plant Certificate at arrival of truck at the site. If no batch plant certificate is provided, recommend to the General Contractor that the truckload of concrete be rejected. So note in daily log, along with the location of the load of concrete in the structure if the load is not rejected. See requirements of CBC 1705A.3.3.
    - a. Laboratory's inspector shall obtain for each transit mixer Batch Plant Certificates to verify mix design quantities and condition upon delivery to the site.
    - b. Certificates to include: Date, time, ingredient quantities, water added at plant and on job, total mixer revolutions at time of placement, and time of departure.
    - c. Concrete with specified water cement ratio: Add no water on site unless mix design and batch records each show additional water may be added. See ASTM C94 for additional requirements.

## **PART 3 - EXECUTION**

### 3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.
- B. Verify work of other sections is complete and tested as required before proceeding.

### 3.02 PREPARATION

- A. Observation, Inspection and Testing:
  - 1. Architect/Engineer: Notify not less than 2 working days before each concrete placement, for observation and review of reinforcing, forms, and other work prior to placement of concrete.
  - 2. Testing Agency: Notify not less than 24 hours before each placement for inspection and testing.
- B. Placement Records: Contractor shall maintain records of time, temperature and date of concrete placement including mix design and location in the structure. Retain records until completion of the contract. Make available for review by Testing Agency and Architect/Engineer.
- C. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.
- D. Verify location, position and inclusion of all embedded and concealed items.
- E. Verify installation of vapor retarder under interior slabs on grade, as specified in related section, is complete.
- F. Cleaning and Preparation:
  - 1. Remove loose dirt, mud, standing water, and foreign matter from excavations and cavities.
  - 2. Close cleanout and inspection ports securely.
  - 3. Thoroughly clean reinforcement and other embedded items free from loose rust and foreign matter. Maintain reinforcing securely in place. Do not place concrete on hot reinforcing.
  - 4. Dampen form materials and substrates on which concrete is to be placed at least 1 hour in advance of placing concrete; repeat wetting as necessary to keep surfaces damp. Do not saturate. Do not place concrete on saturated material.
    - a. Thoroughly wet wood forms (except coated plywood), bottom and sides of trenches, adjacent concrete or masonry and reinforcement.
    - b. Concrete slabs on base rock, dampen rock.
    - c. Concrete slabs on vapor retarder, do not wet vapor retarder.
  - 5. Verify that metal forms are clean and free of rust before applying release agent.
  - 6. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

- G. Drill holes in existing concrete at locations where new concrete is doweled to existing work. Insert steel dowels and prepare connections as detailed.
- H. Do not overcut at existing concrete work to remain. Contractor is responsible for repair/replacement of overcut concrete to the Owner's satisfaction.

### **3.03 PIPES AND CONDUITS IN CONCRETE**

- A. Slabs-on-Grade:
  - 1. No pipe or conduit exceeding 1 inch outside diameter shall be embedded within the specified slab thickness except as specifically detailed.
  - 2. Do not stack or abut pipes, maintain 3 inches minimum clearance.
- B. Sleeving and Wrapping:
  - 1. Foundations: Sleeve or wrap all individual pipe penetrations, minimum 1-1/2 inches clear to reinforcing all around.
    - a. Sleeves: PVC. Provide 1 inch minimum clear all around O.D. pipe to I.D sleeve, UNO at ends, fill void space with mastic or plastic bituminous cement.
    - b. Wrapped Vertical Pipes: Provide 1/8 inch nominal sheet foam with three wraps minimum, UNO.
    - c. Wrapped Horizontal Pipes: Provide 1/8 inch nominal sheet foam with eight wraps minimum, UNO.
    - d. Underground Fire Lines 4" and Larger: At sleeves provide 2 inch minimum clear all around O.D. pipe to I.D sleeve. At wrapped pipes, provide 1/8 inch nominal sheet foam with sixteen wraps minimum.
  - 2. Slabs or Curbs: Wrap pipes as described above.
- C. Space groups of pipes/conduits at least 3 sleeve diameters apart, do not interrupt specified concrete and reinforcement.
  - 1. Provide block-outs as detailed when grouping of pipes/conduits in foundation or other structural member prevents spacing as described. Notify Architect/Engineer for review of any conditions not conforming to details.
  - 2. Center pipe/conduit penetrations in the depth and/or thickness of foundations.
  - 3. Maximum size of pipe/conduit penetrations shall not exceed the least dimension of concrete divided by 3.

### **3.04 CONCRETE PLACEMENT**

- A. Transporting:
  - 1. Provide clean, well-maintained equipment of sufficient quantity and capacity to execute the work and produce concrete of quality specified.



2. Handle and transport concrete from mixer to final deposit location as rapidly as practicable. Prevent separation or loss of ingredients.
- B. Perform concrete placement by methods which will not puncture, damage or disturb vapor retarder membrane. Repair all damage to vapor retarder membrane before covering.
- C. Placement - General: Placement, once started, shall be carried on as a continuous operation until section of approved size and shape is completed. Provide construction joints as detailed on the drawings. Engineer's written approval required for all deviations.
1. Deposition:
    - a. Deposit concrete to maintain an approximately horizontal plastic surface until the completion of the unit placement.
    - b. Deposit as neatly as practicable in final position, minimize re-handling or flow.
    - c. Do not drop concrete freely where reinforcing bars, embeds, or obstructions occur that may cause segregation. Provide spouts, elephant trunks, or other means to prevent segregation during placement.
  2. Progress Cleaning: Remove all concrete spilled on forms or reinforcing steel in portions of structure not immediately concreted. Remove completely before concrete sets.
  3. Interruptions: Shut down placement operations and dispose of all remaining mixed concrete and concrete in hoppers or mixers following all interruption in placement longer than 60 minutes.
    - a. If such interruption occurs, provide new or relocate existing construction joints as directed by Engineer.
    - b. Cut concrete back to the designated line, cleaning forms and reinforcing as herein specified.
    - c. Prepare for resumption of placement as for new unit when reason for interruption is resolved.
- D. Consolidation:
1. Consolidate all concrete thoroughly during placement with high-speed mechanical vibrators and other suitable tools. Perform manual spading and tamping to work around reinforcement, embedded fixtures, and into corners of formwork as required to obtain thorough compaction.
    - a. Provide vibrators with sufficient amplitude for adequate consolidation.
    - b. Use mechanical vibrators at each point of concrete placement.
    - c. Keep additional spare vibrators, in addition to those required for use, at the site for standby service in case of equipment failure.
  2. Consolidate each layer of concrete as placed.
    - a. Insert vibrators vertically at points 18 to 30 inches apart; work into top area of previously

placed layer to reconsolidate, slowly withdraw vibrator to surface.

- b. Avoid contact of vibrator heads with formwork surfaces.
- c. Systematically double back and reconsolidate wherever possible. Consolidate as required to provide concrete of maximum density with minimized honeycomb.

E. Unacceptable Materials:

- 1. Do not place concrete that has started to set or stiffen. Dispose of these materials.
- 2. Do not add water on site to concrete except as specified in the approved mix design, see PART 2 above.

F. Protection of installed work:

- 1. Do not introduce any foreign material into any specified drainage, piping or duct systems.
- 2. Contractor shall bear all costs of work required to repair or clean affected work as a result of failure to comply with this requirement.

### 3.05 CONCRETE JOINTS

A. Structural Joints (Construction/Cold Joints):

- 1. Locate joints only where shown, or as approved.
- 2. Review Required: Joints not indicated on the plans shall be located to meet the minimum requirements below, shall not impair the strength of the structure and shall be submitted to Architect/Engineer for review prior to placement of concrete.
  - a. Indicate proposed location(s) of construction/cold/expansion joints on shop drawing submittals for review prior to placing concrete.
- 3. Clean and roughen all surfaces of previously placed concrete at construction joints by washing and sandblasting to expose aggregate to 1/4 inch amplitude.
- 4. Slabs-On-Grade: Maximum Length of continuous placement shall not exceed 60 feet without special review by the Architect/Engineer. Alternate or stagger placement sections.
- 5. Foundations: Maximum Length of continuous placement shall not exceed 200 foot increments. Provide "keyed" shut-off locations made up with form boards. Extend reinforcing one lap length or more through shut-off.
  - a. All reinforcement shall be continuous through construction/cold joint, lapping to adjacent reinforcing in future placement.

B. Expansion/Construction Joints (Dowel Joints and Control Joints):

- 1. Interior and Exterior Slabs-on-Grade:
  - a. Expansion/Construction Joints: Provide dowel joints or control joints at a maximum dimension (in feet) of three times the slab thickness (in inches) in each direction unless noted

otherwise (15'-0" maximum). Install joints to match slab level and in straight lines. Locate joints at all reentrant corners including blockouts.

- b. Proportions: Install joints to divide slab into rectangular areas with long dimensions less than 1.5 times short dimension.
2. Exterior Concrete Slabs on Grade (walkways, patios):
    - a. Expansion/ construction joints: Provide a 2 inch deep troweled groove or asphalt impregnated joint material embedded 50 percent of the slab depth at 12 feet on center, maximum.
    - b. Proportions: Place no section with a length larger than two times width. Additionally, place joints at all inside corners and at all intersections with other work.

C. Joint Types:

1. Dowel Joint: A keyed joint with smooth dowels passing through to allow unrestricted movement due to contraction and expansion. Joints are as specified on the drawings.
2. Control Joint(s): Shrinkage crack control joints may be of the following types when shown on the drawings. Install joints in a straight line between end points with edges finished appropriate to type. Depth shall be 25% of the slab thickness, unless noted otherwise. Fill joints with sealant as shown on the drawings or as required by related sections.
  - a. 1/4 inch wide troweled joint.
  - b. Keyed joint: Only at locations where concealed by other finishes.
  - c. Masonite Strip, 1/8 inch: Only at locations where concealed by other finishes.
  - d. Saw Cut, 1/8 inch: Must be performed within eight hours of completion of finishing. Do not make saw cuts if aggregate separates from cement paste during cutting operation. Prevent marring of surface finish. Fill with flexible sealant.

**3.06 VAPOR RETARDER**

- A. Vapor Retarder Installation: Install as specified in PART 2, ASTM E1643, and per manufacturer's recommendations including taping and lapping of seams, sealing of penetrations, and repair of damage. Do not extend vapor retarder below footings.

**3.07 FLATWORK**

- A. General Requirements for All Concrete Formed & Finished Flat:
  1. Edge Forms and Screeds: Set accurately to produce indicated design elevations and contours in the finished surface, edge forms sufficiently strong to support screed type proposed.
  2. Jointing: Located and detailed as indicated.

3. Consolidation: Concrete in slabs shall be thoroughly consolidated.

B. Flatwork Schedule:

1. Exterior Slabs-On-Grade: Place concrete directly over sub-base as indicated.
  - a. Sub-Base: Clean free-draining, crushed base rock, 4 inch minimum thickness, thoroughly compacted.
2. Interior Slabs-On-Grade:
  - a. Sub-Base: Clean free-draining, crushed base rock, 4 inch minimum thickness, thoroughly compacted.
  - b. Vapor Retarder: Install over sub-base.

**3.08 FORMED SURFACES**

- A. Form all concrete members level and plumb, except as specifically indicated. Comply with tolerances specified in ACI 318 Section 26.11, ACI 301 Section 2, and this specification, except that maximum permissible deviation is 1/4 inch end-to-end for any single member.

**3.09 CONCRETE FINISHES**

A. Flatwork Finishing:

1. All exposed concrete flatwork surfaces shall be non-slip. See Architectural, Civil, and Landscape drawings.
2. Perform with experienced operators.
3. Finish surfaces monolithically. Establish uniform slopes or level grades as indicated. Maintain full design thickness.
4. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on drawings.
5. Flatwork Finish Types:
  - a. Wood Float Finish: Surfaces to receive quarry tile, ceramic tile, or cementitious terrazzo with full bed setting system, or wood frame for raised finished floors.
  - b. Steel Trowel Finish: Surfaces to receive carpeting, resilient flooring, seamless flooring, thin set terrazzo, thin set tile or similar finishes specified in related sections. Trowel twice, minimum.
  - c. Broom Texture Finish: Exterior surfaces as indicated or for which no other finish is indicated. Finish as for steel trowel finish, except immediately following first troweling, (depending on conditions of concrete and nature of finish required) provide uniform surfaces texture using a medium or coarse fiber broom.

- B. Other Concrete: Provide as required to achieve appearance indicated on structural and architectural drawings and related sections.

1. Repair surface defects, including tie holes, immediately after removing formwork.

2. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
3. Exposed Form Finish: Finish concrete to match forms. Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
  - a. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
  - b. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
  - c. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
4. Intermediate joint and score marks and edges: Tool smooth and flush unless otherwise indicated or as directed by the Architect.
5. Use steel tools of standard patterns and as required to achieve details shown or specified. All exposed corners not specified to be chamfered shall have radiused edges.

### **3.10 TOLERANCES**

- A. Minimum Flatwork Tolerances: Measure flatness of slabs with in 48 hours after slab installation in accordance with ACI 302.1R and ASTM E1155 and to achieve the following FF and FL tolerances:
  1. Exterior surfaces: 1/8 inch minimum per foot where sloped to drain. Level otherwise. FF20 and FL15.
  2. Interior surfaces not otherwise shown or required: Level throughout. FF25 and FL20
  3. Interior surfaces required to be sloped for drainage: 1/8 inch in 10 ft.
  4. Finish concrete to achieve the following tolerances:
    - a. Under Glazed Tile on Setting Bed: FF30 and FL20.
    - b. Under Resilient Finishes: FF35 and FL25.
    - c. Flooring manufacturer and pertinent section of Division 9.
- B. Formed Surface Tolerances:
  1. Permanently Exposed Joints and Surfaces: Provide maximum differential height within two feet of, and across construction joints of 1/16 inch.
  2. Vertical Elevations: Elevation of surfaces shall be as shown or approved.

### **3.11 SEPARATE FLOOR TOPPINGS**

- A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

- B. Place required dividers, edge strips, reinforcing, and other items to be cast in.
- C. Apply bonding agent to substrate in accordance with manufacturer's instructions.
- D. Apply sand and cement slurry coat on base course, immediately prior to placing toppings.
- E. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels not to exceed 20 feet in either direction.
- F. Screed toppings level, maintaining surface tolerances per above.

### **3.12 CONCRETE CURING**

- A. Curing - General: Cure in accordance with ACI 308. Maintain concrete water content for proper hydration and minimize temperature variations. Begin curing immediately following finishing.
- B. Protection During Curing: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. The General Contractor is responsible for the protection of the finished slab from damage.
  - 1. Avoid foot traffic on concrete for minimum of 24-hours after placement.
  - 2. Protect concrete from sun and rain.
  - 3. Maintain concrete temperature at or above 50 degrees F. during the first 7 days after placement. See Article ENVIRONMENTAL REQUIREMENTS.
  - 4. Do not subject concrete to design loads until concrete is completely cured, and until concrete has attained its full specified 28-day compressive strength or until 21 days after placement, whichever is longer.
  - 5. Protect concrete during and after curing from damage during subsequent building construction operations. See Article PROTECTION.
- C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
  - 1. Normal concrete: Not less than 7 days.
- D. Begin curing immediately following finishing.
- E. Surfaces Not in Contact with Forms:
  - 1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than 3 days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
  - 2. Begin final curing after initial curing but before surface is dry.

- a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
    - b. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.
  3. In addition, see specific conditions noted below.
- F. Slabs on Grade: Cure by one of the following methods:
1. Water Cure (Ponding): Maintain 100 percent coverage of water over floor slab areas, continuously for minimum 7 calendar days.
  2. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
  3. Moisture-Retaining Film or Paper: Lap strips not less than 6 inches and seal with waterproof tape or adhesive; extend beyond slab or paving perimeters minimum 6 inches and secure at edges; maintain in place for minimum 7 days.
  4. Absorptive Moisture-Retaining Covering: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides and extend beyond slab or paving perimeters 6 inches minimum; maintain in place for minimum 7 days.
  5. Liquid Membrane-forming Curing Compound: Provide only when subsequent concrete treatments or finish flooring specified in related sections will not be affected by cure/sealer. Apply curing compound in accordance with manufacturer's instructions at the maximum recommended application rate in two coats, with second coat applied at right angles to first.
- G. Foundations: Apply curing compound immediately after floating.

### **3.13 CONCRETE HARDENER**

- A. Apply hardener to all floor slabs not receiving other finishes after 30 days minimum curing. Clean slabs of non-compatible cure/sealers or other foreign material(s) and apply in strict accordance with the manufacturer's directions.

### **3.14 GROUTING AND DRY PACK**

- A. Bolts or inserts dry packed or grouted in place shall cure for minimum 7 days before tensioning.

### **3.15 FIELD QUALITY CONTROL**

- A. Testing and Inspections by Independent Testing Agency: Provided verification and inspection of concrete per CBC Table 1705A.3. Provide written reports for to Engineer, Architect, Contractor and Building Official for the following tests and inspections:
- B. Testing & Inspection: Provide periodic inspection of reinforcing steel. Provide continuous inspection during placement of structural class concrete, 3000 psi or more. Non-structural class concrete with a design strength of 2500

psi or less to have periodic inspection on a 150 cubic yard basis as required to assure conformance.

1. Provide periodic inspection of bolts in concrete prior to and during placement where so noted on the construction documents.
2. Structural Concrete Cylinder Tests: Perform in accordance with ASTM C31.
  - a. Take four standard 6 inch x 12 inch (or five 4 inch x 8 inch) cylinder specimens on the site, of each class of concrete as specified in PART 2, not less than once a day or for each 50 cubic yards or 2000 sq ft or fraction thereof placed each day.
  - b. Record the location of each concrete batch in the building in a log and also note on each specimen.
  - c. Perform standard compression test of cylinders in accordance with ASTM C39, one at 7 days and two (three for 4x8 cylinders) at 28 days.
  - d. Hold fourth (fifth) cylinder untested until specified concrete strengths are attained.
3. Structural Concrete Slump Test and Air Tests: Perform in accordance with ASTM D143 and C231 or C173 at the time of taking test cylinders, and/or at one-hour intervals during concrete placing.
4. Measure and record concrete temperature upon arrival of transit mixers and when taking specimens. Note weather conditions and temperature.
5. Propose adjustments to reviewed mix designs for Architect / Engineer review to account for variations in site or weather conditions, or other factors as appropriate.
6. Water Vapor Transmission Tests: Floors receiving floor finishes specified in related sections will be tested prior to installation of flooring systems. Refer to sections specifying floor finishes for related requirements.

C. Services by Contractor:

1. Rejection of Concrete Materials: Do not use the following without prior written approval of the Architect/Engineer;
  - a. Materials without batch plant certificates.
  - b. Materials not conforming to the requirements of these specifications.

### **3.16 ADJUSTING**

- A. Inspect all concrete surfaces immediately upon formwork removal. Notify Architect/Engineer of identified minor defects. Repair all minor defects as directed.
- B. Surface and Finish Defects: Repair as directed by the Architect/Engineer, at no added expense to the Owner. Repairs include all necessary materials; reinforcement grouts, dry pack, admixtures, epoxy and aggregates to perform required repair.
  1. Repair minor defective surface defects by use of drypack and surface grinding. Specific written approval of



- Architect/Engineer is required. Submit proposed patching mixture and methods for approval prior to commencing work.
2. Slabs-on-Grade: Review for "curled" slab edges and shrinkage cracks prior to installation of other floor finishes. Grind curled edges flush, fill cracks of 1/16 inch and greater with cementitious grout.
  3. Grind high spots, fins or protrusions caused by formwork; Fill-in pour joints, voids, rock pockets, tie holes and other void not impairing structural strength. Provide surfaces flush with surrounding concrete.

### **3.17 DEFECTIVE CONCRETE**

- A. Defective Concrete: Concrete not conforming to required compressive strength, lines, details, dimensions, tolerances, finishes or specified requirements; as determined by the Architect/Engineer.
- B. Repair or replacement of defective concrete will be determined by the Architect/Engineer who may order additional testing and inspection at his option. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- C. Specific Defects:
  1. "Low-Strength"; Concrete Not Meeting Specified Compressive Strength after 28 days:
    - a. Concrete with less than 25% Fly Ash or 35% Slag as cementitious material: Test remaining cylinder(s) at 56 days. If strength requirements are met, concrete strength is acceptable.
    - b. Concrete with 25% or more Fly Ash or 35% or more Slag as cementitious material: Test remaining cylinder(s) at 70 days. If strength requirements are met, concrete strength is acceptable.
  2. Excessive Shrinkage, Cracking, Crazeing or Curling; Defective Finish: Remove and replace if repair to acceptable condition is not feasible.
  3. Lines, Details, Dimensions, Tolerances: Remove and replace if repair to acceptable condition is not feasible.
  4. Slab sections not meeting specified tolerances for trueness/flatness or lines/levels: Remove and replace unless otherwise directed by the Architect/Engineer. Minimum area for removal: Fifteen square feet area unless directed otherwise by the Architect/Engineer.
  5. Defective work affecting the strength of the structure or the appearance: Complete removal and replacement of defective concrete, as directed by the Architect/Engineer.

### **3.18 CLEANING**

- A. Maintain site free of debris and rubbish. Remove all materials and apparatus from the premises and streets at

completion of work. Remove all drippings; leave the entire work clean and free of debris.

- B. Slabs to Receive Floor Finishes Specified in other sections: Remove non-compatible cure/sealers or other foreign material(s) which may affect bonding of subsequent finishes. Leave in condition to receive work of related sections.

### **3.19 PROTECTION**

- A. Protect completed work from damage until project is complete and accepted by Owner.
- B. Construction Loads: Submit engineering analysis for equipment loads (including all carried loads) specified in article submittals.
- C. Keep finished areas free from all equipment traffic for a minimum of 4 additional days following attainment of design strength and completion of curing.
- D. Protection of Drainage Systems:
  - 1. Care shall be taken not to introduce any foreign material into any specified drainage, piping or duct system.
  - 2. Cost of work to repair or clean drainage system as a result of failure to comply with this requirement will be back charged to the contractor.
- E. Cover traffic areas with plywood sheets or other protective devices; maintain protection in place and in good repair for as long as necessary to protect against damage by subsequent construction operations.

END OF SECTION

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**SECTION 03354**  
**POLISHED CONCRETE FINISHING**

**PART 1 GENERAL**

1.01 SUMMARY

- A. Section Includes: This Section specifies a polished and epoxy soaked/filling concrete surface finishing.
  - 1. Concrete slabs on grade.
  - 2. Grinding, epoxy soaking/filling of concrete floors.
- B. Related Sections:
  - 1. Section 09650 Resilient Flooring.
  - 2. Section 09312 Ceramic Tile Wall Finish

1.02 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. ACI 302.1R Guide for Concrete Floor and Slab Construction.
- B. ASTM International:
  - 1. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - 2. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete.
  - 3. ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
  - 4. ASTM D2047 Static Coefficient of Friction of Polish coated flooring surfaces as measured by the James Machine.
  - 5. ASTM E1155-96 Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
- C. Reunion Internationale des Laboratoires D'Essais et de Recherches sur les Materiaux et les Constructions (RILEM):
  - 1. Rilem Test Method 11.4 Standard Measurement of Reduction of Moisture Penetration Through Horizontal Concrete Surfaces.
- D. National Floor Safety Institute (NFSI):
  - 1. NFSI Test Method 101-A Standard for Evaluating High-Traction Flooring Materials, Coatings, and Finishes.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide polished flooring of new and existing horizontal and vertical concrete surfaces, that has been selected, manufactured and installed to achieve the following:
  - 1. Abrasion Resistance: ASTM C779, Method A, high resistance, no more than 0.008 inch (0.20 mm) wear in 30 minutes.
  - 2. Reflectivity: Increase of 35% as determined by standard gloss meter.
  - 3. Waterproof Properties: Rilem Test Method 11.4, 70% or greater reduction in absorption.

4. High Traction Rating: NFSI 101-A, non-slip properties.
  5. Coefficient of Friction: > 0.5 per ASTM D2047.
- B. Design Requirements:
1. Hardened Concrete Properties: (New and Existing Concrete Slabs)
    - a. Minimum Concrete Compressive Strength: 3500 psi (24 MPa).
    - b. Normal Weight Concrete: No lightweight aggregate for slabs on grade.
    - c. Non-air entrained.
  2. Placement Properties:
    - a. Flatness Requirements:
      - 1) Specified Overall Value = 35
      - 2) Minimum Local Value = 24
    - b. Levelness Requirements:
      - 1) Specified Overall Value = 30
      - 2) Minimum Local Value = 20

#### 1.04 ACTION SUBMITTALS

- A. General: Submit listed action submittals in accordance with Contract Conditions and Section 01300 - Submittal Procedures.
- B. Shop Drawings: Indicate information on shop drawings as follows:
  1. Typical layout including dimensions and floor grinding schedule.
  2. Plan view of floor and joint pattern layout.
  3. Hardener, sealer, densifier in notes.
- C. Product Data: Submit product data, including manufacturer's product sheet, for specified products.
  1. Material Safety Data Sheets (MSDS).
  2. Preparation and concrete grinding procedures.

#### 1.05 INFORMATION SUBMITTALS

- A. Quality Assurance:
  1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties as cited in 1.03 Performance Requirements.
  2. Certificates:
    - a. Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
    - b. Letter of certification from the National Floor Safety Institute confirming the system has been tested and passed phase Two Level of certification when tested by Method 101-A.
    - c. Current contractor's certificate signed by manufacturer declaring contractor as an approved installer of polishing system.
  3. Manufacturer's Instructions: Manufacturer's installation instructions.

## 1.06 CLOSEOUT SUBMITTALS

- A. Warranty: Submit warranty documents specified.
- B. Operation and Maintenance Data: Submit operation and maintenance data for installed products in accordance with Section 01700 - Contract Closeout.
  - 1. Include:
    - a. Manufacturer's instructions on maintenance renewal of applied treatments.
    - b. Protocols and product specifications for joint filing, crack repair and/or surface repair.

## 1.07 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project with a minimum of five years of documented experience.
  - 2. Installer trained and holding current certifications for each type of product being installed. Installer must provide written documentation from the manufacturer confirming the Installer's current accreditation and training from DIAMATIC on installation of the polished concrete system and related equipment and processes.
  - 3. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.
  - 4. Installer must be an DIAMATIC ELITE installer for the ULTRAFLOOR polished concrete system, including the use of DIAMATIC equipment and diamond abrasives, and DIAMATIC concrete preparation, and chemical hardening and finishing materials.
  - 5. A factory-trained, competent supervisor must be maintained on site during all times during which specified work is performed.
  - 6. Installer must provide written documentation from the manufacturer confirming the Installer's current accreditation and training from DIAMATIC on installation of the ULTRAFLOOR DIAMATIC polished concrete system and related equipment and processes.
- B. Regulatory Requirements.
  - 1. NFSI Test Method 101-A Phase Two Level High Traction Material.
- C. Mock-Ups:
  - 1. Construct mock-ups in accordance with Section 01400 - Quality Control.
  - 2. Mock-Up Size: 25 S.F. sample panel at jobsite at location as directed under conditions similar to those which will exist during actual placement.
  - 3. Mock-up must be installed using the same installer personnel who will perform the actual work.
  - 4. Mock-up will be used to judge workmanship, concrete substrate preparation, operation of equipment, material application, color selection and shine.
  - 5. Allow 24 hours for inspection of mock-up before proceeding with work.

6. When accepted, mock-up will demonstrate minimum standard of quality required for this work. Mock-up may be used as a part of the final product provided the mock up is found to be acceptable to the school district.
- D. Preinstallation Meetings: Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01039-Coordination and Meetings. A Diamatic Management Services personnel must be in attendance during the pre-installation meeting to ensure quality control standards are in compliance. Review the following:
    1. Environmental requirements.
    2. Scheduling and phasing of work.
    3. Coordinating with other work and personnel.
    4. Protection of adjacent surfaces.
    5. Surface preparation.
    6. Repair of defects and defective work prior to installation.
    7. Cleaning.
    8. Installation of polished floor finishes.
    9. Application of liquid hardener, densifier.
    10. Protection of finished surfaces after installation.
  - E. Prohibit the placement and storage of construction materials over the new polished concrete system, to include ferrous metals and steel members.
  - F. Prohibit pipe cutting operations over concrete before and after the polished concrete system.
  - G. Moisture Vapor Testing
    1. Test existing concrete for moisture vapor transmission according to methods indicated in ASTM F1869. Acceptable results: not more than 5 pounds per 1,000 square feet in 24 hours.
    2. Test existing concrete for relative humidity using in situ probes according to ASTM F2170. Acceptable results: not more than 80%.

1.08 DELIVERY, STORAGE & HANDLING

- A. General: Comply with 01400 - Quality Control.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery:
  1. Deliver materials in manufacturer's original packaging with identification labels and seals intact.
- D. Storage and Protection:
  1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
  2. Protect concrete slab.
    - a. Protect from petroleum stains during construction.
    - b. Diaper hydraulic power equipment.
    - c. Restrict vehicular parking.
    - d. Restrict use of pipe cutting machinery.

- e. Restrict placement of reinforcing steel on slab.
- f. Restrict use of acids or acidic detergents on slab.

E. Waste Management and Disposal:

- 1. Separate waste materials for Reuse and Recycling in accordance with manufacturer's disposal requirements.
- 2. Remove from site and dispose of packaging materials at appropriate recycling facilities.
- 3. Remove from site and dispose of all concrete slurry material. Slurry shall be disposed of off-site at an approved concrete dump site or shall be dewatered and disposed of as a dry "cake" off site at an approved concrete dump site.

1.09 PROJECT AMBIENT CONDITIONS

- A. Installation Location: Comply with manufacturer's written recommendations.

1.010 SEQUENCING

- A. Sequence with Other Work: Comply with manufacturer's written recommendations for sequencing construction operations.

1.011 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.
- C. Warranty: Commencing on date of acceptance by Owner.

1.012 MAINTENANCE

- A. Comply with manufacturer's written instructions to maintain installed product.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. Ensure each manufacturer has a minimum 5-years-experience in manufacturing components similar to or exceeding requirements of project.

2.02 Polished Concrete Finishing Products

- A. Manufacturer: DIAMATIC USA
  - 1. DIAMATIC FLOR-SHIELD
  - 2. DIAMATIC FLOR-FINISH (High Gloss)
- B. Semi-Rigid Joint Filler
  - Manufacturer; Metzger/McGuire
  - 1. EDGE\_PRO 80 Semi-Rigid Polyurea Joint Filler
  - 2. Contact: P.O. Box 2217, Concord, NH 03302; (800) 223-MM80; Fax (603)



224-6020; website: metzgermcguire.com.

C. Joint Filler:

1. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.
  - a. Acceptable Material: SIKA 2CSL.
  - b. No poly-urea or epoxy or single component urethane joint sealant will be allowed.

2.03 SOURCE QUALITY CONTROL

- A. Ensure concrete finishing components and materials are from single manufacturer.

2.04 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

**PART 3 EXECUTION**

3.01 MANUFACTURERS INSTRUCTIONS

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, and product carton installation instructions.

3.02 EXAMINATION

- A. Site Verification of Conditions:
  1. Verify concrete substrate conditions are acceptable for product installation in accordance with manufacturer's published instructions prior to installation of concrete finishing materials.
- B. Verify Concrete Slab Performance Requirements:
  1. Verify existing concrete flatness and levelness meets the specified requirements.
  2. Verify concrete surfaces are cleaned; all glues, floor leveling compounds and paint have been removed. Voids filled level with floor. Existing joints ground down to level with finish floor. Expansion joints cleaned out and resealed.
  3. With the start of work this contractor accepts the existing concrete slab as found with no additional costs to the owner for any extra preparation work required other than identified within this specification section.

3.03 PREPARATION

- A. Ensure surfaces are clean and free of dirt and other foreign matter harmful to performance of concrete finishing materials.
- B. Examine surface to determine soundness of concrete for polishing.
- C. Contractor to remove any existing surface contamination by means of wet grinding. Do not use ultra-high-pressure water (30,000+psi), as it can damage or excessively mar the concrete substrate.
- D. Inspect the concrete slab for hidden conditions, including any cracks, holes and non-matching spall repairs and work out an agreeable repair

method with the owner. Obtain written direction from the owner prior to proceeding with the repairs of any discovered hidden conditions.

- E. For shallow or feather-edged repairs, epoxy/aggregate mortars shall be used in conjunction with closely matching aggregate type and size to that of the adjacent surface.
- F. Fill all voids in concrete slabs. Clean out expansion joints and re-fill with sealant. Grind down all expansion joints so they are level with the finish floor.
- G. Install protective covering on walls around room where floor is to be polished.
- H. Remove doors, store in a secure location. Reinstall upon completion of work.
- I. Contractor shall remove grates from floor drains and store in a secure location for reinstallation. Grind out around perimeter of drain. Install new sealant in joint. Reinstall grate upon completion of work. Plug drain line during work to prevent the entry of concrete debris.
- J. Contractor shall remove covers from floor clean outs and store in a secure location for reinstallation. Grind out around perimeter of drain. Install new sealant in joint. Reinstall grate upon completion of work. Plug drain line during work to prevent the entry of concrete debris.
- K. Contractor after grinding floor down to final depth shall create a transition not exceeding 1.8 percent between the rim of trench drains to the depth of the concrete slab using an epoxy and concrete dust mixture so the transition will blend in and match the concrete surface to be sealed. Plug drain line during work to prevent the entry of concrete debris.

### 3.04 GENERAL REQUIREMENTS FOR INSTALLATION OF THE POLISHED FLOOR SYSTEM

- A. All initial flattening, milling and grinding through the 200 grit level shall be done by fully wetted, slurry type grinding. Slurry shall be promptly vacuumed up so as to not leak under walls or soak up into wall coverings. Slurry shall be disposed of off-site at an approved concrete dump site or shall be dewatered and disposed of as a dry "cake" off site.
- B. Walls shall be protected against splashing by attaching 24-inch wide plastic film or other suitable protective material to the walls and sealing all vertical joints or overlapping sufficiently to prevent entry of material.
- C. Before proceeding to the next finer grinding/polishing step, the preceding scratch pattern must be completely removed. Care shall be taken, to properly clean the floor before each new grinding/polishing step. This is especially to be observed starting with the dry polishing steps.
- D. All edges shall be ground and polished to the same degree as the "field" up to and including 400 grit. Edges shall be ground to a flush and level condition to the face of the wall so that a ridge is not created which could interfere with the installation or replacement of baseboards.
- E. Any dry grinding starting with 400 grit level shall be done in conjunction with a dust collector of suitable size and power to adequately eliminate air borne dust and to keep the floor adequately clean.

### 3.05 GLOSS ATTAINMENT (ASTM E430)

- A. Gloss readings are not to be obtained through the use of any microfilming products, sealers, coatings, enhancers or as the result of resin transfer from resin bond abrasives.
- B. Readings shall be taken not less than 10 feet on center in field areas and

within 1 foot of floor area perimeters. In no case shall a reading be below 2% of specified minimum sheen.

1. Level C Sheen - High Gloss reading of 56 or higher. 1500 grit or higher.
2. See Article 3.06.

### 3.06 POLISHING

#### A. CUT LEVEL

1. LEVEL 2 CUT - A slightly deeper but that removes surface paste and exposes the fine aggregates and begins to expose the coarse aggregates. Also referred to as a salt and pepper finish.

#### B. SPECIFIED POLISHED FLOOR DETAIL

1. Specified Floor Finish shall have a Cut Level of 2.
2. Specified Floor Finish shall have a Gloss Level of C.

### 3.07 INSTALLATION FOR CONCRETE SLABS ON GRADE

#### A. Floor Surface Polishing and Treatment:

1. Prior to starting any grinding, all open unprotected construction (cold) joints, control joints and cracks in concrete shall be filled with a polymer modified cementitious grout or epoxy mortar to protect the joint and crack edges against cracking or spalling off during the grinding phase.
2. Re-saw all construction joints and control joints to a width of 3/16-inch to ¼-inch by approximately ¾-inch to 2-inches deep per manufacturers published instructions. Clean out the joints and cracks in accordance with the joint filler manufacturers published instructions and then install foam "backer rod" approximately 2-inches deep. Finally, mix and install the joint sealant using hand-operating caulking guns. Tool the top of the sealant so that a slight downward "meniscus" is formed below the adjacent surface.
3. Install joint filler according to manufacturers published installation requirements and at the proper point in the grinding and polishing process to achieve proper joint protection and sealing. Color to match as closely as possible the adjacent natural concrete color.
3. Remove defects and re-polish defective areas.
4. Finish edges of floor finish adjoining other materials in a clean and sharp manner.
5. The finish surface shall have a coefficient of friction of > 0.5 per ASTM D2047.

### 3.08 POLISHING PROCESS

1. Grind/Polish #1: DIAMATIC 60/80 Grit Metal Bonded Diamonds.
2. Broom and vacuum the floor to remove residual dust.
3. Grind/Polish #2: DIAMATIC #1 Transitional Diamonds, Ceramic Bonded.
4. Broom and vacuum the floor to remove residual dust.
5. Grind/Polish #3: DIAMATIC 200 Grit Resin Bonded Diamonds.
6. Broom and vacuum the floor to remove residual dust.
7. Apply DIAMATIC FLOR-SHIELD per application instructions at a rate of 400 square feet per gallon.

8. Allow DIAMATIC FLOR-SHIELD to dry 1 hour before continuing on to the next step.
9. Grind/Polish #4: DIAMATIC 400 Grit Resin Bonded Diamonds.
10. Broom and vacuum the floor to remove residual dust.
11. Grind/Polish #5: DIAMATIC 800 Grit Resin Bonded Diamonds.
12. Broom and vacuum the floor to remove residual dust.
13. Grind/Polish #5: DIAMATIC 1500 Grit Resin Bonded Diamonds.
14. Broom and vacuum the floor to remove residual dust.
15. MICROPOLISH/BURNISH #1: FLOR-GRIT 1500 Diamond Impregnated Pad.
16. Dry mop the floor clean to remove all debris. Check gloss level here. If not above 56 then continue to a 3000 Grit resin bonded diamond micropolish/burnish.
17. Apply DIAMATIC FLOR-FINISH (High Gloss) per application instructions at a rate of 2,500 to 3,000 square feet per gallon.
18. Allow to dry a minimum of 15-30 minutes.
19. MICROPOLISH/BURNISH #2: FLOR-GRIT 1500 Diamond Impregnated Pad.
20. Dry mop the floor clean to remove all debris.
21. Apply DIAMATIC FLOR-FINISH (High Gloss) per application instructions at a rate of 3,000 square feet per gallon, 90 degrees to the first application.
22. Allow to dry a minimum of 15 minutes.
23. MICROPOLISH/BURNISH #2: FLOR-GRIT 1500 Diamond Impregnated Pad.

### 3.09 EDGES AND VERTICAL CURBS

- A. Polish edge work of all areas and vertical curbs. Polishing shall be done with a 5-inch or 7-inch DIAMATIC Hand-Held or Walk Behind polishing tool. The edge polishing process will match the corresponding steps outlined above for the desired gloss level, and edge polishing step shall be done immediately after the matching main polishing step.
- B. All grinding and polishing completed with a grinder/polisher equipment connected to a dust collector.

### 3.10 REPAIR OF CONCRETE CRACKS

#### A. CRACK REPAIR OF CONCRETE SLABS ON GRADE

1. Contractor shall remove and replace any and all inferior patches in the concrete.
2. The contractor shall repair and fill any and all holes, joints, fractures or delaminated toppings.
3. All fractured edges shall be cleaned with a needle scaler.
4. All wide cracks shall be projected up to the floor level by inserting some type of semi-rigid foam board (approximately 3/16-inch thick into a saw cut made into the crack. Once the foam board is secured in place, replace the missing material on either side of the foam board with a low modulus, clear epoxy mixed with a mixture of coarse sand and aggregate sizes to closely approximate the exposed rock in the adjoining floor. The excess epoxy mortar is then to be ground down exactly flush with the adjoining floor and polished out the same as the rest of the floor.

5. After the adjoining floor is fully polished out, the 3/16-inch divider strip is to be saw cut down approximately ½ inch by 3/16 - inch to ¼ inch wide and a two component, brown urethane sealant installed, flush to the surface with a slightly downward "meniscus". The sealant shall be equal to "Sika" 2CSL having good elongation characteristics.
6. All cracks and joints shall be welded closed to provide a finished product that is impervious to water penetration in wet rooms such as restrooms, showers, locker rooms and custodial closets.

### 3.11 RE-SETTING OF DRAINS AND CLEAN OUT FITTINGS TO NEW ELEVATIONS

#### A. Removal of upper portion of fixtures.

1. Saw cut around the perimeter of the fixture and chip out the adjacent concrete sufficiently that the top half of the drain/cleanout assembly can be un-bolted and removed. Save for reinstallation.
2. Carefully remove any concrete residue that is attached to the adjustment threads of the removed upper half. This may be facilitated by soaking the fixture half in pure muriatic acid to decompose any remaining cementitious film.

#### B. Re-setting of fixtures to new elevations.

1. Re-set the top elevation of the drain/cleanout by screwing the bronze central portion down until it matches the new floor elevation. In the event there is not enough adjustment capability in the threaded portion, then usually this can be accomplished by flipping the top half of the cast iron sub drain over, thus lowering the threaded female portion of the sub-drain.
2. In the event that there is not enough adjustment capacity, even after exhausting all the suggested methods in B.1, then the desired elevation can usually be achieved by performing some machining on the cast iron hub; an if that is still not adequate, then it may be necessary to lower the bottom half of the sub-drain assembly. This would require more concrete removal and cutting some of the drain standpipe off.

### 3.12 CREATION OF TRANSITION STRIPS AT A TRENCH DRAINS

- A. Wherever a trench drain is located which is not in a traffic lane, the existing adjacent epoxy topping can be ground and re-tapered away from the drain lip at a slope not to exceed 1/8-inch in 1-inch of horizontal travel.
- B. Wherever a trench drain is located in a traffic lane, the existing adjacent epoxy topping shall be re-tapered away from the drain at a slope of not to exceed 1.8 percent (3/16-inch in 12"-inch run).

### 3.13 ADJUSTMENTS

- A. Polish to higher gloss those areas not meeting specified gloss levels per mock-up.
- B. Fill joints flush to surface.

### 3.12 FINAL CLEANING

- A. Do cleanup in accordance with Section 01700 - Contract Closeout.
- B. Mechanically scrub treated floors for seven days with soft to medium pads with approved cleaning solution.

- C. Upon completion, General Contractor must remove surplus and excess materials, rubbish, tools and equipment.
- D. Remove plugs from all drain lines. Flush out drain lines to verify they are clear of any debris.

### 3.13 PROTECTION

- A. Protect installed product from damage during construction in accordance with Section 01500.
- B. Protect the finished polished concrete system from continuing construction and build out as need by installing DIAMATIC ECONO-COVER Protective Floor Covering or an approved equal.
- C. Remove protective cover after build-out is complete.

**END OF SECTION**

**SECTION 04200**

**CONCRETE UNIT MASONRY**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes: All labor, material and equipment and perform all operations required to complete all masonry work as indicated on the drawings and specified.
- B. Additional work included in this section: Provision of concrete grout and installation of items provided by other trades that are embedded in and/or attached to masonry work; providing forms at block-outs and formed concrete grout.
- C. Related Sections:
  - 1. Pertinent Sections of Division 01 specifying Quality Control and Testing Agency services.
  - 2. Pertinent sections of other Divisions specifying formwork, reinforcement, concrete, masonry, steel, and rough carpentry.
  - 3. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete work.

**1.02 REFERENCES AND STANDARDS**

- A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 19A Concrete, Chapter 21A Masonry
- B. TMS 402 / ACI 530 / ASCE 5 "Building Code Requirements for Masonry Structures".
- C. TMS 602 / ACI 530.1 / ASCE 6 "Specification for Masonry Structures".
- D. ASTM A615 "Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement".
- E. ASTM C90 "Load-Bearing Concrete Masonry Units".
- F. ASTM C144 "Aggregate for Masonry Mortar".
- G. ASTM C270 "Mortar for Unit Masonry".
- H. ASTM C404 "Aggregates for Masonry Grout".
- I. ASTM C476 "Grout for Masonry".

**1.03 SUBMITTALS**

- A. Submit in accordance with Division 01 specifying submittal procedures. The General Contractor shall review and approve submittals prior to submittal to the Architect/Engineer.

Submittals that do not meet these requirements will be returned for correction without review.

- B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.
- C. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.
- D. Contractor Submittals:
  - 1. Mix design for all grout and mortar, prepared by a qualified testing laboratory, per TMS 602 section 1.5. Show conformance of mix to proportion specification of ASTM C270 for mortar and ASTM C476 for grout. Alternatively, provide test results and show conformance of mix to property specification of ASTM C270 for mortar and ASTM C476 for grout. Mix shall conform to all requirements herein.
  - 2. Material certificates for all materials used in mixes.
  - 3. Submit shop drawings for all shapes and sizes of concrete unit masonry shown and scheduled on the drawings. Submit shop drawings detailing and locating all masonry reinforcement.
  - 4. Certificate of compliance and test data by concrete unit masonry supplier showing conformance to specified material strengths and properties.
  - 5. Samples: Laid up sections of masonry walls for the Architect's approval of size, texture and color of block, mortar and joint pattern.
  - 6. Layout of vertical control joints in masonry walls coordinated with structural and architectural drawings.
  - 7. Submit cold and/or hot weather construction procedures when ambient temperature is below 40°F or above 90°F. See PART 3.

#### **1.04 QUALITY ASSURANCE**

- A. For requirements of the Authority Having Jurisdiction, refer to pertinent sections of Division 01 and CBC Chapter 17A.
- B. All tests shall be performed by an approved Testing Agency as specified in pertinent sections of Division 01.
- C. Testing and Inspection: Tests and inspections performed by approved Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL and the Testing & Inspection Form. Duties and limitations of approved Testing Agency, test costs and test reports in conformance with pertinent sections of Division 01.
- D. General: Provide reports to Architect/Engineer and Authorities Having Jurisdiction (AHJ) indicating results of tests and inspections.



- E. Concrete Unit Masonry
  - 1. All testing of concrete unit masonry by the approved Testing Agency shall comply with the requirements of CBC Chapters 17A and 21A.
  - 2. Approved Testing Agency shall provide Level C Quality Assurance Program per TMS 602 and CBC Chapter 17A by an approved inspector of masonry construction.
- F. Contractor shall provide adequate materials for sampling and shall patch core holes made by the approved Testing Agency using non-shrink, high- strength grout.

**1.05 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver and store packaged material in original containers with seals unbroken and labels intact until time of use.
- B. Unload masonry units carefully and store on raised platform protected from weather.
- C. Protect cementitious materials against exposure to moisture. Use of cementitious or other materials that have become caked and hardened from absorption of moisture will not be permitted.

**1.06 JOB CONDITIONS**

- A. Environmental Conditions: Do not place concrete unit masonry when temperature is below 40 degrees Fahrenheit or above 90 degrees Fahrenheit unless the Contractor provides means for preventing damage due to freezing or high-temperatures before and after placement and the Architect/Engineer approves. See Section PART 3.
- B. Protection: Protect surrounding work as required against damage from masonry work. Clean satisfactorily or otherwise correct damage to surrounding work resulting from masonry work. See PART 3.

**1.07 SCHEDULING AND SEQUENCING**

- A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the approved Testing Agency.
- B. Provide schedule and sequence information to approved Testing Agency in writing upon request. Update information as work progresses.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. Hollow Load-Bearing Concrete Masonry Units:
  - 1. General: All concrete masonry units shall be double open end wherever possible (single open end otherwise).

2. Concrete masonry units shall be medium or light weight and shall conform to ASTM C90. Minimum compressive strength shall be 2000psi.
  3. Concrete masonry units exposed to view shall be 8x8x16 unless otherwise noted on the construction drawings. Concrete masonry caps shall be 2x8x16 (nominal) standard grey unless otherwise noted on the construction drawings.
- B. Portland Cement: ASTM C150, Type II, low alkali
- C. Aggregates
1. For Mortar: ASTM C144.
  2. For Grout: ASTM C404.
- D. Hydrated Lime: ASTM C207, Type S
- E. Quick Lime: ASTM C5, high calcium
- F. Reinforcing Steel: ASTM A615 (or A706) grade 60.
- G. Water: Clean and potable, free from impurities detrimental to mortar and grout.
- H. Grout Aid: "Grout Aid" by Sika Corporation.
- I. High Strength Grout: Conform to CRD-C621 and ASTM C1107. Non-shrink, non-ferrous, minimum compressive strength at 28 days to be 7000 psi (when placed in a fluid state). Meet or exceed BASF "Master Flow 928".
- J. Pre-molded Control Joint: ASTM D2000 M2AA-805 rubber shear keys with a minimum durometer hardness of 80 or ASTM D2287 Type PVC 654-4 PVC shear keys with a minimum durometer hardness of 85.
- K. Flexible Sealant: ASTM C920.
- L. Mortar Color: Submit to Architect for approval.

## **2.02 FABRICATION**

- A. Reinforcement: Conform to requirements of Section 03 200, Concrete Reinforcing.

## **2.03 MIXES AND MIXING**

- A. General Mixing Requirements:
1. Measure materials accurately. Shovel measurements will not be permitted.
  2. Use mechanical mixer of at least one sack capacity.
  3. Mix for minimum of three minutes and in no case less than time required for securing uniform mass and workable consistency.
  4. Completely empty drum before charging succeeding batch of materials.
  5. Exercise extreme care in measuring ingredients for partial batches.

6. Air entraining admixtures are not permitted.

B. Mortar

1. Type M or S per ASTM C270. Minimum compressive strength at 28 days: 1800 psi (Type S), 2500 psi (Type M). Admixtures not allowed. Otherwise conform to CBC Section 2103A.2.1.
2. Use and place mortar in final position within 2-1/2 hours after mixing. Mortars that have stiffened due to evaporation of water may be retempered with water as frequently as required to restore required consistency during this time period.
3. Provide integrally colored mortar to match block. Colors to be submitted to Architect for approval. Add mortar colors in accordance with manufacturer's recommendations. Ensure uniformity of mix and coloration.

C. Concrete Grout

1. General:
  - a. Six sacks (94 pounds per sack) of cement per cubic yard minimum. Concrete masonry grout compressive strength to attain 2000 psi minimum after 28 days
  - b. One pound "Sika Grout Aid" per sack of cement (6 pounds maximum per cubic yard).
  - c. Slump: 8 to 11 inches.
  - d. "Coarse" type per TMS.
2. Otherwise conform to CBC Section 2103A.3.

**2.04 SOURCE QUALITY CONTROL**

- A. An approved Testing Agency will perform source quality control tests and submit reports, as specified in pertinent section of Division 01 and CBC Chapter 17A and 21A.
- B. Test materials per CBC Chapter 17A and CBC Section 2105A.1 unit strength method or prism test method.

**PART 3 - EXECUTION**

**3.01 INSPECTION BY CONTRACTOR**

- A. Examine areas to receive masonry and verify following per TMS 602:
  1. Foundation surface is level to permit bed joint within range of 1/4 to 3/4-inch.
  2. Edge is true to line to permit projection of masonry to less than 1/4-inch.
  3. Projecting dowels are free from loose scale, dirt, concrete or other bond-inhibiting substances and properly located.
  4. Built-in items are properly sized and located.
- B. Do not begin work before unsatisfactory conditions have been corrected.

**3.02 PREPARATION**

- A. Clean concrete surfaces to receive masonry. Remove laitance or other foreign material lodged in surface by sandblasting or other means as required. Roughen foundation bed to expose aggregate; remove loose particles and saturate before laying units.
- B. Ensure masonry units are clean and free from dust, dirt or other foreign materials before laying.

### **3.03 REINFORCEMENT**

- A. Place bars where noted in accordance with drawings and SP-66 "ACI Detailing Manual". Do not disturb after start of masonry placement.
- B. Splice bars with dowels cast in concrete; lap bars per drawings. Bars shall not be "stabbed" after grout placement. All reinforcing shall be tied in place with wire prior to grout placement. The use of approved bar spacers is acceptable.

### **3.04 PLACEMENT**

- A. General Requirements
  1. Masonry construction shall conform with TMS 602 as modified by CBC Chapter 21A.
  2. Ensure masonry units are sound, clean and free of cracking at time of placement.
  3. Accurately cut and fit units as required using masonry saws to accommodate work of other sections.
  4. Lay masonry units plumb, true to line with level courses accurately placed. Maximum tolerance 1/4" in 8'-0".
  5. Adjust unit to final position while mortar is soft and plastic.
  6. Align vertical cells accurately.
  7. Remove units disturbed after stiffening of mortar, clean joints and relay unit with fresh mortar.
  8. Do not attach construction supports to walls.
  9. Install anchor bolts and other embedded items accurately as work progresses. Use templates as necessary to meet required tolerance of other's work.
  10. Brace walls adequately until supporting structure is complete.
  11. Do not place conduit, pipes, wire, etc. in cells containing reinforcing steel.
- B. Joints:
  1. Fill joints; ensure full coverage of face shells in both horizontal and vertical joints and on webs.
  2. Tool (concave) and finish joints as specified to achieve solid, smooth, watertight compacted joint.
  3. Immediately fill holes made by line pin with mortar when pin is withdrawn.
  4. Remove surplus mortar from joints.
  5. Provide vertical control joints at 1.5 times the wall height (but not greater than 25'-0") and as detailed on the structural drawings.

C. Cold Weather Requirements

1. When ambient temperature is below 40 degrees Fahrenheit, submit cold weather protection plan per TMS 602 Section 1.8C. Ensure reinforcing, masonry units, etc. contacting mortar and grout are free of frost.

D. Hot Weather Requirements

1. When ambient temperature exceeds 90 degrees, submit hot weather protection plan per TMS 602 Section 1.8D.

E. Protection

1. Protect face materials against staining.
2. Remove misplaced grout or mortar immediately.
3. Protect sills, ledges, off-sets and similar items from mortar drippings or other damage during construction.
4. Cover top of unfinished work to protect it from weather and debris.

F. Concrete Masonry Units

1. Bond: Running bond unless specifically noted otherwise.
2. Joint Thickness: 3/8-inch both vertically and horizontally.
3. Joint Treatment:
  - a. Typical exterior and interior walls; tool joint for weather tightness.
  - b. Construction joints to be sealed with joint sealant or high strength grout as noted on the drawings.
4. Use proper units to provide for doors, bond beams lintels, etc. in order to minimize cutting.
5. Do not wet units.
6. Align vertical cells to provide continuous, unobstructed opening for grouting.
7. Corners: Provide standard masonry bond by overlapping units.
8. Provide mechanical cleanout methods as needed. To facilitate cleanout where pour height exceeds 48 inches, provide inverted bond beam units at the bottom of each pour and provide cleanouts in these courses as necessary, not exceeding 32 inches on center. Provide cleanout at each vertically-reinforced cell. Locate cleanouts to minimize visual impact. Verify with Architect/Engineer.

**3.05 GROUTING**

A. General Requirements

1. Conform to requirements of TMS 602 as modified by CBC Chapter 21A.
2. A pour is defined as the height of grout to be placed in one day. The height of masonry unit placement at the time of grouting shall not exceed the pour height. Masonry shall have cured minimum 4 hours before grout placement. Maximum pour height is 12 feet, or less, as determined by the contractor. Maximum individual lift height is 5 feet 4 inches, or less, as determined by the contractor. Allow time between lifts for initial water loss of grout to

occur. Do not allow grout to cure between lifts.  
Contractor is responsible for adequate cleaning and prevention of blowouts.

3. Grout void between wythes and cells of concrete block.
4. Ensure grout flows into voids and completely surrounds reinforcing steel.
5. Stop grout approximately one and a half inches below top of last course except at top course without a concrete cap.
6. Grout from a non-exposed face of masonry wherever possible.
7. Where necessary to stop longitudinal run, provide suitable dam to retain grout in place.
8. Clean all cells of pour space prior to grouting. Remove all loose mortar, etc.
9. Consolidate grout with a mechanical vibrator with a 3/4" head.
10. Slushing with mortar will not be permitted.
11. Use grout pump, hopper or bucket to place grout.
12. Do not wet down grout spaces prior to grouting.
13. Otherwise conform to CBC Section 2104A.1.3.1.

### **3.06 FIELD QUALITY CONTROL**

- A. The approved Testing Agency will perform field quality control tests, as specified in pertinent sections of Division 01 and CBC Chapters 17A and 21A.
- B. The approved Testing Agency will provide inspections per the requirements of CBC Section 1705A.4.
- C. Concrete masonry shall have an assumed 28 day prism strength of 2000psi.
- D. Core test installed masonry per CBC Section 2105A.4.

### **3.07 POINTING AND CLEANING**

- A. Point holes or defective mortar joints upon completion of work; where necessary, cut out and repoint defective joints.
- B. At end of workday, fiber brush new surfaces to remove mortar splashes, clean with mild detergent or enzymes, and rinse with clean water.
- C. When ordinary methods are not adequate, employ sandblasting, chipping or other special methods.
- D. Do not use acid solution to remove green stain or efflorescence resulting from vanadium salts. Follow recommendations of manufacturer for removal of such stains.
- E. Clean all surfaces upon completion of erection; leave free of grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave surfaces broomed clean.
- F. Protect work from damage by subsequent operations.

### **3.08 ADJUSTING**

- A. Replace all defective work at Contractor's expense.
- B. Replace defective or damaged work with conforming work.
- C. Architect/Engineer shall review all proposals for the repair or replacement of damaged, defective, or missing work.
- D. Contractor to pay expenses incurred by Owner for Architect/Engineer's costs for (re-) design and obtaining approvals of Authorities Having Jurisdiction necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.
- E. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

END OF SECTION

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SECTION 05500

**METAL FABRICATIONS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated ferrous metal items, galvanized and prime painted.

1.2 REFERENCES

- A. C.B.C., California Building Code, 2019 Edition, Chapter 22A.
- B. ASTM A36 - Structural Steel.
- C. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
- D. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
- F. ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.
- G. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- H. AWS A2.4 - Standard Welding Symbols.
- I. AWS D1.3 - Structural Welding Code.
- J. SSPC - Steel Structures Painting Council.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations and details where applicable.
- C. Indicate welded connections using standard A2.0 welding symbols. Indicate net weld lengths.

1.4 QUALIFICATIONS

- A. Welders' Certificates: Submit under provisions of Section 01300, certifying welders employed on the work, verifying AWS qualifications within the previous 12 months.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Drawings.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Pipe: ASTM A53, Grade B.

- D. Bolts, Nuts, and Washers: ASTM A307 galvanized to ASTM A153 for galvanized components.
- E. Welding Materials: AWS D1.3; type required for materials being welded.
- F. Shop and Touch-Up Primer: Fabricator's standard, fast-curing, lead-free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC 20.

## 2.2 FABRICATION, GENERAL

- A. Fit and shop assemble in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds unless indicated otherwise.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## 2.3 FINISHES

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with one coat.
- D. Galvanize items to minimum 1.25 oz/sq.ft. zinc coating in accordance with ASTM A386.

# 3 PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

## 3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in

masonry with setting templates, to appropriate sections.

### 3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on Drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain Architect approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

### 3.4 SCHEDULE

- A. The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
- B. Miscellaneous Framing and Supports: Steel not a part of structural steel framework as required to complete work.
- C. Bumper Posts: As detailed; prime paint finish.
- D. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- E. Metal Gates and Fences: Welded tubular steel as detailed, complete with all necessary hardware; prime paint finish.
- F. Metal Cages: Welded angular frames with expanded metal lath as detailed with all necessary hardware; prime paint finish.

END OF SECTION

## SECTION 06100

### ROUGH CARPENTRY

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Section Includes: All labor, materials and equipment and all operations required to complete all rough carpentry and structural framing as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:
1. Structural wall and roof framing.
  2. Wall and roof sheathing.
  3. Rough hardware, framing connectors and fasteners.
  4. Treatment of wood.
  5. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim, and other work requiring supporting blocking.
  6. Miscellaneous wood nailers and furring strips, including roof applications, other wood framing, furring, shims or blocking as required to complete the work.
- B. Related Sections:
1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
  2. Pertinent sections of Division 01 specifying Structural Product Requirements: Structural Product Options, Substitution procedures and limitations, transportation, handling and storage.
  3. Pertinent sections of Division 03 specifying wood formwork construction and/or setting anchors in concrete.
  4. Pertinent section of Division 06 specifying wood construction and materials.
  5. Pertinent sections of other divisions specifying steel or concrete construction.

##### **1.02 REFERENCES**

- A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 23 Wood.
- B. American National Standards Institute (ANSI) / American Wood Council (AWC) "NDS - National Design Specification for Wood Construction".
- C. National Institute of Standards and Technology (NIST) / Engineered Wood Association (APA) "PS 1 - Voluntary Product Standard for Structural Plywood".
- D. NIST / APA "PS 2 - Performance Standard for Wood-Based Structural-Use Panels".
- E. NIST "PS 20 - American Softwood Lumber Standard".

- F. Redwood Inspection Bureau (RIS) "Standard Specifications for Grades of California Redwood Lumber".
- G. West Coast Lumber Inspection Bureau (WCLIB) "Standard Grading Rules for West Coast Lumber No. 17".
- H. Western Wood Products Association (WWPA) "Western Lumber Grading Rules".
- I. American Wood Preservers Association (AWPA) "Book of Standards".

**1.03 SUBMITTALS**

- A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication. Submittals that do not meet these requirements will be returned for correction without review.
  - 1. Substitutions for products specified require conformance to substitution requirements in Division 01.
  - 2. Review of materials and hardware for substitution to products specified is at the additional expense of the Contractor.
- B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.
- C. Product Data:
  - 1. Submit manufacturer's product data, specifications, and installation instructions for & location of framing connectors, wood preservative materials, application instructions, and fasteners. Include complete, accurate equivalence data when submitting alternate products to those specified. Provide samples of these items upon request.
  - 2. Submit product data and current ICC-ES report for machine-driven nails, fasteners, and equipment, including dimensions of all fasteners, including head, shank diameter and length.
  - 3. Submit samples of every type and size of proposed machine-driven nails and fasteners.
- D. Shop drawings: For manufactured wood products, submit each building as a complete unit. Do not mix components from multiple buildings or units of work in a submittal. Include all of the following:
  - 1. Indicate profiles, sizes, and spacing locations of structural members.
  - 2. Cross-reference all shop drawing detail references to contract document detail references.
  - 3. Secure all field measurements as necessary to complete this work.

- E. Manufacturer's Certificate: Submit all certifications of physical and chemical properties of materials as specified below in Article titled QUALITY ASSURANCE.
  - 1. Certify that wood products supplied for rough carpentry meet or exceed specified requirements, including specified moisture content.

#### **1.04 QUALITY ASSURANCE**

- A. Requirements of Regulatory Agencies, refer to pertinent sections of Division 01 and CBC Chapter 17A.
- B. All tests shall be performed by a recognized testing agency as specified in pertinent sections of Division 01.
- C. Inspection of fabricators is required per CBC 1704A.2 unless fabricator is registered and approved by the building official. Wood product quality standards:
  - 1. All wood products to comply with article REFERENCES.
  - 2. Factory-mark each piece of lumber and sheathing with type, grade, mill, and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
  - 3. Sheathing panels to be marked by APA (The Engineered Wood Association).
- D. End-Jointed lumber shall not be used.
- E. Hardware and engineered wood products shall have current ICC ES Evaluation/research reports that are equivalent to products specified.
- F. Employ competent workers experienced in work of the types specified and required.

#### **1.05 MOCK-UP**

- A. Construct mock-ups of machine-driven nailed sheathing panels using submitted products and demonstrating conditions indicated. Locate where directed.
- B. Mock-up shall be accepted and approved by the Inspector of Record (IOR) before commencement of machine-driven nailing activity.
- C. Accepted mock-up shall remain exposed for reference for the duration of machine-driven nailing activity.
- D. Remove all mock-ups at the completion of the work.

#### **1.06 DELIVERY, STORAGE AND HANDLING**

- A. Comply with pertinent requirements of Division 01.
- B. Delivery: Time delivery and installation of carpentry products to avoid delaying other trades whose work is

dependent on or affected by this section and to comply with moisture content, protection and storage requirements.

- C. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and sheathing panels to prevent deformation and provide air circulation within stacks.
  - 1. Store materials for which a maximum moisture content is specified only in areas where relative humidity has been reduced to a level where specified moisture content can be maintained.
  - 2. Handle and store materials above ground to prevent damage, contamination, or accumulation of dirt or foreign materials.
  - 3. Provide special protection for horizontal sheathing panels. Deformation of panels due to moisture is not acceptable.

#### **1.07 PROJECT/SITE CONDITIONS**

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

### **PART 2 - PRODUCTS**

#### **2.01 DIMENSIONED LUMBER**

- A. General
  - 1. Size per industry standards for nominal sizes shown; S4S (sanded four sides).
  - 2. Warped/twisted and excessively checked members shall not be used regardless of grade marks.
  - 3. At the Contractor's option, engineered lumber of equivalent size and material properties may be substituted for solid sawn lumber where material is difficult to source due to length, availability, etc. Submit proposed substitution to Engineer for review prior to purchasing materials.
- B. Moisture content of framing:
  - 1. All lumber to be maximum 19% at time of fastener installation, except 3x and 4x studs may be 25% at time of sheathing panel nailing. All lumber to be maximum 19% at time of close-in, unless noted otherwise.

2. The Owner's Testing Laboratory will test for moisture content prior to commencement of close-in.
  3. The Contractor shall recognize that excessive shrinkage of lumber results from excess moisture content at the time of installation. The Contractor will compensate for use of such lumber by waiting for acceptable moisture content before close in and/or by replacing/repairing lumber that has sagged, twisted, or warped prior to close in.
  4. Deviation from this specification would require structural redesign of connections and fasteners.
- C. Sills/ledgers on concrete or masonry: No. 2 pressure treated Douglas Fir and as called for on the drawings.
- D. Interior structural framing shall be Douglas Fir (D.F.) with grades as noted below, unless otherwise specified on the drawings. All grades are per WCLIB standard grading rules.
1. All permanently exposed (interior or protected from weather) framing shall be select structural grade with no box heart.
  2. Except per 1 above, unless noted otherwise, minimum grades are:
    - a. Roof joists/rafters (2x) and 2x8 & larger studs & plates: D.F. No. 1
    - b. 2x4 and 2x6 studs and plates: D.F. No. 1
    - c. 4x and larger: D.F. No. 1
    - d. Blocking: D.F. No. 2
- E. Exterior structural framing (exposed to weather) shall be redwood select structural grade or pressure treated D.F. No. 1, unless noted otherwise.
- F. Framing not otherwise shown or specified: Douglas Fir construction grade per WCLIB paragraphs applicable to uses and sizes required.

## **2.02 MANUFACTURED LUMBER**

- A. Laminated Veneer Lumber (LVL): for use as joists, beams, blocking, or studs when so noted on the drawings. Conform to ICC AC 47. Minimum  $F_b = 2,600$  PSI. Minimum  $E=2,000,000$  PSI. Acceptable products:
1. "Microllam LVL" by Trus Joist, ICC ESR-1387
  2. "Redlam LVL" by RedBuilt, ICC ESR-2993
  3. Approved equal
- B. Laminated Strand Lumber (LSL): for use as blocking (flat or vertical) or rim joist when used with I-joist or LVL, when so noted on the drawings. Conform to ICC AC 124. Minimum  $F_b = 1,700$  PSI. Minimum  $E=1,300,000$  PSI. Acceptable products:
1. "Timberstrand LSL" by Trus Joist, ICC ESR-1387
  2. "Redlam LSL" by Redbuilt, ICC ESR-1387
  3. Approved equal
- C. Parallel Strand Lumber (PSL): for use as beams and posts when so noted on the drawings. Conform to ICC AC 47. Minimum material properties for beams:  $E = 2,200,000$  psi;  $F_b = 2,900$



psi;  $F_c = 2,900$  psi (parallel);  $F_v = 290$  psi. Minimum material properties for posts:  $E = 1,800,000$  psi;  $F_b = 2,400$  psi;  $F_c = 2,500$  psi (parallel);  $F_v = 190$  psi. Acceptable products:  
1. "Parallam PSL" by Trus Joist, ICC ESR-1387  
2. Approved equal

### **2.03 STRUCTURAL SHEATHING PANELS**

- A. Plywood: Structural sheathing shall conform to product standard PS-1 or PS-2. All panels shall have a minimum bond classification of "Exposure 1" and bear the trademark of the Engineered Wood Association (APA) or other qualified agency. Grades shall be "Rated Sheathing" or "Structural 1" as required on the drawings.
- B. Oriented Strand Board (OSB): All structural OSB shall be grade marked by a qualified agency for conformance with Product Standard PS-2 and shall be fabricated with exterior glue. Grades shall be as required on the drawings.

### **2.04 TREATED WOOD:**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA Standard U1. See Standard U1 for "Use Category" designations. Do not provide higher Use Category lumber than that specified. Maximum moisture content shall be the same as required for "dimensioned lumber" as specified above.
- B. Preservative Treated Lumber
  - 1. General
    - a. Preservatives shall be waterborne. Preservative retention rate shall be as required per AWPA Standards U1 & T1. Lumber shall be Douglas Fir No. 2 (or better). Cut faces of treated wood shall be brush treated (two complete applications) prior to installation.
    - b. Lumber less than 8 inches above grade and lumber less than 6 inches above exterior hard-surface flatwork shall be treated.
    - c. Each piece of wood shall be stamped by the wood preservative applicator to identify its treatment and preservative retention.
  - 2. Lumber at interior, non-weather exposed locations installed adjacent to concrete or masonry shall be Use Category UC2. Examples include sill plates & ledgers and lumber in contact with roofing, flashing, or water proofing. Borate treated lumber meeting AWPA UC2 is acceptable in this application.
  - 3. Lumber at exterior locations, not in contact with soil/ground, shall be Use Category UC3B. Examples include Douglas Fir decking and deck framing.
  - 4. Lumber in contact with soil/ground shall be Use Category UC4A. Examples include timber retaining walls.
  - 5. Poles, posts, and sheathing panels shall be treated as recommended by AWPA Standard U1 per use and exposure.
  - 6. Maximum Volatile Organic Compound (VOC) content of field-applied preservative shall meet local air quality standards

and the California Green Building Code. Provide either of the following:

- a. Copper Azole (CA-B) per ICC-ES AC326.
- b. Alkaline/Copper/Quaternary (ACQ).

## 2.05 FASTENERS AND ACCESSORIES

### A. General requirements for fasteners:

1. Fasteners shall be of adequate size, spacing, and number to resist design loads under intended use, and types shall be appropriate for the materials or conditions for which used.
2. Provide washers, pre-drilling, etc. as required for proper installation and to prevent damage to framing.
3. Fasteners shall be hot-dip galvanized (ASTM A153), mechanically galvanized (ASTM B695 class 55 minimum), stainless steel (type 303, 304, 305, or 316), silicon bronze, or copper by approved methods for the following applications:
  - a. Exterior, exposed use.
  - b. In contact with preservative or fire-retardant treated wood.
  - c. Nails in contact with preservative treated wood containing ammonia shall be stainless steel.
4. Fasteners in moist corrosive atmosphere to be of stainless steel (type 303, 304, 305, or 316).
5. Where the retention level of ACQ or MCQ preservative is greater than 0.40 pcf, CBA-A preservative is greater than 0.41 pcf, or CA-B preservative is greater than 0.21 pcf, provide stainless steel fasteners (type 303, 304, 305, or 316).
6. All fasteners specified by manufacturer shall be installed in framing hardware, unless noted otherwise.
7. At borate treated lumber a clear zinc coating per ASTM F1941 is acceptable.

### B. Nails and nailing not otherwise shown or specified:

1. Comply with requirements of governing building code.
2. For securing materials to hardened concrete or masonry provide hardened steel masonry nails or Simpson Strong-Tie "Titen" screws.
3. For framing and general woodwork: Common bright wire nails (not box nails) with centered full-round heads per ASTM F1667 including Supplement S1. 16d cement coated sinker nails may be used in lieu of common nails for framing, where noted on the drawings. Unless otherwise noted on drawings, nail sizes shall be as follows
  - a. 8d Common: 0.131"Ø x 2-1/2" long with 0.281"Ø head.
  - b. 10d Common: 0.148"Ø x 3" long with 0.312"Ø head.
  - c. 16d Common: 0.162"Ø x 3-1/2" long with 0.344"Ø head.
4. Nails for sheathing panels shall be of common wire with full round heads and shall be of sufficient length to fully develop the nails.

5. Machine-driven nails of all types must comply with the requirements of this section. All proposed nails shall match diameter and penetration of specified nails.
  6. Staples shall conform to length and gauges specified and shall be installed to match specified patterns and spacing.
  7. Powder-Driven Pins (PDP): Use only as approved by the Architect/Engineer; operators shall be qualified.
- C. Bolts: Malleable iron washers or steel plate washers, unless otherwise shown, shall be provided under all bolt heads and nuts.
1. Machine Bolts: ASTM A307 and ANSI/ASME B18.2.1, standard semi-finished machine bolts as shown or required. Nuts shall be standard size unless noted otherwise and shall be per ASTM A563.
  2. Anchor bolts or threaded rod anchors shall conform to ASTM F1554, ASTM A307, or ASTM A36. Anchor bolts shall be headed or end in two nuts tightened against one another, unless noted otherwise. Provide embedded plate washer as indicated on drawings. No upset threads allowed. No L or J bolts allowed.
- D. Lag screws: Standard hex lag screws per ANSI/ASME B18.2.1.
- E. Wood screws: Standard wood screws per ANSI/ASME B18.6.1.
- F. Powder-Driven Pins (PDP): Hilti X-CP72, ICC ESR-2379; Simpson PDPAWL-300 MG, ICC ESR-2138.
- G. Framing hardware: Fabricated sheet metal timber framing connectors shall be manufactured from painted or galvanized G90 steel by Simpson Strong-Tie (connectors specified on drawings are per Simpson Strong Tie, USP Lumber Connectors, or approved equivalent. Connectors shall be at least 16 gauge material, (1/8 inch plate materials where welded), unless otherwise noted, punched for nailing. All heavy hardware to be fabricated from A36 steel per Division 05, Metals. All hardware intended for exterior exposed use shall be galvanized per G185 ASTM A653 or stainless steel.
1. For contact with preservative or fire-retardant treated wood, provide minimum G185 galvanizing per ASTM A653.
  2. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. Nails to be used with framing accessories are subject to the requirements specified in this Section for fasteners and anchors.
- H. Subfloor Glue: Water proof, water base, air cure type, cartridge dispensed conforming to APA Standard AFG-01 or ASTM D3498. Maximum Volatile Organic Compound (VOC) shall meet local air quality standards and the California Green Building Code.

## **2.06 SOURCE QUALITY CONTROL**

- A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform testing for moisture content of all lumber at time of fastener installation.
- B. The Testing Agency will submit reports as specified in Division 01.

### **PART 3 - EXECUTION**

#### **3.01 REQUIREMENTS FOR STRUCTURAL FRAMING**

- A. General
  - 1. Refer to drawings for layouts, notes and details, provide framing as required; comply with governing building code requirements.
  - 2. Provide framing to achieve true alignments as surfaces receiving finish materials.
  - 3. It shall be the responsibility of the Contractor to provide and install all wood blocking, furring strips, or grounds detailed or required to provide anchorage for all finishes, accessories, fixtures, etc. as required to complete all work. All blocking and/or backing shall be securely bolted or otherwise anchored in place.
  - 4. Contractor shall be responsible for layout of anchor bolts, and other hardware embedded in concrete when placed by other trades.
  - 5. Provide and install all structural framing, blocking, fasteners, brackets, clips, etc. as required to complete work specified in the Construction Documents.
- B. Framing
  - 1. Sill Plates and Ledgers:
    - a. Sill plates and ledgers on concrete shall be anchored with bolts, unless noted otherwise, shall have full bearing on concrete, and shall be placed for sheathing panel nailing as indicated. All bolt nuts shall be provided with a cut plate steel washer for bearing on wood.
    - b. Provide a minimum of two sill anchor bolts per sill piece with a bolt no less than 4 ½" and no more than 12" from the end of the sill. Bolts to be 5/8" diameter x 12" (18" at curb) long at 48" on centers, unless otherwise shown or noted. Provide additional anchor bolts each side of a notch or hole, as per a typical plate splice, where notch or hole is in excess of 1/3 the plate width. At shear walls, provide a plate washer 3" x 3" x 0.229" minimum between the sill and nut at anchor bolts. Plate washer to extend within ½ inch of the structural wall sheathing. Offset and/or stagger anchor bolts, or provide larger plate washer as required.
    - c. Anchor bolt holes in sill plates or ledgers shall be 1/16" maximum larger than anchor bolt.
  - 2. Stud Walls and Framing:

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

### 3. Top Plates

- a. Top plates shall be double, set single. Corners where stud wall or partitions meet shall be framed with studs on all surfaces and blocking to form a "rigid" corner with nailing for all corners. Double top plates shall be lapped at corners. Lap splices and nailing per the drawings.

### 4. Roof and Ceiling Framing

- a. Joists and beams shall be accurately aligned and the position and spacing of all joists and beams shall be as shown and be coordinated with other framing and to other trades prior to actual construction.
- b. Place all joists and beams with crown up. Cantilevered joists and beams shall be placed with the crown down.

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

### **3.02 STRUCTURAL SHEATHING**

#### **A. General**

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

B. Roof Sheathing: Lay with face grain perpendicular to roof rafters. Stagger sheets. Block all unsupported sheet edges with 2x material unless noted otherwise.

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

### **3.03 ROUGH HARDWARE**

A. General: Nails, spikes, screws, fabricated sheet metal anchors, ties, hangers and any other materials shown or required for the attachment of wood to concrete and wood to steel and wood to wood shall be furnished and installed as part of this work.

B. Framing Nailing: All framing nailing shall conform to minimum requirements of the Building Code, and with details shown on the drawing.

#### **C. Bolts, Lag Screws and Washers:**

1. Bolts in wood shall be machine bolts unless otherwise noted and shall be of such length that the bearing length of the treads does not exceed  $\frac{1}{4}$  of the full bearing length in the member holding the treads. Bolt holes in wood shall be

- 1/32" oversized. Bolt holes for sill plates may be 1/16" maximum oversize. Holes in steel shall be 1/16" oversize. See Section 3.1 for anchor bolts at sill plates and ledgers.
2. Provide square plate or malleable iron washer and nut at head where bearing is against wood; cut washer under nut where it is against steel. Washer will not be required under head of carriage bolts. Provide malleable iron washers where exposed.
  3. All nuts shall be tightened when placed and retightened at completion of the job or immediately before closing with final construction.
  4. Lag screws shall be screwed (not driven) into place. Drill pilot hole to 70% of shank diameter. Drill clearance hole to full shank diameter and depth of unthreaded screw length.
- D. Wood Screws: Minimum penetration is 10 diameters unless noted otherwise. Where fastening hardwood timber species or where wood tends to split, provide pilot hole 70% of screw shank diameter.
- E. Proprietary Fasteners and Hardware: Install per manufacturer's published installation instructions (MPII) and code approval report (e.g. ICC ESR, IAPMO ER, etc). Provide MAX quantity, size, and length of fastener at hardware (i.e. joist hangers, framing, clips, etc) unless otherwise noted per plan.

### **3.04 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD**

- A. Coordinate installation wood I-joists.
- B. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members. Fasten curbs corner-to-corner and to rafters with framing connectors configured for this application.
- C. Blocking:
1. Provide fire blocking at locations and spacing's as required by CBC Chapter 7. Locate other blocking, supplementary framing, backing plates and bracing to facilitate installation of finish materials, fixtures, equipment, services, accessories, and trim requiring attachment and support.
  2. Solid block joists and rafters over all supports with blocking of the same size and material as the joist or rafter.
- D. Furring:
1. Nominal 1 inch x 3 inch minimum, continuous and spaced at 16 inches on center, maximum.
  2. Install plumb, rigid, and level. Shim where necessary to provide a true, even plane suitable to receive the finish required.
  3. Attach to concrete and masonry as shown in the contract drawings.

- E. Bridging: Use 2 inch solid cross bridging. Nail bottom ends of bridging only after sheathing has been nailed.
- F. Install miscellaneous metal angles, bolts, and other items; secure into formwork where embedded in concrete.
- G. Install accessory items not otherwise set under other sections; after completion of painting and other finishing work; in locations shown or directed by the Architect. Set items plumb, level, and secure using appropriate fastening as applicable.

**3.05 FIELD APPLIED WOOD TREATMENT**

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

**3.06 TOLERANCES**

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

**3.07 FIELD QUALITY CONTROL**

- A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following tests and submit reports as specified in Division 01:
  - 1. Moisture content of all lumber at time of close-in.
  - 2. Periodic special inspection of nailing, bolting, and other fastening within the seismic-force-resisting system including shear walls, wood diaphragms, etc. per CBC Section 1705A.12.2.
  - 3. Special inspection of high load diaphragms per CBC Section 1705A.5.1 where designated on documents.

**3.08 ADJUSTING**

- A. Replace all defective work at Contractor's expense.
- B. Replace defective or damaged work with conforming work.



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

### **3.09 CLEANING AND PROTECTION**

- A. Clean all surfaces upon completion of erection, leave free of grime and dirt. Remove unused materials, tools, equipment, and debris from the premises and leave surfaces broomed clean.
- B. Waste Disposal: Comply with the requirements of pertinent sections of Division 01 specifying cleaning and disposal.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- C. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- D. Prevent sawdust and wood shavings from entering the storm drainage system.
- E. Protect work from damage by subsequent operations.

END OF SECTION

## SECTION 06173

### WOOD I-JOISTS

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Section Include: The furnishing and installation of all wood I-joists as shown on the drawings, herein specified and necessary to complete the work.
- B. Related Sections
  - 1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency Services.
  - 2. Pertinent sections of Division 06 specifying Rough Carpentry.

##### **1.02 REFERENCES**

- A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 23 Wood.
- B. American National Standards Institute (ANSI) / American Wood Council (AWC) "National Design Standard (NDS) for Wood Construction".
- C. International Code Council Evaluation Service (ICC-ES) "Acceptance Criteria (AC) 14 Prefabricated Wood I-Joists".
- D. American Society for Testing and Materials (ASTM) D5055 "Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists".

##### **1.03 SUBMITTALS**

- A. Submit shop drawings, furnished by the Manufacturer, showing all critical dimensions for determining fit and placement in the building and erection instructions.

##### **1.04 QUALITY ASSURANCE**

- A. All wood I joists shall be manufactured in a shop approved for fabrication by the Authority Having Jurisdiction (AHJ).
- B. Wood I-joists are not required to be continuously inspected during fabrication but must carry a stamp indicating the plant of manufacture, date of manufacture, and logo of the third-party independent inspection agency, conforming to AC14, and ASTM D5055.
- C. Fabricators must have a minimum of three years' experience in manufacturing comparable systems and shall have a valid evaluation report issued by a qualified evaluation agency prescribed in DSA IR A-5.

- D. Wood I-joists delivered shall be free from any defects in materials, and the members shall be adequate to carry the design loads for the life of the building.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. Joists shall be manufactured from materials in the evaluation report and shall be of sizes and shapes shown on the contract documents.
- B. Blocking construction shall be the same as I-joists, unless noted otherwise.

**2.02 FABRICATION**

- A. Camber - None, unless noted otherwise.
- B. Tolerances:
  - 1. Length (between outside bearing edges): +/- 1/2 inch
  - 2. Depth: +/- 3/8 inch
  - 3. Camber: +/- 1/4 inch

**PART 3 - EXECUTION**

**3.01 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Wood I-joists shall be stored in a vertical position and protected from the weather. They shall be handled with care so they are not damaged. Provide bearing supports and bracings to avoid bending or overturning of I-joists, and protect I-joists from construction operations.

**3.02 ERECTION AND INSTALLATION**

- A. Use all means necessary to coordinate the work of this section with the work of other sections to ensure proper and adequate erection of the work of this section.
- B. Wood I-joists shall be installed in accordance with the approved shop drawings and installation instructions therein.
- C. Temporary construction loads, which will cause member stresses beyond design limits, are not permitted.
- D. Erection bracing in addition to specified bridging is to be provided to keep the I-joists straight and plumb as required to assure adequate lateral support for the individual I-joist and entire system until the sheathing material has been applied. Bridging as shown on the drawings and per Manufacturer's recommendations shall be installed as erection of I-joists progresses and before any construction loads are placed on the I-joists.

- E. Round holes may be cut in the I-joist web as indicated on the drawings. Square or rectangular holes may be cut when the diagonal dimension of the square or rectangular hole does not exceed the diameter of the maximum allowable round holes shown on the drawing. Overcut square or rectangular holes shall be treated as a hole matching the overcut. Holes exceeding maximum holes shown on the drawings are cause for rejection of the I-joist.
- F. The Contractor shall give notification prior to enclosing the I-joists to provide opportunity for inspection of the installation.

END OF SECTION

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SECTION 06200

**FINISH CARPENTRY**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items, other than shop prefabricated casework.
- B. Hardware and attachment accessories.

1.2 REFERENCES

- A. WI - North American Architectural Woodwork Standards

1.3 QUALITY ASSURANCE

- A. Manufacture millwork and finish carpentry items in accordance with custom quality standards of the 2016 edition of the North American "Architectural Woodwork Standards" and all addenda issued out as of the bid date of this project.

1.4 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Indicate materials, component profiles, fastening methods, jointing details, finishes, and accessories to a minimum scale of 1-1/2 inch to one foot. Provide WI Certified Compliance label on first page of each set.
- C. Submit samples under provisions of Section 01300.
- D. Submit two samples 2 x 3 inch in size illustrating wood grain and specified finish.
- E. Submit two samples 3-inch long of wood trim.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01500.
- B. Store materials in ventilated, interior locations under constant minimum temperatures of 70 degrees F and maximum relative humidity of 50 to 55 percent.

2 PART 2 PRODUCTS

2.1 ACCEPTABLE FABRICATORS

- A. W.I. certified fabricator

2.2 MATERIALS

- A. Materials specified under Architectural Woodwork Standards  
Section Numbers refer to lumber grades in WI Manual as follows:  
Section 3, Lumber Hardwood/Softwoods; Section 4, Sheet Products  
Section 5, finishing; Section 6, Interior & Exterior trim, frames  
and millwork, Section 10, Casework.

### 2.3 EXTERIOR TRIM

A. Fabricate in accordance with Section 7 of Millwork Manual:

<u>Item</u>	<u>WI Species</u>	<u>WI Grade</u>	<u>Intended Finish</u>
Exterior wood trim fascias & rakes	Redwood	Custom	Opaque

### 2.4 MISCELLANEOUS EXTERIOR MILLWORK

A. Fabricate in accordance with Section 7 of Millwork Manual:

<u>Item</u>	<u>WI Species</u>	<u>WI Grade</u>	<u>Intended Finish</u>
Plywood Casing and Sheathing	Douglas Fir Texture-II	Custom	Opaque

### 2.5 EXTERIOR FRAMES

A. Fabricate in accordance with Section 7 of Millwork Manual:

<u>Item</u>	<u>WI Species</u>	<u>WI Grade</u>	<u>Intended Finish</u>
Door, Window & Sidelight Frames	VG Douglas Fir, KD	Custom	Opaque

### 2.6 INTERIOR TRIM

A. Fabricate in accordance with Section 9 of Millwork Manual:

<u>Item</u>	<u>WI Species</u>	<u>WI Grade</u>	<u>Intended Finish</u>
Base, Casing & Trim	Red Oak	Custom	Stained
Tackboard Frames Chalk Rail & Frame	Redwood	Custom	Opaque
Wall Paneling	Red Oak	Custom	Stained

### 2.7 MISCELLANEOUS INTERIOR MILLWORK

A. Fabricate in accordance with Section 11 of Millwork Manual:

<u>Item</u>	<u>WI Species</u>	<u>WI Grade</u>	<u>Intended Finish</u>
1x3 Trim	Red Oak	Custom	Stain
¾ inch Plywood Backboard	Doug Fir	AC	Opaque
OSB Backing	Oriented strand board	AC	Covered with FRP or ceramic tile
Window sills	Red Oak	Custom	Stain
Wainscot	Red Oak	Custom	Stain

## 2.8 INTERIOR JAMBS

- A. Fabricate in accordance with Section 12 and 13 of Millwork Manual:

<u>Item</u>	<u>WI Species</u>	<u>WI Grade</u>	<u>Intended Finish</u>
Interior door & borrowed light frames, stops and trim	Red Oak	Custom	Stain

## 2.9 ACCESSORIES

- A. Nails: Size and type to suit application, galvanized finish.
- B. Bolts, Nuts, Washers, Blind Fasteners, Lags, and Screws: Size and type to suit application; galvanized finish.
- C. Lumber for Shimming and Blocking: Softwood lumber of Douglas Fir species.
- D. Primer: Alkyd primer sealer.
- E. Wood Filler: Solvent base, tinted to match surface finish color.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that surfaces and openings are ready to receive work and field measurements are as instructed by the fabricator.
- B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.
- C. Beginning of installation means acceptance of existing conditions.

### 3.2 PREPARATION

- A. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

### 3.3 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

### 3.4 INSTALLATION

- A. Install work in accordance with W.I. Manual of Millwork, Installation of Millwork, Custom quality standard.
- B. In accordance with the manufacturer's instructions and recommendations unless specifically noted otherwise:
- Provide experienced, factory trained craftspeople under manufacturers direct supervision.
  - In accordance with the reviewed fabrication drawings.
  - In accordance with the regulatory requirements.
  - The entire installation shall present a workmanlike appearance, without open joints, tool marks or other blemishes and subject to the Architect's approval.



- C. Set and secure casework in place rigid, plumb, level with true lines as shown on the drawings.
- D. Filler panels and scribe strips or moldings, as required, shall be properly scribed to adjacent work and securely attached to cabinets as indicated on the drawings.
- E. Install casework in accordance with "Installation of Architectural Millwork", Section 15 of Millwork Handbook.

#### 3.6 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Finishing: Refer to Section 09900.

#### 3.7 PROTECTION

- A. Protect finished installation under provisions of Section 01500.

END OF SECTION

SECTION 06415  
**PLASTIC LAMINATE COVERED CASEWORK**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Special fabricated cabinet units.
- B. Countertops.
- C. Prepared for utilities.
- D. Cabinet hardware.

1.2 REFERENCES

- A. WI - North American Architectural Woodwork Standards.

1.3 QUALITY ASSURANCE

- A. Manufacture casework items in accordance with custom quality standards of the 2016 edition of the North American "Architectural Woodwork Standards" and all addenda issued out as of the bid date of this project.
- B. Issue W.I. Certified Compliance Certificate to Architect prior to delivery of millwork.

1.4 MOCKUP

- A. Prepare mockup under provisions of Section 01400.
- B. Provide full size base cabinet and upper cabinet of each type indicated in specified finish with hardware installed.
- C. Units will be examined to ascertain quality and conformity to WI standards.
- D. Units will establish a minimum standard of quality for this work.
- E. Approved units may be used as part of the work.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Include materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, and schedule of finishes. Provide WI Certified Compliance label on first page of each set.
- C. Submit samples under provisions of Section 01300.
- D. Submit two samples 2 x 3 inch in size illustrating laminate textures and colors. Selection by the Architect will be made from manufactures full range of colors and textures.

2 PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Acosta & Sons, (209) 874-9563.
- B. W.I. certified manufacturer.
- D. Substitutions: Under provisions of Section 01300.

2.2 MODULAR CASEWORK - LAMINATED PLASTIC COVERED

- A. Fabricate in accordance with Section 10 of Millwork Manual:

- 1. WI Grade : Custom
- 2. Construction : Flush Overlay.
- 3. Edge Bands : .028" high pressure plastic laminate the same as exposed faces.
- 4. Exposed Surfaces : .028" high pressure plastic laminate, color and pattern as selected by Architect. Price Code "D".
- 5. Semi-Exposed Surfaces : Low pressure decorative polyester or melamine laminate ALA-85.
- 6. Semi-Exposed Surfaces of Open Cabinets : Interior surfaces of open cabinets or behind glass doors shall match exposed surfaces.

- B. Edge Banding:

- 1. General:
  - a. Exposed and semi-exposed edges shall be banded with Polyvinyl Chloride (PCV).
  - b. PVC color to match exposed surface at shelves, dividers, and partitions (unless otherwise indicated on an Interior Color Selection Chart).
- 2. 0.5 mm nominal edge banding typical at standard modular cabinetry unless otherwise noted).
- 3. 3 mm nominal edge banding:
  - a. The width of banding shall match edge condition being banded.

2.3 LAMINATED PLASTIC COUNTERTOPS

- A. Fabricate in accordance with Section 11 of Millwork Manual:

- 1. WI Grade : Custom
- 2. Edge Covering : No-drip bullnose
- 3. Back Splash : Integral Cover
- 4. Top of Back Splash : Square self-edge
- 5. Plastic Colors and Pattern : .028" high pressure plastic laminate, colors and patterns as selected by Architect, Price Code "D".

2.3 JANITOR ROOMS

- A. Provide economy grade casework.

2.4 HARDWARE

- A. Finish: Satin Aluminum.
- B. Shelf Standards and Rests: Grants 120AL, Recessed.
- C. Drawer and Door Pulls: Stanley, SH4483.5, 3-1/2".
- D. Door Locks: National No. C8123.
- E. Drawer Locks: National No. C8138.
- F. Cabinet Locks: Corbin 0737.
- G. Sliding Glass Door Locks: EPCO NO. G-03.
- H. Catches: EPCO 591 and 592 (two on doors over 36" in height).
- I. Drawer Slides: Grant 338.
- J. Hinges: Heavy duty wrap-around, 2-1/2" minimum width, offset for overlay doors.
- K. Sliding Door Track Assemblies: Grant No. 6005 with No. 6320 and No. 6330 hangers.
- L. Sliding Door Pulls: Sugatsune, KK-M S, 3-1/2".
- M. Sliding Door Stops: Grant No. 1018.
- N. Sliding Door Pins: Ammerock No. 36686.
- O. Sliding Glass Door Tracks: Knapp and Vogt No. 1092 set.
- P. Passage Gate Hardware: Chicago Sagless No. 6007.
- Q. Cloths Pole Sockets: Ronthor-Reiss No. R44, 1-1/4" I.D.
- R. Hand Rods: 1-1/4" O.D., 0.065 wall aluminum tubings.
- S. Teachers' Wardrobe Pin Trays: Ronther Reiss No. 11-87.

2.5 FABRICATION

- A. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- B. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.
- C. All adjustable shelves shall be 1" thick.
- D. All edges shall be furnished with 3 mm thick PVC; color to match exposed surfaces at shelves, dividers or partitions.
- E. Backs ½-inch minimum
- F. Provide 2 magnetic catches at full length doors.
- G. All fabricated stainless steel items shall have relieved polished edges.

- H. All drawers and doors shall be keyed locked. Key alike in each room and with the building masters and grand master or as directed by the Architect.
- I. Construct openings and backing as required for Work done under Division 15 MECHANICAL (sinks, faucets, plumbing, etc.), Division 16 ELECTRICAL (outlets, switches, wiring, etc). DIVISION 27 COMMUNICATIONS, (outlets, switches, wiring, etc).
- J. Furnish and install three-inch grommet holes in counter tops and sides of cabinetry for data lines where indicated on the plans. Furnish and install grommets in each hole. Color as selected by Architect.

### 3 PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Verify adequacy of backing and support framing.

#### 3.2 INSTALLATION

- A. In accordance with the manufacturer's instructions and recommendations unless specifically noted otherwise:
  - a. Provide experienced, factory trained craftspeople under manufacturers direct supervision.
  - b. In accordance with the reviewed fabrication drawings.
  - c. In accordance with the regulatory requirements.
  - d. The entire installation shall present a workmanlike appearance, without open joints, tool marks or other blemishes and subject to the Architect's approval.
- B. Set and secure casework in place rigid, plumb, level with true lines as shown on the drawings.
- C. Filler panels and scribe strips or moldings, as required, shall be properly scribed to adjacent work and securely attached to cabinets as indicated on the drawings.
- D. Install casework in accordance with "Installation of Architectural Millwork", Section 15 of Millwork Handbook.

#### 3.3 CONSTRUCTION

- A. Special Techniques:
  - 1. 3MM Edge Banding:
    - a. 3-mm edge banding tapes shall be installed with an Automatic Edge Banding Machine made for the installation of 3-mm to 5-mm thick edge banding tapes, capable of installing the tapes with a continuous hot-melt pressure applied glue.
    - b. The use of contact cement is prohibited.
    - c. Provide 1/16 inch radius top and bottom edges, with a polished and buffed finish across both the radiused edges and the face of the 3-mm tape.
    - d. The width of the banding shall match the edge condition being banded.
      - 1) The top of the banding shall be flush with the plastic laminate finish, and the bottom shall be flush with the substrate to which it is applied.
      - 2) Do not overlap plastic laminate over the 3mm tape.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

4 PART 4 CLOSE OUT

4.1 CLOSE OUT

- A. Upon completion of work of this section, Contractor shall remove all equipment, excess material and waste products from site.

5 PART 5 GUARANTY

5.1 GUARANTY

- A. Upon completion of work of this section, Contractor shall provide one (1) year guaranty in accordance with Section 01700.

END OF SECTION

SECTION 07213

**BATT AND BLANKET INSULATION**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Batt insulation and vapor barrier in exterior wall and roof construction.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
- C. Batt sound insulation within all interior walls and partitions full height floor to structure above.

1.2 REFERENCES

- A. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

1.3 PERFORMANCE REQUIREMENTS

- A. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements.
- B. Materials of this Section shall provide continuity of sound control where indicated or scheduled.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS - INSULATION MATERIALS

- A. Manville Corporation.
- B. Owens-Corning Fiberglass Corporation.
- C. United States Gypsum Insulation Products.
- D. Substitutions: Under provisions of Section 01300.

2.2 MATERIALS

- A. Thermal Insulation: ASTM C665 preformed glass fibers, Type III, Class B, with reflective covering one side.
  - 1. Flame Spread Rating: 25 or less.
  - 2. Maximum smoke density of 450.
  - 3. Walls: R-19.
  - 4. Roof: R-38
- B. Sound Insulation: ASTM C665 preformed glass fibers, Type I unfaced.
  - 1. Flame Spread Rating: 25 or less.
  - 2. Maximum smoke density of 450.
  - 3. Walls and Ceilings: Provide R-22.
- C. Nails or Staples: Steel wire; electroplated; type and size to suite application.

- D. Tape: Bright aluminum self-adhering type, mesh reinforced, 2" wide.

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

#### 3.2 INSTALLATION

- A. Install insulation in accordance with insulation manufacturer's instructions.
- B. Install in all exterior walls, roof transitions and ceiling spaces without gaps or voids.
- C. Install sound insulation between studs in all stud partition walls, walls surrounding restrooms, from floor to roof deck and also in areas where shown on the drawings from floor to roof deck.
- D. Install sound insulation in areas where shown on the drawings.
- E. Trim insulation neatly to fit spaces.
- F. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- G. Install with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane between framing members.
- H. Staple or nail in place at maximum 6" o.c.
- I. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- J. Do not compress insulation in excess of 10%.
- K. Where downspouts from the roof drains come down inside the building, wrap downspouts from the roof to the floor with 2-1/2" sound insulation blankets. These batts shall be secured in place.

#### 3.3 CLEAN UP

- A. Remove all rubbish and surplus materials from the site and dispose of in a legal manner.

END OF SECTION



SECTION 07240

**EXTERIOR FINISH SYSTEMS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide all labor, materials, and equipment necessary to install the exterior finish system, including expansion joints and miscellaneous trim for a complete installation.
- B. New finish and texture to match existing wall finish.

1.2 RELATED SECTIONS

- A. 033000 - Cast-in-place Concrete.
- B. 061000 - Rough Carpentry.
- C. 07260 - Vapor Retarders.
- D. 07270 - Air Barriers.
- E. 07620 - Sheet Metal Flashing and Trim: Perimeter Flashings.
- F. 07900 - Joint Sealers.
- G. 09260 - Gypsum Board Systems.

1.3 REFERENCES

- A. ASTM A641 - Zinc Coated (Galvanized) Carbon Steel Wire.
- B. ASTM C91 - Masonry Cement.
- C. ASTM C79 - Gypsum Sheathing
- D. ASTM C150 - Portland Cement.
- E. ASTM C206 - Finishing Hydrated Lime.
- F. ASTM C207 - Hydrated Lime for Masonry Purposes.
- G. ASTM C847 - Standard Specification for Metal Lath.
- H. ASTM C897 - Aggregate for Job-Mixed Portland Cement-Based Plaster.
- I. ASTM C926 - Application of Portland Cement-Based Plaster.
- J. ASTM C1002 - Standard Specification for steel self-piercing tapping screws for application of gypsum panel products or metal plaster bases to wood studs or steel studs.
- K. ASTM C1063 - Installation of Lathing and Furring for Portland Cement Based Plaster.
- L. ASTM E119 - Method for fire test of building construction materials.
- M. ASTM E1677 - Standard Specification for air barriers (AB) material or assemblies for low rise framed building walls.

- N. PCA (Portland Cement Association) Plaster (Stucco) Manual.
- O. Plaster and Drywall Systems Manual, Third Edition.
- P. CBC - California Building Code, 2019 Edition.
- Q. ICC - ESR 4004

#### 1.4 DEFINITIONS

- A. Accessories - Linear formed metal, metal and paper members fabricated for the purpose of forming corners, edges, control joints, or decorative effects in conjunction with plaster assemblies, as required to ensure weather resistance with the plaster.
- B. Base Coat - Coat of plaster directly beneath the finish coat. Brown coat or base coat refers to the base coat plaster applied over wire lath/metal lath. Base coats are applied with a fairly rough surface (due to sand aggregate) to receive the finish material.
- C. Backing Board - A system component of a specific type and density that functions as the surface to receive the base coat. See Specification Section 09260.
- D. Fiberboard - Minimum 1/2 inch thick, asphalt impregnated subsurface complying with ASTM E96.
- E. Gypsum Sheathing - Water-resistant core gypsum sheathing complying the ASTM E96 as described in Specification Section 09260.
- F. Fasteners - Screws or Staples utilized in compliance with ASTM C1002.
- G. Finish Coat - A decorative material that provides a protective textured coating applied to the base coat.
- H. Flashings - Strips of sheet metal or building paper used to waterproof, intercept and redirect the flow of water around openings, roof penetrations, etc. to prevent it from entering the building
- I. Lath - A reinforcement base to receive plaster. It is secured to framing or furring members.
- J. Weather Resistive Barrier - See Specification Section 07260.

#### 1.5 SYSTEM DESCRIPTION

- A. General: The Exterior Finish System is comprised of a weather-resistive barrier, lath, base coat, and a finish coat.
- B. Application Methods: The Exterior Finish System is applied directly to each structure at the construction site.

#### 1.6 SUBMITTALS

- A. Submit under provisions of Section 01300: Submittal Procedures.
- B. Product Data: All products data sheets and details that pertain to the project including specifications on installation requirements of each different material to be

used in the system.

C. Samples: To be submitted:

1. Samples of the Exterior Finish System shall be of an adequate size as required to represent each color and texture to be utilized on the project.
2. Retain approved samples at the construction site throughout the application process.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. System component materials shall be manufactured by a company specializing in manufacturing products specified in this section with minimum five years of documented experience.
2. Plastering Contractor:
  - a. Shall specialize in cement plasterwork with five years documented experience.
  - b. Shall show proof of current applicator's training certificate issued by manufacture.

B. Mock Ups:

1. Prior to commencement of work, provide a mock-up for approval:
  - a. Size suitable to represent the products to be installed and each color and texture, constructed using the same tools and techniques to be utilized on the project.
  - b. Retain approved mock-up at job site throughout the application process.
  - c. The color and texture of the mockup shall match the existing buildings.

1.8 DELIVERY STORAGE AND HANDLING

- A. Deliver all materials to the construction site in their original, unopened packaging with labels intact.
- B. Inspect the materials upon delivery to assure that specified products have been received. Report defects or discrepancies to the responsible party according to the construction documents; do not use reported material for application.
- C. Store materials in a cool, dry place, protected from direct sunlight, weather, and other damage (not in direct contact with the ground).
- D. Comply with Specification Section 01500 - Construction Facility and Temporary Controls.

1.9 PROJECT CONDITIONS

A. Environmental Requirements:

1. Before, during and following the application of the

Exterior Finish System, the ambient and surface temperatures must remain above 40°F (4°C) for a minimum period of 24 hours.

2. Provide electrical outlets, clean, potable water, and a suitable work area at the construction site throughout the application of the Exterior Finish System.

#### 1.10 SEQUENCING AND SCHEDULING

- A. The installation of the Exterior Finish System shall be coordinated with all other construction trades.
- B. Provide sufficient manpower to ensure continuous operation, free of cold joints, scaffolding lines, variations in texture, etc.
- C. Comply with Specification Section 01039 for coordination and meetings.

#### 1.11 WARRANTY

- A. Upon the completion of the project, the manufacturer shall provide a five year materials warranty.
- B. Upon the completion of the project the installer shall provide a one-year guarantee.

#### 1.12 MAINTENANCE

- A. The following materials shall be presented to the owner following the completion of the application of the System:
  1. One container of finish for each color and texture utilized on the project.
  2. A maintenance program for finishes as required.
  3. Comply with Specification Section 01700 - Contract Closeout.

## 2 PART 2 PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS -

- A. Omega Products International, Inc. (916) 635-3335
- B. La Habra Products
- C. Substitutions: Under provisions of Section 01300.

#### 2.2 COMPONENTS

- A. Weather Resistive Barrier - See Specification Section 07260 for material.
- B. Lath
  1. 3.4 lb. galvanized rib expanded metal lath per CBC Table 25A-B.
- C. Accessories:
  1. Corner Mesh: Formed steel, minimum 26 gauge thick; expanded flanges shaped to permit complete embedding in plaster; minimum 2 in. wide; galvanized finish.

2. Strip Mesh: Metal Lath, 3.4 lb/yd<sup>2</sup> expanded metal, galvanized, 6 inch wide x 18 inches long.
3. Vent Screed: Minimum 24-gauge thick; thickness governed by plaster thickness; minimum 4 inch width, double "V" profile with perforated expanse between "V's" of maximum possible lengths; galvanized finish expanded metal flanges, with square edges.
4. Casing Bead: Formed steel; minimum 24-gauge thick; thickness governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges; galvanized finish.
5. Drip Screed: Minimum 26-gauge thick, depth governed by plaster thickness, minimum 3-1/2 in. high flange, of longest possible lengths; galvanized finish.
6. Control and Expansion Joints: depth to conform to plaster thickness, maximum practical lengths, with Uni-joint II, galvanized finish.
7. Anchorages: Screws, staples, or other approved metal supports, of type and size to suit application, galvanized to rigidly secure lath and associated metal accessories in place to steel studs.
8. Penetration Flashing: Type I, Grade A building paper conforming to ASTM E96 and ASTM E1677; 9 in. wide x length required. See Specification Section 07270.
9. Wire: ASTM A641, Class I coating (galvanized), soft temper.
10. Drip Screed (Weep Screed): formed steel; minimum 26 gage thickness with weep holes; size and profile to suit application; galvanized finish ready to receive paint.

D. Sand

1. Sand must be clean and free from deleterious amounts of loam, clay, silk, soluble salts and organic matter.
2. Sampling and testing must comply with ASTM C144 or C897.
3. Sand must be graded in accordance with ASTM C. 144 or C987 or within the following limits:

RETAINED ON U.S. STANDARD SIEVE	PERCENT RETAINED BY WEIGHT ±2 %	
	MIN	MAX.
No. 4		0
No. 8	0	10
No. 16	10	40
No. 30	30	65
No. 50	70	90
NO. 100	95	100

E. Water

1. Clean and potable without foreign matter.

F. Base Coat

1. Cement: ASTM C150, Normal - type I
2. Lime: ASTM C206, Type S
3. Aggregate: In accordance with ASTM C897 and PCA Plaster Manual.
4. Plaster Mix Reinforcement: Alkali resistant fibers 3/8" to 1/2" long of either glass fibers or polypropylene fibers.
  - a. Glass fibers; 1/2" long shall be added at a rate of 1-1/2 lbs. per sack of cement.
  - b. Polypropylene fibers; 3/8" long single strand added at a rate of 1/5 lb. per sack of cement.
  - c. Fibers shall be measured out in a calibrated measuring cup in the field.
  - d. Fibers shall be feathered into the mixes and blended thoroughly."

G. Article 2.3 - Mixes

1. Add the following to the end of this article:
  - "C. Mix and proportion cement plaster in accordance with ASTM C926 and PCA Plaster (Stucco) Manual.
  - D. Basecoat: One part cement, minimum 3-1/2 and maximum 4 parts aggregate, and 0-3/4 parts hydrated lime, and fibers at a rate listed in Article 2.2.
  - E. Mix only as much plaster as can be used in one hour.
  - F. Mix materials dry, to a uniform color and consistency, before adding water.
  - G. Do not retemper mixes after initial set has occurred.
  - H. Completely discharge the mixer and remove all set or partially hardened materials before loading the next batch. Partially set materials shall not be retempered or reused."

H. Finish Coat

1. Equal to Akroflex finishes/Omega Finishes, manufactured by Omega Products International, Inc. The Akroflex system is to have a 'Malibu' No. DS03-001 finish with a color to be selected from the manufacturers full color line. A minimum of two colors will be used on this project.

2.3 MIXES

- A. Contractor shall comply with all material mixing and tinting instruction per manufacturer's product information sheets.
- B. Protect base coat and finish coat from frost, contamination, and rapid evaporation.
- C. Mix and proportion cement plaster in accordance with ASTM C926 and PCA Plaster (Stucco) Manual.
- D. Basecoat: One part cement, minimum 3-1/2 and maximum 4 parts aggregate, and 0-3/4 parts hydrated lime, and fibers at a rate listed in Article 2.2.

- D. Mix only as much plaster as can be used in one hour.
- E. Mix materials dry, to a uniform color and consistency, before adding water.
- F. Do not re-temper mixes after initial set has occurred.
- G. Completely discharge the mixer and remove all set or partially hardened materials before loading the next batch. Partially set materials shall not be re-tempered or reused."

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Prior to the application of the Exterior Finish System, plastering contractor shall ensure that:
  - 1. Surface and site conditions are ready to receive work.
  - 2. Grounds and Blocking: Verify items within walls for other sections of work have been installed.
  - 3. Mechanical and Electrical: Verify services within walls have been tested and approved.
  - 4. Beginning of installation means acceptance of conditions.
- B. Substrates:
  - 1. Acceptable substrates must be securely fastened per applicable building code requirements.
  - 2. Acceptable substrates and adjacent materials must be dry, clean, and sound. Substrate surface must be flat, free of fins or planar irregularities greater than 6mm in 3m (1/4" in 10).
- C. Flashings:
  - 1. As per manufacturer's details. All flashing around windows, at deck flashing must be properly installed prior to application of exterior finish system.
- D. The plastering contractor shall notify the General Contractor, according to the construction contract, of any discrepancies found.

#### 3.2 SURFACE PREPARATION

- A. Clean the substrate to which the Exterior Finish System is to be applied, ensuring that there are no foreign materials present.
  - 1. Foreign material include, but are not limited to, oil, dirt, dust form release agents, efflorescence, paint, wax, water repellants, moisture, frost, and or extended screws that may rupture the weather resistive barrier.
- B. Protect surfaces near the work of this Section from damage, disfiguration, and over spray; mask off all ventilation screeds, openings, windows and other items occurring in plastered areas.

### 3.3 INSTALLATION

#### A. Weather Resistive Barrier

1. Install weather resistive barrier over sheathing according to Specification Section 02760.
2. Flash around all openings in walls according to Specification Section 07270 - Air Barriers.

#### B. Sheathing: of the following:

1. Exterior grade gypsum sheathing - see Specification Section 09260.

#### C. Metal Lath

1. Attach using wire, screws, or staples; type, size, and spacing shall be in accordance with California Building Code and manufacturer's requirements.
2. Wire or lath shall be applied with minimum 25 mm (1 inch) end laps and side laps.
3. Furring crimps shall occur at maximum 152.4-mm (6 inch) intervals each way. Furring crimps shall provide a minimum 3.18mm (1/8 inch) clearance from the substrate after installation.
  - a. the metal lath shall be applied with minimum 13mm (1/2 inch) side laps and 25 mm (1 inch) end laps.
  - b. When end laps occur between supports, lace or wire tie the ends of the sheets with 1.2 mm (0.0475 inch) galvanized annealed steel wire.
  - c. Refer to ASTM C-1063 for additional information.
  - d. Correction resistant fasteners for lath attachment shall penetrate a minimum of 25.4mm (1 inch) into metal framing.
4. The lath shall be applied tightly over the backing and shall be fastened through the board to all steel framing members (minimum No. 20 ga. 0.912 mm (0.0359 inch) thick using no 8 18.S-12 panhead, self-tapping screws spaced a maximum of 152.4 mm (6inches) on center to all framing. The screws shall penetrate framing at least 6.35 mm (1/4 inch). The wire lath shall be applied with minimum .25± mm (1 inch) end laps.

#### D. Application over solid Backing

1. Gypsum Sheathing
  - a. Minimum thickness 12.7 mm (1/2 inch), water resistant core, gypsum sheathing shall be installed directly on steel framing with studs spaced a maximum of 610 mm (24 inches) on center. See Specification Section 09260.
  - b. The gypsum sheathing shall be fastened to steel framing with No. 20 gauge ((0.91 mm (0.0359 inch) thick steel studs with No. 8-18, S-12 pandhead, 25.4 mm (1 inch) long, self-tapping screws spaced a maximum of 254.0 mm (10 inches) on center to all furring members. A weather-resistive membrane shall be applied over the gypsum sheathing. The metal lath and coating shall be as described in sections of this specification.



E. Control and Expansion Joints

1. Shall be placed as indicated on drawings.
2. Coordinate joint placement with all other related work.
3. Trim Junction: When two pieces of trim abut:
  - a. Set intersection of trim in a minimum 4 inch bed of manufacturer's recommended trim sealant.
  - b. Allow 1/8" - 3/16" gap between the abutting trim pieces. Do not overlap trim.
  - c. Attach the trim in accordance with manufacturer's specifications. True expansion joints must be fastened to the structural substrate.
4. When two or more pieces of trim intersect:
  - a. The vertical trim piece shall be continuous with all horizontal pieces.
  - b. Miter all corners at intersections of trim.
  - c. Set intersection of trim in a minimum 4 inch bed of manufacturer's recommended trim sealant.
  - d. Allow 1/8" - 3/16" gap between the abutting trim pieces. Do not overlap trim.
  - e. Attach the trim in accordance with manufacturer's specifications. True expansion joints must be fastened to the structural substrate

F. Base Coat

1. Apply product by either mechanical sprayer or hand application method to the correct thickness shown below per manufacturer's requirements.
  - a. Over, gypsum sheathing use 3.4 lbs. expanded lath with side laps and end laps per manufacturers requirements and Chapter 25A of the CBC. When end laps occur between supports, lace or wire, the ends of the sheets with 0.0475 galvanized annealed steel wire."
  - b. Corrosion resistant screws for lath attachment shall penetrate a minimum of 5/8 inches into steel studs.
  - c. Basecoat to be applied to dampen surface to a minimum of 3/4 inch thickness; rod and float to true and even surface with not over 1/8 inch variation when tested by a five foot straight edge. Finish to assure adequate bond for finish coat. Leave basecoat surface free of imperfections which might reflect in the finish coat."

G. Finish

1. One-Coat stucco products must cure for a minimum of 7 days and concrete must cure for minimum of 28 days. The pH level of these products must be below 10 prior to the application of the AkroFlex or OmegaFlex primer.
2. ColorTek finish shall be applied no sooner than 24 hours following the application of the base coat. Refer to the instructions on the appropriate data sheet.

3. Install the finish coat in accordance with the manufacturer's printed instructions.

G. Tolerances

1. Maximum variation from true flatness: 1/8 inch in 10 feet.

3.4 CLEANING

A. Remove any and all materials used, over-spray from surrounding materials, and all protective masking.

B. Clean adjacent surfaces and remove excess material, droppings and debris from project site.

END OF SECTION

SECTION 07260  
VAPOR RETARDERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sheet materials for controlling vapor diffusion.
- B. Related Sections:
  - 1. Section 07270 - Air Barriers.

1.2 REFERENCES

- A. ASTM C920 - Elastomeric Joint Sealants.
- B. ASTM D491 - Asphalt Mastic Used on Waterproofing.
- C. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
- D. SWRI (Sealing, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.3 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data indicating material characteristics, performance criteria, limitations.
- C. Manufacturer's Installation Instructions: Submit preparation and installation requirements, techniques.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with SWRI - Sealant and Caulking Guide Specification requirements for materials and installation.

1.5 SEQUENCING

- A. Section 01010 - Summary: Work sequence.
- B. Sequence Work to permit installation of materials in conjunction with other retardant materials and seals, and air barrier assemblies specified in Section 07270.
- C. Do not install vapor retarder until items penetrating vapor retarder are in place.

## PART 2 PRODUCTS

### 2.1 VAPOR RETARDERS

- A. Manufacturers:
  - 1. Alumiseal Corp., Model Zero-Perm (800) 235-2313.
  - 2. Fortifiber Corp., Model Moistop Flashing (800) 773-4777
  - 3. Griffolyn, Reef Industries, Model Type -65 (800) 231-6074.
  - 4. Substitutions: Section 01300 - Product Requirements.

### 2.2 COMPONENTS

- A. Sealant: Type specified in Section 07900.
- B. Primer and Backer Rods: Recommended by sealant manufacturer to suit application.
- C. Cleaner: Non-corrosive type; recommended by sealant manufacturer; compatible with adjacent materials.

### 2.3 ACCESSORIES

- A. Thinner and Cleaner for Butyl Sheet: As recommended by sheet material manufacturer.
- B. Tape: Polyester self-adhering type, mesh reinforced, **2-inch** wide, compatible with sheet material.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Remove loose or foreign matter capable of impairing adhesion.
- B. Clean and prime substrate surfaces to receive adhesive and sealants.

### 3.2 EXISTING WORK

- A. Clean and repair existing construction to provide positive and continuous seal for vapor retarders.

### 3.3 INSTALLATION

- A. Vapor Retarder for Solid Substrate: Secure sheet retarder to solid construction with tape. Lap edges and ends **6 inches** and adhesive seal, calk with sealant to ensure complete and continuous seal.
- B. Vapor Retarder for Wall/Roof Junction: Lap sheet retarder from wall retarder onto roof vapor retarder continuously. Seal edges and ends with sealant adhesive. Calk with sealant to ensure complete seal. Position laps over firm bearing.

- C. Vapor Retarder Seal For Openings: Install sheet retarder between window and door frames and adjacent vapor retarder and seal with sealant. Calk with sealant to ensure complete seal. Position laps over firm bearing.
- D. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges or where compatibility with adjacent materials may be in doubt.

#### 3.4 SCHEDULES

- A. Window, Door Frame Perimeter: Lap sheet retarder from wall vapor retarder (with 3 inches (75 mm) of contact over firm bearing) to window, Doorframe (with 1 inch (25 mm) of contact). Seal with sealant.
- B. Wall, Roof and Wood Beam Projection Junctions: Lap sheet retarder from wall vapor retarder (with 6 inches (150 mm) of contact over firm bearing) to roof vapor retarder or steel beams (with 4 inches (100 mm) of contact). Seal with sealant.

END OF SECTION

## SECTION 07270

### AIR BARRIERS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes weather resistive barriers on exterior side of exterior wall sheathing as described in the contract documents.
- B. Related Sections:
  - 1. Section 07240 – Exterior Finish System
  - 2. Section 07260 - Vapor Retarders: Vapor retarders.
  - 3. Section 07900 - Joint Sealers: Sealant materials and installation techniques.

##### 1.2 REFERENCES

- A. ASTM E-96 – 90 – Standard Test Method for Water Transmission of Materials
- B. ASTM E – 1677-95 -
- C. ASTM C920 - Elastomeric Joint Sealants.
- D. AATCC 127 -
- E. ICC – ESR Report No. ESR-2375
- F. CBC Chapter 14

##### 1.3 DESIGN REQUIREMENTS

- A. Perform design work in accordance with ASTM E-96.

##### 1.4 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on material characteristics, performance criteria, and limitations, showing performance characteristics equaling or exceeding those specified.
- C. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, product storage and handling criteria.

##### 1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with manufacturers written requirements for materials and installation.
- B. Maintain one copy of each document on site.

## 1.6 PRE-INSTALLATION MEETING

- A. Section 01039 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this section.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01500 - Product Requirements.
- B. Maintain temperature and humidity recommended by materials manufacturers before, during and after installation.

## 1.8 SEQUENCING

- A. Section 01010 - Summary: Work sequence.
- B. Sequence Work to permit installation of materials in conjunction with related materials and seals.

## 1.9 COORDINATION

- A. Section 01039 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work of this section with sections referencing this section.

## PART 2 PRODUCTS

### 2.1 AIR BARRIERS

- A. Manufacturers:
  - 1. Dupont Tyvek Model Commercial Wrap (800) 448-9835.
  - 2. Dupont Tyvek Model Stucco Wrap (800) 448-9835.
  - 3. Substitutions: Section 01300 - Product Requirements.
  - 4.
- B. Performance Characteristics:
  - 1. ASTM E1677 Type I Air Retarder. Air Leakage at 25 mph wind pressure of less than 0.6 cfm/ft<sup>2</sup>.
  - 2. Water Vapor Transmission of greater than 20 perms in accordance with ASTM E-96-90, Method B.
  - 3. Water penetration resistance of 200 cm on hydrostatic head in accordance with AATCC – 127.

## 2.2 ACCESSORIES

### A. Sealing Tape:

1. Tape equal to DuPont Contractor Tape.

### B. Fasteners:

1. For attachment to Exterior plywood use screws with plastic washer heads.
2. For attachment to Cement Board use screws with plastic washer heads.
3. For attachment to Wood Framing use rust-resistant screws with washers.

## PART 3 EXECUTION

### 3.1 PREPARATION

- #### A. Clean and prime substrate surfaces to receive material in accordance with manufacturers written instructions.

#### B. INSTALLATION

1. Begin at a corner of each building, leaving approximately six to twelve inches (6"-12") extended beyond the corner edge to overlap later. Hold the roll vertical and unroll for a short distance. Make sure the roll is plumb and the bottom edge runs along the line of the foundation. Fasten to the corner edge of the building.
2. The bottom edge of the barrier should always extend over the sill track and the face of the footing a minimum of 8 inches. Secure the barrier to the slab with a polyurethane latex base joint sealer.
3. Continue to unroll a few feet at a time, being careful to follow the line of the foundation. Roll is to lap over the foundation a minimum of 8 inches. Secure the barrier to the wall at approximately every 16 to 24 inches on the vertical stud line.
4. Unroll the barrier directly over the window, door and vent openings.
5. Overlap the barrier on the high walls 6 inches over the barrier on the lower walls where occurs. Fasten edge of overlap.
6. At the top of walls the barrier should cover the interface of the weather proofing membrane from the roof. At the top of parapet walls extend over the top plate and lap with the roof membrane a minimum of 6 inches.
7. At each opening, cut a modified "I" in the barrier. Pull the lower and side flaps to the inside of the rough opening. Trim excess upper flap material as needed.



8. Seal and flash around each opening in accordance with the manufacturers written instructions.
9. Tape all remaining vertical and horizontal seams.
10. Repair any tears, breaks, holes and other damaged areas with tape. Remove and replace sections that cannot be satisfactorily repaired with tape.

### 3.2 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction. Do not permit adjacent work to damage work of this section.
- B. Barrier must be covered within four months of installation in accordance with the manufacturers written instructions and warranty requirements.

### C. 3.4 SAFETY PRECAUTIONS

- A. The barrier maybe slippery and should not be used in any application where in would be walked on. Kick jacks or scaffolding is required for exterior work above the first floor or ten feet in height whichever is less.
- B. If ladders must be used, extra caution must be taken to use them safely by following the requirements set forth in ANSI 14.2 and ANSI 14.5.

### 3.3 SCHEDULES

- A. Wall Air Seal Over all Exterior Surfaces of Gypsum Sheathing and Cement Backing Board.
- B. Window and Door Frame Perimeter: Lap sheet seal from wall air seal surface with 75 mm of full contact over firm bearing to window and door frame with 25 mm of full contact. Edge seal with sealant.
- C. Wall and Roof Junctions: Lap sheet seal from wall seal material with 150 mm of contact over firm bearing to roof air seal membrane with 100 mm of full contact. Seal with sealant.
- D. Contractor shall install over all exterior stud walls a weather resistive barrier full height from 6 inches below the sill plate at finish floor to the tops of all walls. This layer is in addition to any protective layer over backing board specified on the drawings or in individual specification sections.

END OF SECTION

SECTION 07311

**LAMINATE SHINGLES**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Laminate shingle roofing, with moisture shedding underlayment, eave, rake, wall, ridge protection, and associated protective flashings.

1.2 REFERENCES

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron-Alloy-Coated (Galvannealed) by the Hot-Dip Process
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- D. ASTM D 225 - Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules.
- E. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- F. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Steep Roofing Underlayment for Ice Dam Protection.
- G. ASTM D 3018 - Standard Specification for Class A Shingles Surfaced with Mineral Granules.
- H. ASTM D 3161 - Standard Test Method for Wind Resistance of Asphalt Shingles (Fan-Induced Method).
- I. ASTM D 3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
- J. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- K. ASTM D-4869 - Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing.
- L. ASTM D 6757 - Standard Specification for Inorganic Underlayment for Use with Steep Slope Roofing Products.
- M. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- N. ASTM G 21 - Determining Resistance of Synthetic Polymers to Fungi
- O. NRCA - Roofing and Waterproofing Manual.
- P. ICC-ES Report 3150
- Q. CBC Energy Code - Latest Requirements.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide manufacturer's printed product information

indicating material characteristics, performance criteria and product limitations.

- C. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.

#### 1.4 QUALITY ASSURANCE

- A. Installer Minimum Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall perform work in accordance with Manufacturers requirements and the NRCA Roofing and Waterproofing Manual.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store Products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials and materials used with solvent based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Deliver shingles to site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately remove damaged products from site.

#### 1.6 PROJECT CONDITIONS

- A. Anticipate and observe environmental conditions (temperature, humidity and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environment conditions outside manufacturer's absolute limits.
- B. Extra Material - Furnish under provision of section 01700.
- C. Provide 12 square feet of extra shingles of each color specified.

#### 1.7 WARRANTY

- A. Provide shingle manufacturer's warranty on installed work, agreeing to pay for repair or replacement of defective shingles as necessary to eliminate leaks. Period of warranty is 50 years from date of substantial completion of the entire project. Provide 110 mph limited wind warranty.

## 2 PART 2 PRODUCTS

### 2.1 ACCEPTABLE ASPHALT SHINGLE MANUFACTURERS

- A. Malarkey - Legacy XL Laminated Flexor SBS Polymer Modified Shingles with Scotchgard 3M protection. Color; as selected by Architect from manufacturers full range of colors.
- B. Substitutions: Under provisions of Section 01300.

### 2.2 ROOFING MATERIALS

- A. Laminate Shingles: Mineral-surfaced, self-sealing, laminated multi-ply overlay construction fiberglass based strip shingle complying with ASTM D 3018, Type I, bearing UL Class B or better external fire exposure label and UL wind resistant label. Shingles to meet latest CBC Energy Code Requirements. Color as selected by Architect.

- B. Ridge Shingles: SBS modified traditional ridge strips with Scotchgard Protection from 3M. Installed per manufacturers requirements.
- C. Underlayment: Equal to Malarkey Right Start UDL flexor SBS Polymer Modified Fiberglass underlayment (2 Layers)
- D. Nails: Standard round wire shingle type of hot-dipped zinc-coated steel; minimum 13/64" head diameter and 0.080" shank diameter of sufficient length to penetrate through roof sheathing.
- E. Plastic Cement: ASTM D2822; asphaltic type with mineral fiber components.

### 2.3 FLASHING MATERIALS

- A. Sheet Flashings: ASTM A525; 22 and 24-gauge galvanized sheet metal in shapes and sizes required and shown on the drawings.
- B. Bituminous Paint: Acid and alkali resistant type; black color.
- C. Nails: Standard round wire roofing type of hot-dipped zinc-coated steel; minimum 19/64" head diameter and 0.104" shank diameter; of sufficient length to penetrate through roof sheathing.

### 2.4 FLASHING FABRICATION

- A. Form flashings to profiles indicated on Drawings, and to protect roof assembly and shed water. Form sections square, true, and accurate to profile, in maximum possible lengths, free from distortion and other defects detrimental to appearance or performance.
- B. Hem exposed edges of flashings minimum 1/4" on underside.
- C. Apply bituminous paint on concealed surfaces of flashings.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify existing site conditions. Beginning of installation means acceptance of existing substrate.
- B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surfaces.
- C. Verify deck surfaces are dry and free of ridges, warps or voids.

### 3.2 ROOF DECK PREPARATION

- A. Follow shingle manufacturer's recommendations for acceptable roof deck material
- B. Broom clean deck surfaces under eave protection and underlayment prior to their application

### 3.3 INSTALLATION - GENERAL

- A. Install asphalt shingle roofing over dry surfaces, free of ridges, warps, and voids.
- B. Coordinate installation of roof mounted components or work projecting through roof. Verify roof openings are framed, sized,

and located prior to installing work of this Section.

- C. Completed installation to provide weather tight service.

#### 3.4 EAVE PROTECTION INSTALLATION

- A. Place eave edge and gable edge flashing tight with fascia boards. Weather lap joints 2" and seal with plastic cement. Secure deck flange with nails spaced 12".
- B. Furnish and install a continuous Malarkey Smart Start Shingle 12 - wide minimum for eave protection.
- C. Starting from eave edge of starter strip, lay additional 36" wide strips of underlayment in lap cement, to produce a two ply membrane. Weather lap plies minimum 19" and nail in place. Lap ends minimum 6". Stagger end joints of each consecutive ply.

#### 3.5 RAKE PROTECTION INSTALLATION

- A. Place rake edge flashing tight with fascia boards. Weather lap joints 2" and seal with plastic cement. Secure deck flange with nails spaced 12".
- B. Apply 4" wide band of plastic cement over deck flange of rake edge flashings, and embed an 18" wide strip of underlayment. Place underlayment with rake edge flush with face of flashings. Secure in place. Lap ends minimum 6", high side over low side.
- C. Apply lap cement at rate of approximately 1-1/4 gal/square on underlayment starter strip.

#### 3.6 PROTECTIVE UNDERLAYMENT INSTALLATION

- A. Place two plies of underlayment over area not protected by eave membrane, with ends and edges weather lapped minimum 6". Stagger end laps of each consecutive layer. Nail protective underlayment to hold in place.
- B. Install protective underlayment perpendicular to slope of roof.
- C. Weather lap underlayment minimum 4" over eave membrane.
- D. Weather lap and seal items projecting through or mounted on roof with plastic cement.

#### 3.7 FLASHING INSTALLATION

- A. Weather lap joints minimum 2" and seal weather tight with plastic cement. Secure in place with nails at 12" o.c. Conceal fastenings.
- B. Flash and seal work projecting through or mounted on roofing with 24 gauge metal jacks with 6 inch wide flanges and minimum 6 inch high seal with plastic cement. Provide weather tight installation.
- C. Install crickets on the high side of each mechanical unit and duct penetration to direct water around item. Use step flashings along sides. Seal all joints.

#### 3.8 LAMINATE SHINGLES INSTALLATION

- A. Install starter strip of role roofing or inverted shingles with tabs removed; fasten shingles in pattern, weather exposure and number of fasteners per shingle as recommended by manufacturer.

- B. Comply with manufacturers published installation instructions, details of shingle manufacturer and NRCA Steep Roofing Manual.
- C. Use four nails per shingle. Use two nails per ridge shingle.

END OF SECTION

SECTION 07513  
COLD-PROCESS BUILT-UP ASPHALT ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Cold-process built-up asphalt roofing system .
2. Roof insulation and/or Cover Board (where designated).
3. Roof surfacing consisting of mineral granulated cap sheet with Energy Star certified, Cool Roof acrylic top coating.
4. Built-up roof flashings and accessories.
5. Manufacturer's Warranty.

- B. Related Sections include the following:

1. Division 6 Section "Miscellaneous Carpentry" for wood nailers, cants, curbs, and blocking and for wood-based, structural-use roof deck panels.
2. Division 7 Section "Sheet Metal Flashing and Trim" for metal flashings, counterflashings, reglets, roof edge flashing, roof penetrations and coping.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Roofing Membrane Load-Strain Properties
1. Provide a roofing membrane identical to component systems that have been successfully tested by a qualified independent testing and inspecting agency to meet the following

minimum load-strain properties at membrane failure when tested according to ASTM D 2523:

- a. Tensile strain at failure minimum: 538-lbf machine direction; 467-lbf cross-machine direction.

## 1.5 SUBMITTALS

- A. Also meet requirements of Division 1 Section 01300, Submittals.
- B. Product Data: For each type of product indicated.
  1. Base, perimeter, and detail flashings, cants, and membrane terminations.
  2. Tapered insulation, including slopes.
  3. Crickets, saddles, and tapered edge strips, including slopes.
- C. Samples, upon request, for Verification: For the following products:
  1. 12-by-12-inch square of ply sheet.
  2. 12-by-12-inch square of roof insulation.
  3. 12-by-12-inch square of modified bitumen cap sheet. (or) 3 lb of aggregate surfacing material, if specified.
- D. Submit evidence of meeting performance requirements, including FMG listing if applicable.
- E. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- F. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
  1. Submit evidence of meeting performance requirements.
- G. Qualification Data: For Installer, manufacturer, and manufacturer's technical representative.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for roofing system and system components.
  1. Include report-indicating compliance with load-strain properties requirements.
- I. Manufacturer Certificates: Indicating compliance of proposed products with requirements, including:
  1. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing base and ply sheets, membrane backer and flashing sheets, reinforcement fabric felts and mats, adhesives, mastics, coatings, and sealants.
- J. Maintenance Data and Training Materials: For roofing system to include in maintenance manuals and Owner's training library.
- K. Inspection Reports: Copy of daily and final technical inspection reports of roofing installation.



## 1.6 QUALITY ASSURANCE

- A. **Installer Qualifications:** A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. **Installer Shall:**
1. Submit an affidavit attesting that Contractor has in place and fully implemented a written Health, Safety and Environmental Plan and the plan is compliant with all applicable Federal, State and Local regulations.
  2. Be experienced in cold multi-ply roofing applications for 10 years minimum.
  3. Be acceptable to Owner.
  4. Be a manufacturer Certified Contractor.
  5. Not have been in Chapter 7 bankruptcy during the last ten (10) years.
  6. Provide a list of 5 (5) projects available for inspection employing same type roof system.
  7. Acquire inspection service days utilizing manufacturer's technical inspectors.
    - a. The minimum number of full time Technical Service inspection days will be three (3) days per project.
    - b. The number of days will increase at a rate of one (1) day for each 100 squares.
- C. **Manufacturer Qualifications:** A qualified manufacturer that has UL Class A listing and FMG approval, where required, for roofing system identical to that used for this project.
- D. **Manufacturer Shall:**
1. Be Associate Member in good standing with National Roofing Contractors Association (NRCA) for at least five (5) years.
  2. Be nationally recognized in the roofing, waterproofing and moisture survey industry.
  3. Be approved by Owner.
  4. Has not been in Chapter 11 bankruptcy during the last five (5) years.
  5. Provide evidence, upon request, of financial responsibility: Certificate of Insurance showing Products Liability in the amount of \$25 million minimum and provide an affidavit signed by a corporate officer showing corporate net worth of \$50 million minimum.
  6. Provide a copy of Corporate Health, Safety and Welfare policy
  7. Provide evidence, upon request, that Roofing Manufacturer manufactures a minimum of 70% of the materials that they supply, by dollar volume, in facilities owned or solely leased by said manufacturer, including equipment used in manufacturing operations..
  8. Provide evidence of twenty (20) quarters of continuous plant inspections of roofing manufacturing sites over the previous five (5) years by an independent Nationally Recognized Testing Laboratory (NRTL) as defined in 29 CFR Ch. XVII (7-1-93 Edition) from the Occupational Safety and Health Administration (OSHA).
  9. Be ISO 9001 registered for at least the prior five (5) years
  10. Furnish a Warranty with ongoing Service Agreement.
  11. Provide Owner names of at least five (5) qualified applicators.
  12. Employ full-time Field Technical Services Representatives for daily job-site monitoring and production of daily reports.
  13. Require local Field Representatives to make periodic job-site visits and produce work quality and progress reports.
  14. Provide a Project Closeout Report upon delivery of the project warranty. This report to include:
    - a. Project Specifications.
    - b. Project Summary.

- c. Progress reports as a result of roof inspections.
  - d. Job-site progress photos.
  - e. Warranty document.
  - f. Owners Manual describing maintenance and emergency repair.
- E. **Technical Inspector Qualifications:** Engage an experienced technical inspector to perform Work of this Section who has specialized in inspecting roofing similar to that required for this Project; who is employed by the roofing system manufacturer to inspect manufacturer's project. If the manufacturer does not employ full-time technical inspectors, approved inspector must be certified as a Registered Roof Observer by the Roof Consultants Institute.
- F. **Source Limitations:** Obtain components for roofing system from or approved in writing by roofing system manufacturer.
- G. **Preliminary Roofing Conference:** Before starting reroofing preparation, conduct conference at Project site. Comply with requirements for preinstallation conferences in Division 1 Section "Project Management and Coordination", where applicable. Review methods and procedures related to reroofing preparation and roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and other installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review work restrictions and requirements for temporary facilities and controls.
  5. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  6. Review structural loading limitations of roof deck during and after roofing.
  7. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  8. Review governing regulations and requirements for insurance and certificates if applicable.
  9. Review temporary protection requirements for roofing system during and after installation.
  10. Review roof observation and repair procedures after roofing installation.
- H. **Preinstallation Conference:** Conduct conference at Project site. Comply with requirements in Division 1 Section "Project Management and Coordination", where applicable. Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.
6. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
  1. Where roofing system is indicated as requiring FMG classification or UL listing, containers shall bear label indicating manufacture in compliance with FMG classification or UL listing quality assurance requirements.
- B. Do not store materials in open or in contact with ground or roof surface.
- C. Store materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Store roll goods on ends only.
- D. Protect stored liquid material from direct sunlight.
  1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- E. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- F. Handle and store roofing materials and place equipment in a manner to avoid temporary overloading or permanent deflection of deck.

#### 1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

#### 1.9 WARRANTY

- A. New Roof Component Coverage: A single manufacturer shall provide specified warranty that includes the Build Up Roofing specified in this section and the systems specified in Metal Roof System, and in Metal Wall Panel System sections. The manufacturer's warranty must include labor and material coverage against leakage on all components **including those manufactured by others**.
  1. Included in the warranty coverage are the following:

- a. Insulation materials, fasteners and adhesives.
  - b. All new and temporary roof membrane components and adhesives.
  - c. All metal edge components including cleat strips.
  - d. All tapered edge and cant strips.
  - e. All surface mastics, coatings, stripping, plies, etc.
  - f. All drain and scupper flashing.
  - g. Any roof leak or other problems caused by substrate movement of any component other than the deck shall not be excluded.
  - h. Any movement associated with metal edge joints of flanges causing leaks.
  - i. Damages caused by wind speed up to 70 miles per hour.
  - j. Permanent tie-ins and/or control joints separating new and old roofing.
2. Warranty Period: 10 years.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Class Rating: Membrane shall have a minimum Class B rating and comply with CBC Chapter 15.
- B. Basis-of-Design Product: The roof system specified in this section is based upon Tremco, Inc. products named in other Part 2 articles. Subject to compliance with requirements, provide the named product or an approved comparable product by one of the following:
  - 1. Cold-Process Built-up Asphalt Roofing System:
    - a. Tremco, Inc.
    - b. Or District approved equal.
- C. Roofing Membrane and Flashing Plies (and Nailed Base Sheet where designated): : Tremco, BURmastic Glass Ply-28 lb.: ASTM D 4601, Type II, nonperforated, asphalt-impregnated and coated glass-fiber sheet dusted with fine mineral surfacing on both sides, with the following properties:
  - 1. Breaking Strength, minimum, ASTM D 146: machine direction, 90 lbf/in (15.75 kN/m); cross direction, 70 lbf/in (12.25 kN/m).
  - 2. Pliability, ½ inch (12.7 mm) radius bend, ASTM D 146: No failures.
  - 3. Net Dry Mass, minimum, ASTM D 228: 28.0 lb/100 sq ft (1.37 kg/m2).
  - 4. Asphalt, minimum, ASTM D 228: 7.0 lb/100 sq ft (342 g/m2).
- D. Cap Sheet: Tremco, SBS-Modified Bituminous Sheet, STANDARD FR granulated SBS-modified asphalt sheet, smooth surfaced, dusted with fine parting agent on both sides; suitable for application method specified; manufacturer's standard thickness and weight; for use and of reinforcing type as follows: ASTM D 6163, Grade G, Type I or II, glass-fiber-reinforced
  - 1. Granule Color: White.
- E. Cool Roof Coating: Tremco, Polarcote FR: Intumescent, fire-retardant, Energy Star Certified, elastomeric, acrylic latex roof coating formulated for use on bituminous roof surfaces, with the following physical properties:
  - 1. Asbestos Content, EPA/600/R-93/116: None.

2. Non-Volatile Content (by weight), minimum, ASTM D 1644: 67 percent.
3. Reflectance, minimum, ASTM E 903: 82 percent.
4. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 155 g/L.

## 2.2 FLASHING MATERIALS

- A. Flashing Membrane: Tremco, SBS-Modified Bituminous Sheet, STANDARD FR granulated SBS-modified asphalt sheet, smooth surfaced, dusted with fine parting agent on both sides; suitable for application method specified; manufacturer's standard thickness and weight; for use and of reinforcing type as follows: ASTM D 6163, Grade G, Type I or II, glass-fiber-reinforced
  1. Granule Color: White.

## 2.3 ASPHALT MATERIALS

- A. Asphalt Primer: ASTM D 41.
- B. Cold-Applied Adhesive: Tremco, PowerPly Standard Cold Adhesive LV: Standard asphalt-based, one-part asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up roofing membranes and flashings, with low-VOC formulation acceptable to authorities having jurisdiction.
  1. Cold-applied adhesive for interply adhesive, of the following properties:
    - a. Asbestos Content: EPA 600 R-93/116: None.
    - b. Volatile Organic Compounds (VOC): ASTM D 3960: <250 g/L.
    - c. Nonvolatile Matter: ASTM D 4479: 75 percent.
    - d. Density: 77 deg F:ASTM D 1475: 8.1 lb/gal.
    - e. Uniformity and Consistency: ASTM D 4479: pass.
    - f. Viscosity: 77 deg F: ASTM D 2196-86(1991): 80-200 Pa \* s.

## 2.4 AUXILIARY ROOFING MEMBRANE MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.
- B. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- C. Cold-Applied Flashing Adhesive: Roofing system manufacturer's asphalt-based, one- part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with CSPE base flashings. Adhesive shall have the following physical properties:
- D. Caulking Sealant: Polyisobutylene, urethane or modified bitumen, nonhardening, nonmigrating, nonskinning, and nondrying.
- E. Metal Flashing Sheet: Metal flashings are specified in Division 7 Section "Sheet Metal Flashing and Trim."
- F. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

## 2.5 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thickness indicated.
- B. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft.
- C. Cover Board: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board, 1/2 inch thick.

## 2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

### 3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's recommendations.

### 3.4 INSULATION INSTALLATION

- A. Coordinate installing roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

- B. Comply with roofing system manufacturer's written instructions for installing roof insulation.
- C. Install red rosin type sheathing paper over wood deck substrates prior to insulation installation.
- D. Install insulation/tapered insulation under area of roofing to conform to slopes indicated.
- E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
  - 1. Where designated, mechanically attach insulation/tapered insulation system to deck with approved fasteners.
- F. Install cover boards over insulation or roof deck with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches in each direction.
  - 1. Apply cold, fluid-applied adhesive to underside and immediately bond cover board to approved insulation substrate.
  - 2. Where no base layer(s) of insulation are specified, mechanically attach cover board insulation over sheathing paper to roof deck with approved fasteners.

### 3.5 ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Loosely lay one course of sheathing paper over wood decks, lapping edges and ends a minimum of 2 inches and 6 inches, respectively. Fasten to hold in place.
- B. On designated roof decks, install one lapped course of base sheet, extending sheet over and terminating beyond cants. Attach base sheet as follows:
  - 1. Mechanically fasten to approved deck substrate or adhere to insulation substrate as directed by roofing manufacturer's written instructions.
- C. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.
- D. Coordinate installing roofing system components, so insulation and roofing membrane sheets are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
  - 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.
  - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
  - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Cold Process Asphalt Heating
  - 1. An in-line heat exchange unit may be used to facilitate application

- a. Do not exceed maximum adhesive temperature of 100° F.
2. Heat exchange unit: Use heat transfer oil approved by heating equipment manufacturer.
3. Follow operation procedures recommended by heating equipment manufacturer.

### 3.6 ROOFING MEMBRANE INSTALLATION

- A. Install (2) two ply sheets starting at low point of roofing system. Align ply sheets without stretching. Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane. Shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.
  1. Embed each ply sheet in cold adhesive applied at rate required by roofing system manufacturer, to form a uniform membrane without ply sheets touching.
  2. Broom in all ply sheets
- B. Cap Sheet: Install lapped granulated cap sheet starting at low point of roofing system. Offset laps from laps of preceding ply sheets and align cap sheet without stretching. Lap in direction to shed water. Extend cap sheet over and terminate beyond cants.
  1. Embed each ply sheet in cold adhesive applied at rate required by roofing system manufacturer, to form a uniform membrane without ply sheets touching.

### 3.7 COATING INSTALLATION

- A. Allow new completed roofing membrane and flashings to cure per manufacturer's requirements.
- B. Lightly prime the completed cleaned, cured roof membrane and flashing surfaces with roofing manufacturer's approved asphalt primer at a rate of 1/3 to 1/2 gallon per 100 sq. ft.
- C. Apply coating to roofing membrane and base flashings according to manufacturer's written instructions, by spray, roller, or other suitable application method.
  1. Prior to application of cool roof coating, contractor shall inspect roof with manufacturer's technical representative and repair any deficiencies.
  2. Apply Coating in 2 layers at a rate of 1 gallon per 100sf for each layer. 2 Gallons/SQ Total.

### 3.8 FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
  1. Prime substrates with asphalt primer if required by roofing system manufacturer.
  2. Flashing Ply and Flashing Cap Sheet Application: Adhere two ply flashing membrane to substrate in cold adhesive applied at rate required by roofing system manufacturer.
- B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 6 inches onto field of roofing membrane.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.



- D. Install stripping, according to roofing system manufacturer's written instructions, where metal flanges and edgings are set on built-up roofing.
  - 1. Flashing-Stripping Ply and Cap Sheet: Install flashing ply and cap sheet stripping in a continuous coating of asphalt roofing cement and extend onto roofing membrane as specified by roofing material manufacturer.
- E. Flashing Coating: Apply coating material to all bases flashings per manufacturers written instructions.
- F. Roof Drains: Where noted on the drawings, Set 30-by-30-inch metal flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with stripping and extend a minimum of 4 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.
  - 1. Install flashing-sheet stripping by same method as installing base flashing.

### 3.9 FIELD QUALITY CONTROL

- A. Manufacturer's Technical Representative: Contractor will engage a qualified manufacturer's technical representative acceptable to Owner for a minimum of 6 full-time days on site to perform roof tests and inspections and to prepare test reports
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
  - 1. Notify Architect and Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.10 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07513

SECTION 07514

**ROOF MEMBRANE REPAIRS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cleaning deck surface.
- B. Patching of Roof membrane assembly, including tapered insulation and backing board with base flashings, to match the existing system installed on the building where repairs are required to be made to the membrane.
- C. Cutting and patching of the existing roof membrane where new work occurs.
- D. Cool Roof reflective coating.
- E. Work shall be in conformance with Tremco's requirements to maintain the current 20-year warranty of the roof membrane system.

1.2 REFERENCES

- A. ASTM D41 - Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- B. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. ASTM D312 - Asphalt Used in Roofing.
- D. ASTM D2909 - Asphalt Roll Roofing (Glass-Felt) surfaced with mineral granules.
- E. ASTM D2178 - Asphalt Glass Felt Used in Roofing and Waterproofing.
- F. ASTM D2822 - Asphalt Roof Cement.
- G. FM - Roof Assembly Classifications.
- H. NRCA - Roofing and Waterproofing Manual.
- I. UL - Fire Hazard Classifications.

1.3 SUBMITTALS

- A. Submit manufacturer's installation instructions under provisions of Section 01300.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years documents experience.

B. Applicator: Company specializing in applying bituminous roofing with minimum five years documented experience and approved by materials manufacturer.

C. Work of this Section to conform to manufacturer's instructions.

#### 1.5 REGULATORY REQUIREMENTS

A. Conform to applicable UL requirements for roof assembly fire hazard requirements.

B. Fire Hazard Classification: UL Class B.

#### 1.6 PRE-INSTALLATION CONFERENCE

A. Convene a pre-installation conference one week prior to commencing work of this section under provisions of Section 01039.

B. Review installation procedures and coordination required with related work.

#### 1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and protect products under provisions of Section 01500.

B. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

C. Store products in weather protected environment, clear of ground and moisture.

D. Stand roll materials on end.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not apply roofing membrane during inclement weather.

B. Do not apply roofing membrane to damp or frozen deck surface.

#### 1.9 SEQUENCING AND SCHEDULING

A. Coordinate the work of installing associated metal flashings as the work of this Section proceeds.

#### 1.10 WARRANTY

A. Provide extension to the current Manufactures twenty-year warranty.

B. Provide two year installer guarantee under provisions of Section 01700.

C. Warranty: Cover damage to building resulting from failure to resist penetration of water.

## 2 PART 2 PRODUCTS

### 2.1 MANUFACTURERS - Roofing System to match existing.

- A. Tremco: PowerPly Supreme HT FR 2 + 1 Cold Applied System with granule membrane to match the existing roof membrane system on the building. Roof membrane was originally installed in 2017.

### 2.2 SHEET MATERIALS

- A. Glass Fiber Felts: ASTM D2178, Type VI.
- B. Base Sheet: UL Type 61, ASTM D-2178.

### 2.3 BITUMINOUS MATERIALS

- A. Asphalt Bitumen: ASTM D312, Type III.
- B. Asphalt Primer: ASTM D41.
- C. Plastic Cement: ASTM D2822, Type I, cutback asphalt type.
- D. Asphalt Roll Roofing: ASTM D3909, Type I.

### 2.4 COOL ROOF SURFACING

- A. Cool Roof coating as required by the manufacturer to match existing conditions.

### 2.5 CANTS

- A. 4" high Fiber Cant and Tapered Edge Strips: Asphalt impregnated wood fiberboard, preformed to 45 degree angle.

### 2.6 ACCESSORIES

- A. Roofing Nails: Galvanized or non-ferrous type, size as required to suit application.
- B. Rosin Paper: Red rosin paper: 3.0lb/CSF.
- C. Roof Barrier Board: Dens-Deck Prime by Georgia Pacific. Minimum of ¼-inch or to match existing conditions.

### 2.7 SUMMARY OF MATERIALS PER 100 SQUARE FEET

- A. Materials listed are based on Tremco Specification No. PowerPly Supreme 2 + 1 Configuration, Cold Applied.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify that deck is supported and secured.

- C. Verify that deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains, valleys or eaves.
- D. Verify that deck surfaces are dry and free of snow or ice of any structural damage.
- E. Verify that roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and reglets are in place.
- F. Beginning of installation means installer accepts existing surfaces.

### 3.2 PROTECTION

- A. Protect building surfaces against damage from roofing work.

### 3.3 PREPARATION

- A. Verify flatness and tight joints of wood decking. Install inverted base sheet strips over all joints greater than 1/8" and all exposed metal.
- B. Prime metal flashings with asphalt primer.
- C. Nail cants to roof deck mechanically fasten at ends and 12" o.c. with 1" head ringed shank nails which penetrate deck. Fit flush at ends and to vertical surfaces. Apply cant 2" back from flange and bevel 8" from ends at scuppers.
- D. Install one (1) layer of rosin sheathing paper over 1 x diagonal roof deck prior to installation of new roof barrier board.
- E. Install Dens-Deck Prime minimum ¼-inch thick over areas. Thickness to match existing conditions. Where required build up to match thickness of tapered insulation.
- E. Where repairs are required or new utility support blocks are to be installed cut back the existing membrane a minimum of 24 inches beyond the new opening or existing opening and block locations being removed.

### 3.4 MEMBRANE APPLICATION

- A. Set base sheet at drains in flashing compound 9" wide around ring and flange. Provide a minimum 30" square, 4 lb. lead or 16 oz. soft copper flashing set in flashing compound over the completed membrane. Strip in flashing with two collars of Base Sheet extending 4" and 6" beyond outside edge of flashing set in asphalt, and while hot, install clamp ring and tighten.
- B. Reinforce valleys with an additional ply of base sheet 36" wide, extending 12" up inclines. Apply in direction of slope of valley, lapping 4" on ends. Solid mop to base ply.
- C. Where projections extend through the roof surface, install flashing with a 4" wide continuous flange. Set flange in flashing compound on base ply. Nail 3" o.c. 3/4" from perimeter. Seal

flange with a 6" wide strip of Glass Fabric, set in asphalt. Follow with a collar of base ply to fit around vents and overlap flanges 6" on all sides, applied in asphalt. After membrane is applied, form a cant of flashing compound around the base. Flashing Plan shall have a minimum 4" level height. Close opening between projection and deck to prevent drippage. Fill the inside of the collar with flashing compound. Cant the flashing compound around projection above the level of outside rim.

- D. Cut plies in lengths not to exceed 18'-0" and allow to flatten. Longer lengths may be used when rolled or machined and broomed into place. Apply base ply lapping 2" on sides. Attach base ply at side laps 9" o.c. and 18" o.c. staggered in two rows 12" from each edge with Approved Fasteners. Solid mop base ply with asphalt and embed three plies of Ply Sheet, shingle method, lapping 24-2/3" on sides, mopping between plies. All end laps shall be 4" and not less than 3'-0" apart, diagonally staggered. (All side and end laps of each ply shall be staggered, and offset from preceding plies.) Roofing System shall be installed in a continuous application. Cut and patch any wrinkles which occur all fish mouths shall be repaired each day as the work proceeds.
- E. Comply with all of the roof membrane manufactures requirements.

### 3.5 BASE FLASHINGS

- A. At vertical surfaces, install Base Flashings consisting of one ply of Modified Bitumen Cap Sheet, set in an asphalt or Flashing Compound. Nail top edge 4" o.c. through tin-discs. Apply a three-course Flashing System to concrete or masonry walls.

### 3.6 FINAL SURFACING

- A. ASPHALT ROLL ROOFING: CAP SHEET shall be cut into 12-18' lengths and allowed to flatten. Apply parallel to underlying roofing. CAP SHEET shall be lapped 2" on sides and 6" on ends. Adjacent end laps shall be staggered at least 3' apart. Lap so the flow of water is over or parallel to, but never against, the laps. Embed the full width of each 12'-18' length into a uniform solid mopping of hot asphalt applied at a nominal rate of 30 lbs. per 100 sq.ft of roof area. THERE MUST BE COMPLETE CONTACT BETWEEN CAP SHEET AND ASPHALT.
- B. REFLECTIVE COATING: The entire membrane must be clean and dry. Oxidized areas shall be scrubbed with water and flushed clean. Apply two coats of cool roof coating to membrane, base flashings and vertical surfaces to comply with manufacturers requirements. Apply with spray, brush or roller. Apply when surface and air temperatures are moderate. Apply second coat at right angles to first coat.

### 3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.
- B. Correct identified defects or irregularities.

### 3.8 CLEANING

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are soiled by asphalt or any other source of soiling caused by work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or disfigured finishes caused by work of this Section.

### 3.9 PROTECTION

- A. Where traffic must continue over finished roof installation, protect surfaces.

### 3.8 INSPECTOR

- A. Districts Inspector shall be on the job continuously during roofing operations and shall report any discrepancies from the specifications observed immediately to the Owner, Contractor and Architect.

END OF SECTION

SECTION 07620

**SHEET METAL FLASHING AND TRIM**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof flashings.
- B. Counter flashings at roof membrane.

1.2 REFERENCES

- A. ASTM B32 - Solder Metal.
- B. ASTM A526 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, Commercial Quality.
- C. ASTM D226 - Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- D. FS SS-C-153 - Cement, Bituminous, Plastic.
- E. SMACNA - Architectural Sheet Metal Manual.

1.3 SYSTEM DESCRIPTION

- A. Work of this Section is to physically protect membrane roofing, and base flashings, from damage that would permit water leakage to plywood sheathing.

1.4 QUALITY ASSURANCE

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

1.5 STORAGE AND HANDLING

- A. Store products under provisions of Section 01500.
- B. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage which may cause discoloration or staining. and moisture.

2 PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Galvanized Steel: ASTM A526, G90; 24 gage core steel,

2.2 ACCESSORIES

- A. Fasteners: Galvanized steel or stainless steel with soft neoprene washers at exposed fasteners. Finish exposed fasteners same as flashing metal.
- B. Underlayment: 30 # felt, unless noted otherwise.
- C. Metal Primer: As specified in Section 09900.
- D. Protective Backing Paint: Zinc chromate alkyd.
- E. Sealant: Type specified in Section 07900.



- F. Bedding Compound: Rubber-asphalt type.
- G. Plastic Cement: FS SS-C-153, Type I-asphaltic base cement.
- H. Solder: ASTM B32; 50//50 tin/lead type, with rosin flux.

### 2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges on underside 1/2 inch miter and seam corners.
- E. Form material with flat lock seam.
- F. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
- G. Fabricate corners from one piece with minimum 18" long legs; seam for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward 1/4" and hemmed to form drip.
- I. Fabricate flashings to allow toe to extend 2" over roofing surface. Return and brake edges.

### 2.4 FINISH

- A. Shop prepare and prime exposed ferrous metal surfaces.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

## 3 PART 3 EXECUTION

### 3.1 INSPECTION

- A. Verify roof deck is ready to receive flashing.
- B. Verify roofing membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.

### 3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Secure flashings in place using concealed fasteners.
- D. Lap, lock, seam and seal all joints.
- E. Apply plastic cement compound between metal flashings and felt flashings.
- F. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

- G. Solder metal joints watertight for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

### 3.3 INSTALLATION

- A. Conform to SMACNA manual.

END OF SECTION

SECTION 07631

**GUTTERS AND DOWNSPOUTS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized gutters.
- B. Galvanized steel downspouts.

1.2 REFERENCES

- A. ASTM A446 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process, structural (Physical) Quality.
- B. ASTM A525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- C. SMACNA - Architectural Sheet Metal Manual.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel: ASTM A525, G60 gage as specified, steel.
- B. Galvanized Steel: ASTM A446, G60 gage as specified, steel.

2.2 COMPONENTS

- A. Gutters: 22 gage, profile indicated on drawings.
- B. Leaders: 22 gage, profile as indicated on drawings.
- C. Downspouts: Profile indicated on drawings. Schedule 40, galvanized, where mounted to exterior walls.
- D. End Caps, Downspout Outlets, Rain Diverters, Straps, Support Brackets, Joint Fasteners. Profiled to suit gutters and downspouts.
- E. Splash Blocks: Precast plastic type, of sizes and profiles indicated.

2.3 ACCESSORIES

- A. Anchorage Devices: Meet SMACNA requirements.
- B. Protective Backing Paint: Zinc chromate alkyd. Oxide linseed oil paint.

2.4 FABRICATION

- A. Form gutters and downspouts of profiles and sizes indicated.
- B. Field measure site conditions prior to fabricating work.

- C. Fabricate with required connection pieces.
- D. Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
- E. Hem exposed edges of metal.
- F. Seal metal joints.
- G. Fabricate gutter and downspout accessories; seal watertight.
- H. Provide expansion joint in gutters every 30'-0" o.c.

#### 2.5 SHOP FINISHING

- A. Shop prepare and prime exposed ferrous metal surfaces.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15.

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of existing conditions.

#### 3.2 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with SMACNA requirements.
- B. Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Apply backing paint to metal back surfaces.
- D. Seal metal joints watertight.

END OF SECTION

## SECTION 07840

### **FIRESTOPPING**

#### 1. GENERAL

##### 1.1 SUMMARY

- A. Section includes firestopping and through-penetration protection system materials and accessories; and smoke sealing at joints in interior and exterior walls.
- B. Related Sections:
  - 1. Divisions 23 – Plumbing: Plumbing work requiring firestopping.
  - 2. Division 25 – Mechanical: Mechanical work requiring firestopping
  - 3. Division 26 - Electrical: Electrical work requiring firestopping.
  - 4. Division 27 – Low Voltage Communications.
  - 5. Division 28 – Fire Alarm System

##### 1.2 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
- C. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.
- D. FM (Factory Mutual Engineering Corporation) - Fire Hazard Classifications.
- E. UL (Underwriters Laboratories, Inc.) - Fire Resistance Directory.
- F. UL 263 (Underwriters Laboratories, Inc.) - Fire Tests of Building Construction and Materials.
- G. UL 723 (Underwriters Laboratories, Inc.) - Test for Surface Burning Characteristics of Building Materials.
- H. UL 1479 (Underwriters Laboratories, Inc.) - Fire Tests of Through-Penetration Firestops.
- I. WH (Warnock Hersey) - Directory of Listed Products.

##### 1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

##### 1.4 SYSTEM DESCRIPTION

- A. Firestopping Materials: ASTM E119, ASTM E814, UL 263, UL 1479, to achieve fire ratings of adjacent construction in accordance with UL Design Numbers noted on Drawings.

- B. Surface Burning: ASTM E84, UL 723 with maximum flame spread / smoke developed rating of 25/450.
- C. Firestop interruptions to fire rated assemblies, materials, and components.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. Conform to California Building Code and UL and/or WH for fire resistance ratings and surface burning characteristics.

#### 1.6 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance and limitation criteria.
- C. Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Manufacturer's Installation Instructions: Submit preparation and installation instructions.
- E. Manufacturer's Certificate: Certify products meet or exceed applicable code requirements.
- F. Engineering Judgements: For conditions not covered by UL or WH listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

#### 1.7 QUALIFICATIONS

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

#### 1.8 MOCKUP

- A. Section 01400 - Quality Requirements: Requirements for mockup.
- B. Apply **1 linear ft** of each type of linear firestopping material to representative substrate surface.
- C. Apply one of each unit type of firestopping material, such as penetrations through fire rated partition, to representative application.
- D. Locate where indicated on Drawings.
- E. Incorporate accepted mockup as part of Work.

#### 1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below **60 degrees F (15 degrees C)**.
- B. Maintain this minimum temperature before, during, and for minimum 3 days after installation of materials.
- C. Provide ventilation in areas to receive solvent cured materials.

## 2. PRODUCTS

### 2.1 FIRESTOPPING

- A. Manufacturers:
  - 1. Dow Corning Corp.
  - 2. Hilti Corp.
  - 3. 3M fire Protection Products.
  - 4. Pecora Corporation
  - 5. United States Gypsum Co.
  - 6. Substitutions: Section 01300 - Product Requirements
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
  - 1. Silicone Firestopping Elastomeric Firestopping: Single or Multiple component silicone elastomeric compound and compatible silicone sealant as appropriate to the requirements.
  - 2. Foam Firestopping Compounds: Multiple component foam compound.
  - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
  - 4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping as appropriate to the requirements.
  - 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
- C. Color: As selected from manufacturer's full range of colors.

### 2.2 ACCESSORIES

- A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
- B. Dam Material: Permanent:
  - 1. Mineral fiberboard.
  - 2. Mineral fiber matting.
  - 3. Sheet metal.
  - 4. Plywood or particle board.
- C. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

## 3. EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify openings are ready to receive firestopping.

### 3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Remove incompatible materials affecting bond.
- C. Install backing materials to arrest liquid material leakage.

### 3.3 APPLICATION

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- D. Compress fibered material to maximum 40 percent of its uncompressed size.
- E. Dam material to remain.

### 3.4 FIELD QUALITY CONTROL

- A. Section 01410 - Quality Requirements: Testing and Inspection Services.
- B. Inspect installed firestopping for compliance with specifications and submitted schedule.

### 3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Clean adjacent surfaces of firestopping materials.

### 3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Protect adjacent surfaces from damage by material installation.

### 3.7 Finishing

- A. Smooth material out in exposed areas to receive finish material or to be smoothed out to match adjacent finish.

### 3.8 Clean up

- A. Remove all debris and unused materials from construction site.
- B. Leave construction area clean and ready for the next trade to begin work.

END OF SECTION



SECTION 07900

**JOINT SEALERS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing.

1.2 REFERENCES

- A. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- B. ASTM C804 - Use of Solvent-Release Type Sealants.
- C. ASTM 962 - Guide for Use of Elastomeric Joint Sealants.
- D. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, color availability.
- C. Submit samples under provisions of Section 01300.
- D. Submit two samples 4" long in size illustrating colors selected.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.
- B. Applicator: Company specializing in applying the work of this Section with minimum three years documented experience, approved by sealant manufacturer.
- C. Conform to Sealant and Waterproofers Institute requirements for materials and installation.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers and products are listed for each sealant type.
- B. Substitutions: Under provisions of Section 01300.

2.2 SEALANTS

- A. Acrylic Sealant: One-part, nonsag solvent-release-curing, acrylic terpolymer sealant complying with ASTM C920 for Type S; Grade NS; except for selected test properties which are revised as follows: Heat aged hardness; 40-50. Weight loss, 15 percent; maximum cycle movement capability, plus or minus 12-1/2 percent.
  - 1. Protective Treatments Inc., "PT1 738".
  - 2. Protective Treatments Inc., "PT1 767".
  - 3. Tremco Inc., "Mono."
- B. Butyl Sealant: One-part, nonsag solvent-release-curing sealant complying with FS TT-S-001657 for Type 1 and formulated with a minimum of 75% solids.
  - 1. Bostik Construction Products Div., "Chem-Calk 300".
  - 2. Pecora Corp. "BC-158".
  - 3. Tremco Inc., "Tremco Butyl Sealant."
- C. Polysulphide Sealant: One-part chemical curing elastomeric sealant complying with ASTM C920, Type S; Grade NS, Class 12-1/2.
  - 1. Bostik Construction Products Div., "Chem-Calk 400".
  - 2. Pecora Corp., "GC-9".
  - 3. Product Research & Chemical Corp., "PRC Rubber" Nonacid Calk 7000.
- D. Silicone Sealant: One part nonacid-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
  - 1. Dow Corning Corp., "Dow Corning 790".
  - 2. General Electric Co., "Silproof".
  - 3. Tremco, Inc., "Spectrum 1".
- E. Acid-Curing Silicone Sealant: One part acid-curing silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25.
  - 1. Dow Corning Corp. "Dow Corning 999A".
  - 2. General Electric Co., "Construction 1200."
  - 3. Tremco, Inc., "Proglaze".
  - 4. Rhone-Poulenc, Inc., "Rhodorsil 90".
- F. One-Part Mildew-Resistant Silicone Sealant: Complying with ASTM C920, Type S, Grade NS, Class 25.
  - 1. Dow Corning Corp., "Dow Corning 786".
  - 2. General Electric Co., "Sanitary 1700".
  - 3. Rhone-Poulenc Inc., "Rhodorsil 6 B White".
  - 4. Tremco, Inc., "Proglaze White".
- G. One-Part Nonsag Urethane Sealant: Complying with ASTM C920, Type S, Grade NS, Class 25.
  - 1. Bostik Construction Products Div., "Chem-Calk 900".
  - 2. Pecora Corp., "Dynatrol I".
  - 3. Mameco International, Inc., "Vulkem 116".
  - 4. Tremco, Inc., "Dymonic".
- H. One-Part Pourable Urethane Sealant: Complying with ASTM C920, Type S, Grade P, Class 25.
  - 1. Bostik Construction Products Div., "Chem-Calk 950".
  - 2. Mameco International, Inc., "Vulkem 45".
  - 3. Pecora Corp., "NR-201 Urexpan".

### 2.3 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: ASTM D1056; 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 suite application.

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify that joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing substrate.

#### 3.2 PREPARATION

- A. Clean and prime joints in accordance with manufacturer's instructions. Prime if recommended by manufacturer.
- B. Remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Perform preparation in accordance with ASTM C804 for solvent release sealants, and C962 for elastomeric sealants.
- E. Protect elements surrounding the work of this Section from damage or disfiguration.

#### 3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- 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 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Tool joints concave, unless otherwise detailed.

#### 3.4 CLEANING AND REPAIRING

- A. Clean work under provisions of Section 01700.
- B. Clean adjacent soiled surfaces.

- C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.5 PROTECTION OF FINISHED WORK

- A. Protect sealants until cured.

3.6 SCHEDULE

	<u>LOCATION</u>	<u>TYPE</u>	<u>COLOR</u>
A.	Exterior & interior joints in horizontal surfaces of concrete; between metal and concrete masonry and mortar	One-Part Pourable Urethane	Stone
B.	Exterior door, entrance & window frames.	one part Urethane	to match adjacent
C.	Joints within aluminum entrance system, glass & glazing	Acid Curing Silicone	Bronze
D.	Interior joints in ceramic tile and at plumbing fixtures	Mildew-Resistant Silicone	White
E.	Under thresholds	Butyl	Black
F.	All interior joints not otherwise scheduled	Acrylic solvent	to match adjacent surfaces

END OF SECTION

SECTION 08110  
HOLLOW METAL DOORS, FRAMES, AND RELITES

PART 1 - GENERAL

- 1.01 WORK INCLUDED
  - A. Hollow metal doors
  - B. All anchors and accessories
  - C. Louvers in doors
  - D. Vision Panels in doors
  
- 1.02 RELATED WORK SPECIFIED ELSEWHERE
  - A. Field installation
  - B. Finish painting
  - C. Glass and glazing
  - D. Finish Hardware
  
- 1.03 REFERENCES
  - A. DHI - Door Hardware Institute: "Installation Guide for Doors and Hardware"
  - B. NFPA 80 - Fire Doors and windows
  - C. SDI-100 - Standard Steel Doors and Frames
  - D. SDI-105 - Recommended Erection Instructions for steel frames
  - E. NFPA 101 - Life Safety Code
  - F. NFPA 105 - Smoke Control Guide
  - G. ADA - Americans with Disabilities Act
  - H. TITLE 24 California State Accessibility Standards
  - I. California Building Code, 2019 Edition
  - J. UL 10B-93 - Fire Tests of Door Assemblies.
  - K. UL 10C - standard for positive pressure fire tests on door assemblies. UBC 7-2, fire tests of door assemblies.
  - L. ANSI/SDI A250.6-1977-92-Hardware on steel doors (reinforcement application)
  - M. UL - Underwriters Laboratory
  - N. WHI - Warnock Hersey International, Division of Inchtape Testing Services.
  - O. UL - 1784-90 Air leakage test of door assemblies.
  - P. ASTM E283-91 Standard test method for determining the rate of air leakage through exterior windows, curtain walls, and doors under specified pressure differences across the specimen.
  
- 1.04 COORDINATION
  - A. Coordinate work of this section with others directly affected.
  
- 1.05 QUALITY ASSURANCE
  - A. The Hollow Metal Supplier shall be a manufacturer or distributor regularly engaged in supplying Hollow Metal products in this geographic area who has competent field personnel available to correct damaged, or defective manufactured products. He shall have competent personnel available to consult with the architect or contractor regarding problems, applications, or field installation problems.
  
  - B. It is the intent of this specification to provide a general guideline for the quality, function, and design of the Hollow Metal Doors, Frames, and Relites. It is the specific responsibility of the Hollow Metal Supplier to furnish products, which are fully functional, in full compliance with State and Local Building Codes, Fire Codes, and

Accessibility Codes. Any supplier bidding on this section of work will notify the Architect prior to bidding of discrepancies or will be assumed to have included correct material to make this compliance.

- C. All fire rated doors, frames and windows shall conform to and be in compliance with NFPA 80 and the California Building Code as adopted. They shall bear an appropriate UL or WH label.

- D. REGULATORY REQUIREMENTS

Hollow metal products furnished for this project shall be in full compliance with the California Building Code as adopted, NFPA 80, NFPA 101, NFPA 105, UL 10B, UL10C, UBC 7-2, and ADA.

1.06 SUBMITTALS

- A. Submit complete shop drawings listing openings numerically by architects opening numbers showing product construction, sizes, anchors, reinforcing, cutouts, elevations, and finish. (Ref. Section 01300)
- B. Submit notes with shop drawings indicating items that vary from plans and specifications, have conflicts for label compliance, are not in compliance with standards referenced above, have door, frame, hardware or function conflicts, or require review and clarification by architect.
- C. Installation instructions with shop drawings or field delivery receipt.
- D. Instructions for installation, maintenance, and preparation for field painting supplied with delivery of material to jobsite.

1.08

- A. DELIVERY AND HANDLING

All materials will be delivered to the job site undamaged with the doors properly protected by cardboard and plastic covering. Inspect Hollow Metal upon delivery. Minor damages may be repaired provided finish items are equal in all aspects to the original product, otherwise obtain replacements. Initial acceptance by the General Contractor shall signify his assumption of responsibility for job site damage.

- B. STORAGE

Doors and frames shall be stored in an upright position, 4 inches off the floor or ground with proper separation for air circulation and shall be stored inside or under complete weather protection. Damage not acknowledged at delivery shall be considered job site damage and the responsibility of the contractor.

1.09 WARRANTY

Hollow metal work shall be guaranteed for a period of one (1) year after final acceptance. Any door that delaminates during this period shall be replaced, re-hung, and repainted by the contractor at no additional cost to the owner.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Security Metal Products Corp.
- B. Steel Craft
- C. Curries
- D. Substitutions will be considered under Section 01300; however, proposed substitution shall be fully in compliance with all construction and test requirements noted in this section and a certification to this affect complete with recognized test laboratory results substantiating this compliance shall accompany request. No substitution will be considered without test results, or after the allowed substitution period, or after the award of contract.

2.02 FRAMES

- A. Frames shall be cold rolled, stretcher leveled, prime quality steel.
- B. Exterior frames 14 gauge, galvanized, hot dip A60 coating.
- C. Frames shall be full face welded, square, accurately sized and have a welded shipping bar at the base for field removal. Acceptable tolerances per SDI 117. Frames to be back welded.
- D. Frames shall be fully prepped, drilled and tapped for mortise hardware and properly reinforced for surface hardware as follows:
  - 1. Hinges - Minimum 7 gauge, 1-1/2" x 9" with plaster guard 1/8 x 1-1/2 full height for continuous hinges.
  - 2. Strikes - Minimum 16 gauge with plaster guard.
  - 3. Surface Hardware - Minimum 1/8" plate.
  - 4. Closers - Provide 1/8" welded in standard arm and parallel arm closer reinforcing on all frames
  - 5. Pivots - Minimum 1/4" plate.
  - 6. Prepare and install silencers (three per strike jamb two per head) stick on type not acceptable.
  - 7. Closed section mullions to have internal web reinforcement.
  - 8. If not specified in hardware section furnish NFPA tested and approved smoke gasketing at 20-min. label frames.
  - 9. Hinge prep to be 7 gauge with high frequency reinforcement at top hinge at exterior doors.
- E. Anchors: Provide anchors as specifically shown on plans and details. If not specifically detailed furnish anchors that are appropriate, will result in a satisfactory installation, are properly sized for the wall condition, and comply with the manufacturer recommendation. Furnish the following minimum quantities:
  - Two base anchors
  - Six jamb anchors - (Up to 7'0" high add an additional anchor for each 24" or less).

2.03 DOORS

- A. Fabricate doors from cold rolled, stretcher leveled, prime quality steel to sizes and designs as noted in the plans.
- B. Door shall have full flush faces that will show no weld or fabrication marks when painted and viewed from an oblique angle. Stile and rail doors may have face seams at joints. Field verify hinge cut out locations in each existing jamb so the new door hinge cut outs will align with existing.
- C. Doors shall be reinforced, stiffened, sound deadened, and insulated by one of the following methods providing the manufacturer furnishes a certification of tested compliance by a recognized testing laboratory to the minimum requirements noted below:
  - 1. 90 LB Phenolic Resin impregnated honeycomb core completely filling the inside of the door and laminated to the inside faces of the door panels.
  - 2. Steel hat channels at 6" centers welded to both faces and 14 gauge top and bottom channels. Completely fill all internal voids with an inert materials to sound deaden and insulate the door.
  - 3. Polystyrene foam permanently and fully bonded to the entire surface of face skins.
- D. Minimum performance requirements:
  - 1. U Factor: Minimum .41
  - 2. STC Factor: Minimum 34
  - 3. Shear: Minimum 1100 LB per square foot
  - 4. Swing Test: ANSI A151.1 Level AA" 2,000,000 cycle test with twist test
  - 5. Corrosion: Pass ANSI A224.1 200 hr salt spray test
  - 6. Compression: Minimum 5000 LB per square foot
- E. Reinforcement:
  - 1. Hinges: Minimum 7 gauge 1-1/4 x 9 or 14 gauge full channel
  - 2. Locks: Minimum 14 gauge
  - 3. Surface Hardware: Minimum 12 gauge
  - 4. Panics fully reinforced - thru bolting not acceptable
  - 5. Closers: provide reinforcing in all doors
  - 6. Top & Bottom reinforcement channels shall be 14 gage galvanized and spot welded to both panels
  - 7. Hinge reinforcement to be 7-gauge high frequency reinforcement at top hinge at exterior doors.
- E. Fire Labeled doors with temperature rise rating to have a mineral fiber core sufficient to obtain a 250 degree F (121 C) temperature rating.
- F. Construction: All out swinging exterior doors shall have sealed top caps. Top hinge shall have high frequency hinge reinforcement. Doors will be fully reinforced for all hardware to be surface applied and no hardware will be screwed to the surface skin of the door except kick plates, edging, push plates or nameplates.



- G. If a door must be altered by sizing, cutouts, clearances, or notching to accommodate special conditions the door shall be adequately reinforced by welded channel or other means to insure full door life without delaminations, warping, or sagging.
- I. Gauges:  
1. Exterior doors 16 gauge, galvanized, hot dip A60 coating.
- J. Door Design, Clearances, and Locations:  
Doors shall be beveled 1/8" in 2" at both edges. Square edge doors and doors with loose hinge fillers will not be acceptable.
1. Hinge and strike clearance: 3/32"
  2. Head: 1/8"
  3. Floor: (unless otherwise noted) 3/4"
  4. Meeting stiles: 3/32"
  5. Hardware locations:
    - a) Locks: Centerline to finish floor 39" to 41" Dutch doors 37"
    - b) Butts: Manufacturers standard equally spaced
    - c) Panics: Centerline to finish floor 39" to 41"
    - d) Deadlocks: Centerline to finish floor 48"
    - e) Push & Pull: Centerline to finish floor 45"
    - f) Top Flush Bolt: Centerline to finish floor 72"
  6. Louvers: where scheduled shall be 18 gage CRS frame and louver blades with 16 gage CRS security grille on each face. Louver assemblies shall be galvanized with 18-14 mesh insect screen in rolled form aluminum frame. Attach to doors with security fasteners. Louvers equal to "Air Louvers" model 1500-A. Sizes shall be as noted on drawings. Louver cut outs shall be fully reinforced with channels welded to doorframes.

#### 2.04 FINISHES

- A. Doors and frames shall be thoroughly cleaned, bonderized or phosphatized, and finished with one coat of baked on rust-inhibiting primer. Any fabrications, cutouts or repairs shall be finished in a manner to equal this finish. Prime paint shall be tested and certified to pass a 200-hour salt spray test and a 500-hour humidity test. The contractor shall repair any minor job site or shipping damage to the paint surface immediately and the surface shall be sanded smooth and adequately primed prior to finish painting to insure a smooth flat surface. Field sanding of baked on primer must be performed to insure finish paint adhesion.

#### 2.05 INSTALLATION

- A. The contractor shall have in his employment, persons fully experienced and qualified to install the hollow metal doors and frames. Reference "Installation Guide for Doors and Hardware" as a guideline to minimum acceptable practice. Jambs and heads to be installed absolutely plumb and true with jamb in the same plane. Base anchors must be used on all frames. Properly shim and adjust hinges to achieve a uniform margin between door and frame. Do not bend hinges to adjust door.
- B. All functional hardware items must be installed by drilling and taping the concealed reinforcement for manufacture furnished fasteners. Installation using tek type screws will not be acceptable.

- C Install hollow metal doors in frames using hardware specified in Section 08710 Finish Hardware.
  
- D. Clearance at edge of doors.
  - 1. Between door and frame at head and jambs: 1/8 inch (3.2).
  - 2. At meeting edges pairs of doors and at mullions: 1/8 inch (3.2).
  - 3. At transom panels, without transom bars: 1/8 inch (3.2).
  - 4. At sills without thresholds: 5/8 inch (15.9) maximum above finish floor.
  - 5. At sills with thresholds: 1/8 inch (3.2) above threshold.

2.06 ADJUSTMENT AND CLEANING

- A. Remove dirt and excess sealants, mortar or glazing compounds from exposed surfaces.
- B. Adjust moving parts for smooth operation. Use shims if necessary to allow for proper closing.
- C. Fill all dents, holes, etc, with metal filler, sand smooth and flush with adjacent surfaces - re-prime/paint to match finish.

**END OF SECTION**

SECTION 08310  
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire resistive rated and non-rated access doors and panels with frames.
  - 1. Provide access to mechanical units, controls, valves, traps, dampers, cleanouts, fire alarm devices and similar items requiring operation behind inaccessible finished surfaces.
  - 2. Coordinate exact locations and quantities with various trades to assure proper placement of access doors and panels.
- B. Related Sections:
  - 1. Section 09260 - Gypsum Board Systems - Framing of openings and backing.
  - 2. Section 09900 - Paints and Coatings: Field paint finish.

1.2 REFERENCES

- A. NFPA 80 (National Fire Protection Association) - Fire Doors and Fire Windows.
- B. UL (Underwriters Laboratories, Inc.) - Building Materials Directory.
- C. WH (Warnock Hersey) - Directory of Listed Products.

1.3 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate exact position of access door units.
- C. Product Data: Submit literature indicating the various sizes, types, finish, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.
- D. Manufacturer's Installation Instructions: Submit installation requirements and rough-in dimensions.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Contract Closeout: Closeout procedures.
- B. Project Record Documents: Record actual locations of access units.

1.5 QUALITY ASSURANCE

- A. Fire Resistance Ratings: Where indicated as fire rated provide assemblies from manufacturers listed in UL Directory or Warnock Hersey Directory.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified with minimum three-years of experience, and with service facilities within 100 miles of Project.

## 1.7 COORDINATION

- A. Coordinate Work under provisions of Section 01039 - Project Coordination.
- B. Coordinate Work with work requiring controls, valves, traps, dampers, cleanouts, and similar items requiring operation being located behind finished surfaces.

## PART 2 PRODUCTS

### 2.1 ACCESS DOORS AND PANELS

- A. Manufacturers, Wall and Ceiling Units:
  - 1. JL Industries.
  - 2. Milcor
  - 3. Substitutions: Section 01300 - Product Requirements.
- B. Product Description:
  - 1. Non-Fire Rated Wall Unit: Formed stainless steel:
    - a. In Gypsum Board on Steel Studs: Model WB manufactured by JL Industries.
    - b. In Ceramic Tile on Steel Studs: Model WB manufactured by JL Industries.
    - c. In FRP Panels on Steel Studs. Model WB manufactured by JL Industries.
  - 2. Fire Rated Wall Unit: Formed galvanized steel, finish; as required by code:
    - a. In Gypsum Board on Steel Studs: Model FDWB manufactured by JL Industries.
    - b. In Ceramic Tile on Steel Studs: Model FDWB manufactured by JL Industries.
  - 3. Non-Fire Rated Ceiling Unit: Formed galvanized steel:
    - a. In Suspended Gypsum Board on Metal Furring: Model M manufactured by Milcor.
    - b. In Gypsum Board on Steel Studs: Model DW manufactured by Milcor.
    - c. In Metal Ceiling: Model ATR manufactured by Milcor with metal panel insert to match ceiling finish.
  - 4. Fire Rated Ceiling Unit: Formed metal steel, 90 minute or 60 minute label fire rating to match the ceiling rating to be installed in:
    - a. In Suspended Gypsum Board on Metal Furring: Model UFR manufactured by Milcor.
    - b. In Gypsum Board on Steel Studs: Model UFR manufactured by Milcor.

### 2.2 FABRICATION

- A. Fabricate frames and flanges of minimum 0.058-inch (1.5 mm) steel.

1. Furnish expanded galvanized metal lath perimeter flanges where frames are installed in thin brick veneer, except veneer plaster.
- B. Fabricate wall and ceiling door panels of minimum 0.070-inch (1.8 mm) steel single thickness steel sheet for non-rated and double sheet with integral non-combustible insulation filler at fire rated conditions.
- C. Fabricate units of continuous welded construction; weld, fill, and grind joints to assure flush and square unit.
- D. Wall and Ceiling Access Door and Panel Hardware:
  1. Hinge: Standard continuous or concealed spring pin type, 175-degree steel hinges.
  2. Lock: Self-latching lock. Screwdriver slot for quarter turn cam lock for ceiling panels. Cylinder key locks for wall access doors and panels.
- E. Size Variations: Obtain acceptance of manufacturer's standard size units, which vary slightly from sizes shown or scheduled.

### 2.3 SHOP FINISHING

- A. Base Metal Protection: Galvanized, hot dipped finish. Prime coat units with baked on primer.
- B. Finish: Two coats baked enamel, color as selected.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Submittals: Coordination and project conditions.
- B. Verify rough openings for access doors and panels are correctly sized and located.

### 3.2 INSTALLATION

- A. Secure frames rigidly in place, plumb and level in opening, with plane of door and panel face aligned with adjacent finished surfaces.
  1. Set concealed frame type units flush with adjacent finished surfaces.
- B. Position unit to provide convenient access to concealed work-requiring access.
- C. Install fire rated units in accordance with NFPA 80 and requirements for fire listing.

### 3.3 SCHEDULES

- A. Corridor Ceilings: Gypsum board finish type, 24 x 24 inch (600 x 600 mm) size, unless noted otherwise on drawings, screwdriver slot lock, primed and one coat baked enamel "White". Fire rated when required to match assembly being installed into.
- B. Corridor Ceilings: Gypsum board finish type, for access to mechanical units, 24 x 36-inch size, screwdriver slot

lock, primed and one coat baked enamel "White". Fire rated to match assembly being installed into.

- C. Washroom Walls Above Urinal Valves: Ceramic tile finish type, 12 x 12-inch (300 x 300 mm) size, cylinder lock, primed and two coat baked enamel to match ceramic tile color. Fire rated when required to match assembly being installed into.
- D. Walls: Gypsum board finish type 20 x 20-inch size, unless noted otherwise on drawings, cylinder lock, primed and two coat baked enamel to match wall finish color. Fire rated when required to match assembly being installed into.
- E. Miscellaneous locations where needed to access mechanical and electrical components requiring access for servicing or inspection. Coordinate locations and quantities with mechanical and electrical drawings.

END OF SECTION

SECTION 08410

**ALUMINUM DOORS AND STOREFRONT**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum door, frames and glazed lights.
- B. Safety Glazing
- C. Aluminum storefront frame assemblies.
- D. Custom sized brake metal closure sections and trim.
- E. Anchors, brackets and attachments.

1.2 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

- A. Section 08710 - Finish Hardware: Door hardware items other than specified in this Section.

1.3 REFERENCES

- A. ASTM A36 - Structural Steel.
- B. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape and Tube.
- C. ASTM E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
- D. ASTM D2000 - Classification System for Rubber Products.
- E. ASTM D2287 - Non-rigid Vinyl Chloride Polymer and Copolymer molding and Extrusion Compounds.
- F. AAMA 701.2 - Voluntary Specification for Pile Weather-stripping.
- G. NAAMM - Metal Finishes Manual.
- H. DSA IR 24-2 Article 2.6 - Thermal Breaks in Aluminum Extrusions.

1.4 PERFORMANCE

- A. System to provide for expansion and contraction within system components caused by a cycling temperature range of 120 F degrees without causing detrimental effects to system or components.
- B. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with CBC Code.
- C. Limit mullion deflection to 1/180, or flexure limit of glass with full recovery of glazing materials, whichever is less.
- D. Drain water entering joints, condensation occurring in glazing

channels, or migrating moisture occurring within system, to exterior.

- E. Limit air infiltration through assembly to 0.06 cu ft/min sq. ft. as measured in accordance with ASTM E283.
- F. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.

#### 1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Include system and component dimensions; components within assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; door hardware requirements; and affected related work.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.
- D. Submit samples under provisions of Section 01300.
- E. Submit two samples, 12 x 12 inches in size, illustrating pre-finished aluminum surface.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle system components under provisions of Section 01500.
- B. Provide strippable coating to protect pre-finished aluminum surfaces.

#### 1.7 WARRANTY

- A. Provide one (1) year warranty covering all defects, including fading, pin holding, blistering and changes in surface appearance and characteristics.

## 2 PART 2 PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. Vistawall Group, (209) 545-5231.
- B. Kawneer Company, Inc., (415) 489-0212.
- C. Substitutions: Under provisions of Section 01300.

#### 2.2 MATERIALS

- A. Extruded Aluminum: ASTM B221; Alloy G.S. 10A-T5.



- B. Brackets and Reinforcements: High strength aluminum.
- C. Steel Sections: ASTM A36; shapes to suit mullion sections.
- D. Fasteners: Stainless steel, aluminum.
- E. Compression Weather-stripping: Replaceable gaskets of molded neoprene complying with ASTM D2000 or molded PVC; complying with ASTM D2287.
- F. Sliding Weather-stripping: Replaceable wool, polypropylene or nylon woven pile; nylon fabric or aluminum strip backing; comply with AAMA 701.2.

### 2.3 FABRICATED COMPONENTS

- A. Frames: 1 3/4 x 4 1/2 inch profile, flush glazing stops.
- B. Wide Stile Doors: 1-3/4 inches thick, 8 inch wide top rail, 5 inch wide vertical stiles, 10 inch wide bottom rail (nominal dimensions; square glazing strips.
- C. Reinforced Mullion: 1 3/4 x 4 inch profile of extruded aluminum cladding with internal reinforcement of steel shaped structural section.
- D. Posts and Headers: 4 inch by 4 inch one piece no splices.
- E. Furnish stops at head and jambs for door.

### 2.4 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: As specified in Section 08800 and as indicated on drawings.

### 2.5 HARDWARE

- A. Door Hardware: As specified in Section 08710.

### 2.6 FABRICATION

- A. Fabricate doors and frames allowing for minimum clearances and shim spacing around perimeter of assembly, enabling installation.
- B. Rigidly fit and secure joints and corners with internal reinforcement. Weld top and bottom rails of doors to reinforcement clips. Make joints and connections flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchorage items.
- D. Arrange fasteners, attachments, and jointing to ensure concealment from view.
- E. Prepare components with internal reinforcement for door hardware and door operator hinge hardware.

## 2.7 FINISHES

- A. High Performance Organic Coating: NAAMM AA-C12C42R1X coating, color selected by Architect from coating manufacturer's standard colors.
  - 1. Fluorocarbon Coating: Comply with AAMA 605.2.
- B. Apply bituminous paint to separate dissimilar metals and metal surfaces in contact with cementations or dissimilar materials.

## 2.8 THERMAL BREAKS

- A. The thermal breaks in the aluminum extrusions shall meet the following requirements:
  - 1. AAMA TIR A8 "Structural Performance of Composite Thermal Barrier Framing Systems."
  - 2. The thermal material shall be a high-strength polyurethane with minimum:
    - a. Ultimate tensile strength of 4500 psi.
    - b. Modulus of Elasticity of 240,000 psi.
- B. See specification section 07900 for joint sealants.

## 3 PART 3 EXECUTION

### 3.1 INSPECTION

- A. Verify wall openings and adjoining materials are ready to receive work of this Section.
- B. Beginning of installation means acceptance of existing conditions.

### 3.2 INSTALLATION

- A. Install doors, frames, glazing and hardware in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely attach frame assembly to structure.
- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Install sill jamb and head flashings.
- E. Break flashings to fit manufacturers system. Flashings are to extend into depth of wall two inches beyond water drip line of window assemblies. Lap all corners and caulk. Turn back edge of sill flashing up 1/4 inches.
- F. Install hardware using templates provided. Refer to Section 08710 for installation requirements.
- G. Install glass in accordance with Section 08800, using interior

combination method of glazing.

H. Adjust operating hardware.

### 3.3 TOLERANCES

- A. Variation from Plane: 0.03 inches per foot maximum or 0.25 inches per 30 feet, whichever is less.
- B. Misalignment of Two Adjoining Members Abutting in Plane: 0.015 inches.

### 3.4 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
- D. In the event of damage, immediately make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

END OF SECTION

## SECTION 08560

### VINYL CLAD WINDOWS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes factory fabricated tubular extruded plastic windows with fixed dual pane glazing, factory glazed. Each unit shall be field verify for size prior to ordering.
- B. Related Sections:
  - 1. Section 06100 – Rough Carpentry.
  - 2. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.
  - 3. Section 08800 - Glazing.

##### 1.2 REFERENCES

- A. AAMA 303 (American Architectural Manufacturers Association) - Specification for Poly (Vinyl Chloride) (PVC) Exterior Profile Extrusions.
- B. AAMA 1503.1 (American Architectural Manufacturers Association) - Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections.
- C. AAMA/NWWDA (American Architectural Manufacturers Association/National Wood Window and Door Association) 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
- D. ANSI/AAMA 101 (American Architectural Manufacturers Association) - Aluminum and Poly (Vinyl Chloride) (PVC) Prime Windows and Glass Doors.
- E. ASCE 7 (American Society of Civil Engineers) - Calculation of Wind Loads.
- F. ASTM D3656 - Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
- G. ASTM D4726 - White Rigid Poly (Vinyl Chloride) (PVC) Exterior Profile Extrusions Used for Windows and Doors.
- H. ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
- I. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- J. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- K. ASTM E547 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.

- L. ASTM E1105 - Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- M. ASTM F588 - Resistance of Window Assemblies to Forced Entry Excluding Glazing.

### 1.3 SYSTEM DESCRIPTION

- A. Windows: Extruded tubular plastic sections, factory fabricated, vision glass, related flashings, anchorage and attachment devices.
- B. Configuration: Conform with ANSI/ANSI 101 Designations for windows required for Project; Picture fixed pane sash.
- C. Forced Entry Resistance: Conform to ASTM F588 Type E.

### 1.4 PERFORMANCE REQUIREMENTS

- A. Primary Performance Requirements: Plastic windows to meet performance criteria for ANSI/AAMA 101 Designation C20 Commercial or better.
- B. Deflection: Limit member deflection to 1/175 of longer dimension with full recovery of glazing materials.
- C. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.
- D. Thermal Resistance of Assembly: Maximum U Value of 0.69 when measured in accordance with AAMA 1503.1.
- E. Air Infiltration: Limit air infiltration through assembly to **0.15 cfm/min/sq ft** of wall area, measured at reference differential pressure across assembly of **1.57 psf** as measured in accordance with ASTM E283.
- F. Water Leakage: None, when measured in accordance with ASTM E547.
- G. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, and migrating moisture occurring within system, to exterior by weep drainage network.
- H. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound. Position thermal insulation on exterior surface of air barrier and vapor retarder.
- I. Thermal Movement: Design sections to permit movement caused by thermal expansion and contraction of plastic to suit glass, infill, and perimeter opening construction.

### 1.5 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.

- B. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related Work; and installation requirements.
- C. Product Data: Submit component dimensions, anchorage and fasteners, glass, internal drainage, and typical details.
- D. Samples: Submit two samples **12 x 12 inch (300 x 300 mm)** in size illustrating window frame section mullion section, finished surfaces, glass units, glazing materials. Submit two samples of operating hardware.
- E. Manufacturer's Certificates: Certify Product performance ratings by independent third party such as AAMA, CAWM, or NFRC as meeting or exceeding specified requirements.

#### 1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
  - 1. PVC Windows: Fabricate window assemblies in accordance with ANSI/AAMA 101 for types of windows required.
  - 2. Insulated Glass: Fabricate insulated glass units in accordance with SIGMA GANA (formerly FGMA) Glazing Manual.
  - 3. Maintain one copy of each document on site.

#### 1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing institutional PVC windows with minimum three years documented experience, and with service facilities within 100 miles of Project.
- B. Installer: Company specializing in installation of institutional PVC windows with minimum three years documented experience.

#### 1.8 PRE-INSTALLATION MEETING

- A. Section 01400 - Administrative Requirements: Preinstallation meeting.
- B. Convene minimum one week before starting Work of this section.

#### 1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01500 - Product Requirements: Product storage and handling requirements.
- B. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
- C. Jig, brace, and box window frame assemblies for transport to minimize flexing of members and to minimize flexing of joints.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01400 - Product Requirements.

- B. Do not install glazing materials when ambient temperature is less than 40 degrees F (5 degrees C).
- C. Maintain this minimum temperature during and after installation of sealants.

#### 1.11 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five-year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Furnish five-year manufacturer warranty for degradation of plastic color finish.

### PART 2 PRODUCTS

#### 2.1 TUBULAR PLASTIC WINDOWS

- A. Manufacturers:
  - 1. Milgard Windows, 'Montecito' 8500 series fixed dual pane.
  - 2. Substitutions: Section 01300 - Product Requirements.
- B. Product Description: Tubular plastic window frames and intermediate mullions of extruded tubular plastic with welded corner construction.

#### 2.2 COMPONENTS

- A. Extruded PVC: ASTM D4726 hollow, multi-chambered sections of extruded polyvinyl chloride (PVC), with integral ultra-violet degradation resistance.
- B. Insulating Glass: Sealed double pane units conforming with requirements in Section 08800 - Glazing.
  - 1. Outer Pane: Tinted, Low E tempered glass.
  - 2. Inner Pane: Clear tempered glass.
  - 3. Pane Thickness: Minimum 1/4 inch thick. Minimum Total Unit Thickness: 1 inch.
  - 4. Glazing Materials: Manufacturer's standard conforming with requirements specified in Section 08800 - Glazing.
- C. Sills: Tubular plastic; sloped for positive wash; fit under sash to 1/2 inch (12 mm) beyond wall face; one-piece full width of opening.
- D. Stools: Tubular plastic; sloped for positive wash; fit under sash to project 1/2 inch (12 mm) beyond interior wall face; one-piece full width of opening.

#### 2.3 ACCESSORIES

- A. Fasteners and Anchors: Stainless Galvanized steel.
- B. Bituminous Paint: Fibered asphaltic type.

- C. Aprons:  $\frac{3}{4}$ -inch thick PVC, internally reinforced, edged and sealed.

## 2.4 FABRICATION

- A. Fabricate framing, mullions and sash members with fusion welded corners and joints, in rigid jig. Supplement frame sections with internal reinforcement where required for structural rigidity.
- B. Form sills and stools in one piece. Slope sills for wash.
- C. Form snap-in glass stops, closure molds, weather stops, and flashings of extruded PVC for tight fit into window frame section.
- D. Form weather stop flange to perimeter of unit.
- E. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- F. Arrange fasteners to be concealed from view.
- G. Permit internal drainage weep holes and channels to migrate moisture to exterior. Furnish internal drainage of glazing spaces to exterior through weep holes.
- H. Factory glaze window units. Furnish glass in accordance with Section 08800, to glazing method required to achieve performance criteria.

## 2.5 FINISHES

- A. Exterior Surfaces: Manufacturer's standard white.
- B. Interior Surfaces: Manufacturer's standard white.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01039 - Administrative Requirements: Coordination and project conditions.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

### 3.2 INSTALLATION

- A. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- B. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent Work.
- C. Install sill and aprons.



- D. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- E. Coordinate attachment and seal of perimeter air and vapor barrier materials.

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Level or Plumb: **1/16 inches every 3 ft**(**1.5 mm/m**) non-cumulative or **1/8 inches per 10 ft** (**3 mm/3 m**), whichever is less.

### 3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust hardware for smooth operation and secure weather tight closure.

### 3.5 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove protective material from pre-finished surfaces.
- C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

SECTION 08582

SERVICE WINDOWS

1 PART 1 GENERAL

1.1 SUMMARY

- A. Provide all material, labor, equipment and services necessary to furnish and install service windows, which are not specifically described in other sections of these specifications, where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Sections:
  - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions, and sections in Division 1 of these specifications.
  - 2. Section 06415: Plastic Covered Laminate Casework.
  - 3. Section 08800: Glazing for Pass thru Windows.
  - 4. Section 09260: Gypsum Board Systems

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01300.
  - 1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
  - 2. Installation Procedures: Submit manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
  - 3. Shop Drawings: Submit details of each frame type, elevation of door designs, details of openings, and details of construction, installation, and anchorage.

1.3 EXTRA MATERIALS

- A. Deliver specified keys to the Inspector of Record. Obtain and forward to the Architect, a signed receipt from the Inspector accepting delivery.

1.4 QUALITY ASSURANCE

- A. Unless specifically otherwise approved by the Architect, provide all products of the section from a single manufacturer.

2 PART 2 PRODUCTS

- A. Provide pass-thru window assembly "Florence" model 1018 with D7 overhead track, spring loaded D35 guide and D53 catch. Horizontal sliding "XO" without screen. Manufactured by C.R. Laurence Company, or approved equivalent.
  - 1. Window to be furnished with the following:
    - a. Screw pin lock, mounted on concession service side.
    - b. Color coat baked enamel finish. color to be selected from manufacturers full range of colors as selected by Architect.
    - c. Clear Safety Glazing.

d. See window schedule size.

3 PART 3 EXECUTION

3.5 SURFACE CONDITIONS

B. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.6 INSTALLATION

A. Placing Frames:

1. Install frames and safety glass per manufacturer's recommendation
2. Attach to mullions by concealed screws through channel walls.

3.7 ADJUST AND CLEAN

A. Final Adjustments.

1. Check and readjust operating finish hardware items in work just prior to final inspection.
  1. Leave work in complete and proper operating condition.
  2. Remove defective work and replace with work complying with the specified requirements.

3.8 SCHEDULE

A. See Window Schedule for size.

END OF SECTION

**SECTION 08710**

**FINISH HARDWARE**

1 PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. General provisions and special provisions of these Specifications apply to the work specified in this Section.

1.2 DESCRIPTION:

- A. Furnish all finish hardware required to complete the work as indicated on the drawings and as herein specified. Provide all trim, attachments and fastenings specified or required for proper and complete installation. Include all hardware under this Section of the specifications that is not specified in other sections, whether or not such hardware is herein scheduled.

1.3 RELATED WORK NOT INCLUDED IN THIS SECTION:

- A. Installation of finish hardware.
- B. Rough hardware.
- C. Hardware for toilet stall doors.
- D. Toilet room accessories.
- E. Weather stripping for aluminum storefront doors.
- F. Astragals or astragal seals for labeled wood or hollow metal doors.
- G. Roll-up door hardware.
- H. Cabinet hardware.

1.4 GENERAL REQUIREMENTS:

- A. Hardware List: Within thirty (30) days after award of the contract, prepare and submit a hardware list, seven (7) copies to the Architect for acceptance. The list shall identify each hardware item by manufacturer, manufacturer's catalog number and exact location in the work. Hardware list shall be in suitable form to facilitate ready checking by the Architect. Acceptance of the hardware list by the Architect does not relieve the hardware supplier from the responsibility of furnishing the job complete. The hardware supplier shall furnish to the Owner a copy of purchase orders showing the date of placing order.
- B. Packing, Marking and Delivery: Each unit of hardware shall be individually packaged, complete with proper fastenings and all appurtenances. Each package shall be clearly marked on the outside to show the contents and specific location in the work. Except where otherwise specified, deliver all hardware to the job site.
- C. Samples: When so directed by the Architect, a sample of each and every item of hardware proposed in the work shall be submitted to the Architect for approval.
- D. Templates: In order to insure proper placement and fit, all hardware connection with metal doors or metal frames shall be made to template. Templates or physical hardware items shall be supplied to manufacturers concerned and shall be supplied sufficiently in advance to avoid delay in the work.

- E. Warranty: All hardware shall be warranted for a period of one (1) year from the date of acceptance of the work. Defects in materials and workmanship occurring during the warrantee period shall be corrected to the complete satisfaction of the Architect.
- F. Catalog Cuts: When so directed by the Architect, provide two (2) catalog cuts of every item furnished for the project. Show all finishes, sizes, catalog numbers and pictures. Explain fully all abbreviations.
- G. ADJUSTMENTS AND INSPECTION: During the installation of hardware, a periodic inspection in company with the Inspector will be made by the Architectural Hardware Supplier, or his Agent. Any hardware improperly installed shall be removed and reinstalled at the Contractor's expense. At the completion of the work, a final inspection shall be made by the Architectural Hardware Supplier, or his Agent. Make any and all adjustments recommended by the Architectural Hardware Supplier, or his Agent.

2 PART 2 - PRODUCTS

2.1 FINISH OF HARDWARE:

- A. The finish of hardware shall be as hereinafter specified. Special care shall be taken to coordinate the finish of the various manufacturers to insure a uniform acceptable finish. The finish of all hardware shall match the finish of the locksets unless otherwise specified.
- B. Head Seals and Jamb Seals noted in specification as USP finish, shall be furnished in 628 finish and are to be painted to match color of door frame.
- C. Aluminum items to be finished AL.

2.2 MAINTENANCE RELATED ITEMS:

- A. The Contractor shall provide one (1) set of Adjusting Tools, two (2) sets of Maintenance Manuals, for Locksets, Door Closers, Floor Hinges and Panic Devices, direct to the Owner representative in charge of maintenance.

2.3 HARDWARE SCHEDULE:

- A. The schedule is a guide only. Furnish all finish hardware required for the project. Hardware required for any particular location, but not specified shall be the same as that specified for similar locations. All doors shall be covered by a listing of hardware in the Finish Hardware schedule whether specified or not. Hardware shall be as hereinafter specified.

B.	Manufacturers:	Reference Letter
	Hager	H
	Schlage	S
	Marks	M
	Von Duprin, Inc.	V
	L.C.N. Closers	L
	Ives	I
	Pemko	P
	Rixson	R
	Trimco	T

C. HARDWARE GROUPS

HARDWARE GROUP 1 - Doors No. 0a1, A2, A3

For Each door furnish the following new hardware:

3 Hinges	B1191NRP 4.5 x 4.5	626	H
1 Lockset	L9071-06		S
1 Closer	4040XP		L
1 Head Seal	303AV		P
1 Jamb Seal	303AV		P
2 Kick Plates	K0050 - 18 x door width		T
2 Door Bottoms	216		P
1 Threshold	272		P
1 Door Stop	FS18L		I

HARDWARE GROUP 2 - Door No. A, A5, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16, H17, J1, J2, J3, J4

For each door furnish the following hardware:

3 Hinges	B1191NRP 4.5 x 4.5	626	H
1 Panic Device	XP98L-LD		V
1 Cylinder	3216		S
1 Closers	4040XP		L
1 Head Seal	303AV		P
1 Jamb Seal	303AV		P
1 Kick Plate	K0050 - 18 x door width		T
1 Door Bottom	216		P
1 Threshold	272		P
1 Door Stop	FS18L		I

HARDWARE GROUP 3 - Door No. A6

For each door furnish the following hardware:

3 Hinges	B1279 4.5 x 4.5	626	H
1 Electric Lockset	L9094EL-06		S
1 Closer	4040XP		L
1 Wall Bumper	1270		T
1 Head Seal	S88		P
1 Jamb Seal	S88		P
1 Kick Plate	K0050 - 18 x door width		T

HARDWARE GROUP 4 - Door No. 4 - Doors A7, A8, A10

For each door furnish the following hardware:

3 Hinges	B1279 4.5 x 4.5	626	H
1 Lockset	ND75PD-RHO		S
1 Closer	4040XP		L
1 Wall Bumper	1270		T
1 Head Seal	S88		P
1 Jamb Seal	S88		P
1 Kick Plate	K0050 - 18 x door width		T

HARDWARE GROUP 5 - Doors No. A9

For each door furnish the following new hardware:

3 Hinges	BB1279 4.5 x 4.5		H
1 Lockset	ND80PD-RHO		S
1 Wall Stop	1270		T
1 Kick Plate	K0050 - 18 x 34		I
1 Head Seal	S88		P
1 Jamb Seal	S88		P

HARDWARE GROUP 6 - Door No. A11

For each door furnish the following hardware:

3 Hinges	B1279 4.5 x 4.5	626	H
1 Lockset	ND85PD-RHO		S
1 Closer	4040XP		L
1 Wall Bumper	1270		T
1 Kick Plate	k0050 - 18 X 34		i
1 Head Seal	S88		P
1 Jamb Seal	S88		P
1 Threshold	272		P

HARDWARE GROUP 7 - Doors No. A12, H21

For each door furnish the following hardware:

3 Hinges	B1279 4.5 x 4.5	626	H
1 Lockset	ND85PD-RHO		S
1 Closer	4040XP		L
1 Kick Plate	K0050 - 18 x door width		T
1 Head Seal	S88		P
1 Jamb Seal	S88		P
1 Threshold	272		P

HARDWARE GROUP 8 - Doors No. H1, K2

For each door furnish the following hardware:

3 Hinges	BB1191NRP 4.5 x 4.5	626	H
1 Lockset	L9486-06		S
1 Closer	4040XP		L
1 Kick Plate	K0050 - 18 x door width		T
1 Head Seal	S88		P
1 Jamb Seal	S88		P
1 Door Bottom	216		P
1 Threshold	272		P

HARDWARE GROUP 9 - Doors No. H18,H19, K1, K4

For each door furnish the following hardware:

3 Hinges	B1191NRP 4.5 x 4.5	626	H
1 Panic Device	XP98L-LD		V
1 Cylinder	3216		S
1 Closers	4040XP		L
1 Kick Plates	K0050 - 18 x door width		T
1 Head Seal	303AV		P
1 Jamb Seal	303AV		P
1 Door Bottoms	216		P
1 Threshold	272		P
1 Door Stop	FS18L		I

HARDWARE GROUP 10 - Doors No. H20, K3

For each door furnish the following hardware:

3 Hinges	BB1191 4.5 x 4.5	626	H
1 Lockset	L9080-06		S
1 Closer	4040XP		L
1 Kick Plate	K0050 - 18 x door width		T
1 Head Seal	303AV		P
1 Jamb Seal	303AV		P
1 Door Bottom	216		P
1 Threshold	272		P

HARDWARE GROUP 11 - Doors No. J5, J8

For each door furnish the following hardware:

3 Hinges	B1279 4.5 x 4.5	626	H
1 Lockset	ND85PD-RHO		S
1 Closer	4040XP		L
1 Wall Bumper	1270		T
1 Kick Plate	K0050 - 18 x door width		T
1 Head Seal	S88		P
1 Jamb Seal	S88		P
1 Threshold	271		P

HARDWARE GROUP 12 - Doors No. J6, J7

For each door furnish the following hardware:

4 Hinges	B1279 4.5 x 4.5	626	H
1 Lockset	ND70PD-RHO		S
1 Surface Bolt	054		I
1 Wall Bumper	1270		T
1 Kick Plate	K0050 - 18 x door width		T
1 Head Seal	S88		P
1 Jamb Seal	S88		P

HARDWARE GROUP 13 - Existing Doors

For each existing door furnish the following new hardware:

1 Head Seal	303AV		P
1 Jamb Seal	303AV		P
1 Door Bottom	216		P
1 Threshold	271		P

Balance of hardware is existing.

HARDWARE GROUP 14 - Man Gates

For each man gate furnish the following hardware:

1 Lockset	D70PD-RHO		S
1 Deadbolt	B662P		S

Hinges are furnished by gate contractor.

HARDWARE GROUP 15 - Man Gates

For each man gate furnish the following hardware:

1 Panic Device	22 x 230L x 299		V
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Hinges are furnished by gate contractor.

HARDWARE GROUP 16 - Pair of Gates

For each pair of gates furnish the following hardware:

1 Padlock	43 Series	626	S
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Verify shank length required with owner.

1 Tayhope	Model 02-ST		
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[www.northamerican@tayhope.com](http://www.northamerican@tayhope.com)

Hinges are furnished by gate contractor.



SECTION 08800

**GLAZING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass and glazing for hollow metal work, Vinyl clad windows, glazed walls and doors.
- B. Exterior Glazing color to match the existing campus; tempered Solar Cool Bronze with a reflective coating on the exterior pane and tempered clear on the interior pane.
- C. Glass for cabinet doors.

1.2 REFERENCES

- A. ASTM C920 - Elastomeric Joint Sealants.
- B. ASTM C1036 - Flat Glass.
- C. ASTM C1048 - Heat-Treated Flat Glass.
- D. ASTM E744 - Sealed Insulating Glass Units.
- E. SIGMA No. 64-7-2 - Specification for Sealed Insulating Glass Units.
- F. CPSC 16 CFR, Part 1201 and/or ANSI 297.1 in accordance with CBC 2406.2.
- G. FGMA - Glazing Manual and Sealant Manual.

1.3 QUALITY ASSURANCE

- A. Conform to Flat Glass Marketing Association (FGMA) Glazing Manual and Sealant Manual for glazing installation methods.
- B. Safety glazing shall have a permanent ID per CBC 2406.3.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Provide data on glazing sealant. Identify colors available.
- D. Submit samples under provisions of Section 01300.
- E. Submit two samples, 12 x 12 inches in size, illustrating each glass coloration.
- F. Submit 12-inch long bead of glazing sealant in color selected.
- G. Submit sealed glass unit manufacturer's certificate under provisions of Section 01300 indicating units meet or exceed specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01500.

## 1.6 WARRANTY

- A. Provide ten year manufacturer's warranty under provisions of Section 01700.
- B. Warranty: Include coverage of sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

## 2 PART 2 PRODUCTS

### 2.1 ACCEPTABLE GLASS MANUFACTURERS

- A. Clear and Tinted Float Glass:
  - 1. Guardian Industries Corp., (800) 521-9040.
  - 2. Ford Glass Division, (714) 380-1713.
  - 3. LOF Glass, Inc., (818) 960-5591.
  - 4. PPG Industries, Inc., (714) 955-0072.
- B. Wire Glass:
  - 1. AFG Industries, Inc., (615) 229-7200.
  - 2. Guardian Industries Corp., (800) 521-9040.
  - 3. Hordis Brothers, Inc., (609) 662-0400.
- C. Tempered Glass:
  - 1. Guardian Industries Corp., (800) 521-9040.
  - 2. Ford Glass Division, (714) 380-1713.
  - 3. LOF Glass, Inc., (818) 960-5591.
  - 4. PPG Industries, Inc., (714) 955-0072.
  - 5. Hordis Brothers, Inc., (609) 662-0400.
- D. Insulating Glass:
  - 1. Guardian Industries Corp., (800) 521-9040.
  - 2. Ford Glass Division, (714) 380-1713.
  - 3. PPG Industries, Inc., (714) 955-0072.
  - 4. Hordis Brothers, Inc., (609) 662-0400.
- E. Substitutions: Under provisions of Section 01300.

### 2.2 GLASS MATERIALS, GENERAL

- A. Primary Glass Standard: Comply with ASTM C1036 requirements, including reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.
- B. Tempered Glass Standard: Comply with ASTM C1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.
- C. Sizes: Fabricate glass to sizes required for glazing openings, with edge clearances and tolerances complying with recommendations of glass manufacturer and FGMA. Provide thicknesses indicated, or, if not indicated, as recommended by glass manufacturer for application indicated.

### 2.3 PRIMARY GLASS PRODUCTS

- A. Clear Float Glass: Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select).
- B. Tinted Tempered Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select), as follows:

1. Solar Cool Bronze with a reflective coating to match the existing exterior glazing on this campus.
- C. Wired Glass: Type II (patterned and wired glass, flat), Class 1 (translucent), Quality q8 (glazing), Form 1 (wired, polished both sides), [Mesh m1 (diamond)] [Mesh m2 (square)]; complying with ANSI Z97.1.

#### 2.4 TEMPERED GLASS PRODUCTS

- A. Manufacturing Process: Horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed.
- B. Clear Tempered Float Glass: Kind FT (fully tempered), Condition A (uncoated surfaces), Type 1 (transparent glass, flat) Class 1 (clear), Quality q3 (glazing select).
- C. Tinted Tempered Float Glass: Kind FT (fully tempered), Condition A (uncoated surfaces), Type 1 (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select), tint color matching non-heat treated float glass.
  1. Solar Cool Bronze with a reflective coating to match the existing exterior glazing on this campus.

#### 2.5 SEALED INSULATING GLASS UNITS

- A. Comply with ASTM E744, Class A.
- B. Thickness of each pane: 1/4".
- C. Air Space Thickness: 1/2".
- D. Exterior Pane: Tinted float glass, tempered where required.
- E. Interior Pane: Clear float glass, tempered where required.

#### 2.6 GLAZING SEALANTS AND PREFORMED GLAZING TABS

- A. General: Comply with ASTM C 920, and sealant and glass manufacturers recommendations for suitability and compatibility.
- B. One-part Butyl Glazing Sealant:
  1. "Chem-Calk 300"; Bostik Construction Products Div.
  2. "Norseal Butyl"; Norton Performance Products.
  3. "BC 158"; Pleora Corp.
  4. "757 Butyl Sealant"; Protective Treatments, Inc.
- C. Two-Part Polysulfide Glazing Sealant: Type M; Grade NS; Class 25:
  1. "Chem-Calk 200"; Bostik Construction Products Div.
  2. "Synthacalk GC-5"; Pecora Corp.
- D. One-Part Acid-Curing Silicone Glazing Sealant: Type S; Grade NS; Class 25:
  1. "Chem-Calk 1200"; Bostik Construction Products Div.
  2. "Dow Corning 999"; Dow Corning Corp.
  3. "SCS 1200"; General Electric Corp.
  4. "863"; Pecora Corp.
  5. "Rhodorsil 3B"; Rhone-Poulenc Inc.
  6. "Omniglaze"; Sonneborn Building Products Div.; Rexnord Chemical Products Inc.

7. "Proglaze"; Tremco.

E. Preformed Butyl-Polyisobutylene Glazing Tape With Spacer Rod:

1. "Chem-Tape 60"; Bostik Construction Products Div.
2. "Shim-Seal"; Pecora Corp.
3. "PTTI 303"; Shim Tape; Protective Treatments, Inc.
4. "Pre-Shimmed Tremco 440 Tape"; Tremco Inc.

## 2.7 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene; EPDM or silicone blocks, 80-90 Shore A durometer hardness.
- B. Spacer Shims: Neoprene; EPDM or silicone blocks, Shore A durometer hardness; self adhesive one face.
- C. Glazing Splines: Resilient polyvinylchloride extruded shape to suit glazing channel retaining slot, color.
- D. Glazing Clips: Manufacturer's standard type.

## 3 PART 3 EXECUTION

### 3.1 INSPECTION

- A. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready for work of this Section.
- B. Beginning of installation means acceptance of existing substrate.

### 3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses.
- C. Prime surfaces scheduled to receive sealant.

### 3.3 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sightline. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bed of butyl sealant along exterior void ensuring full contact with pane.
- C. Place setting blocks at 1/4 points.
- D. Rest glass on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane.
- E. Install removable stops, spacer strips inserted between glass and applied stops at 24-inch intervals, 1/4 inch below sightline.
- F. Fill gap between pane and applied stop with acid curing type sealant to depth equal to bite of frame on pane, but not more than 3/8 inch below sightline.
- G. Apply cap bead of butyl type sealant along exterior void, to uniform line, flush with sightline. Tool or wipe sealant surface with solvent for smooth appearance.

### 3.4 INTERIOR COMBINATION METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sightline.
- B. Place setting blocks at 1/4 points.
- C. Rest glass on setting blocks and push against tape to ensure full contact at perimeter of pane.
- D. Install removable stops, spacer shims inserted between glass, and applied stops at 24 inch intervals, 1/4 inch below sightline.
- E. Fill gap between pane and applied stop with acid curing type sealant to depth equal to bite of frame on pane to uniform and level line.
- F. Trim protruding tape edge.

### 3.5 CLEANING

- A. After installation, mark pane with an "X" by using plastic tape or removable paste.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after work is completed.

END OF SECTION

## SECTION 09111

### NON-LOAD-BEARING METAL FRAMING SYSTEM

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section includes non-load bearing metal stud framing and accessories to infill existing aluminum storefront system.
  - 1. Bridging or bracing as indicated in the drawings.
  - 2. Clips, accessories, fasteners, backing plates and other materials required or indicated in the drawings to provide a complete and proper installation of the framing systems.
- B. Formed steel framing and accessories for interior walls, door and window openings in interior walls and ceiling joists.
- C. Related Sections:
  - 1. Section 03151 - Concrete Anchoring
  - 2. Section 07213 - Batt and Blanket Insulation
  - 3. Section 08560 - Vinyl Clad Windows
  - 4. Section 09260 - Gypsum Board Assemblies

##### 1.2 REFERENCES

- A. California Building Code 2019, Chapter 22A, Division V.
- B. American Iron and Steel Institute, (AISI).
- C. AISI S201-17 Cold formed steel framing - Product data.
- D. AISI S240-15 Cold formed steel framing - nonstructural members.
- E. ASTM A90 - Test Method for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- F. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by Hot Dip Process, Physical (Structural) Quality.
- G. ASTM A653 - Specifications for steel sheet, zinc-coated (galvanized) or zinc-iron alloy-coated (galvanized by the hot dipped method).
- H. ASTM C955 - Standard specification for load-bearing steel framing.
- I. A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

- J. ASTM A1011 - Standard specification for steel, sheet and strip, hot-rolled, carbon, structural, high-strength low-alloy and high-strength low-alloy with improved formability.
- K. ASTM C1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
- L. AWCI (Association of Wall and Ceiling Industries) - Specifications Guide for Cold Formed Steel Structural Members.
- M. AWS D1.1 - Structural Welding Code.
- N. FS TT-P-645 - Primer, Paint, Zinc-Chromate, Alkyd Type.
- O. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- P. ASTM A446 - Steel Sheet, zinc-coated (galvanized) by hot dip process, physical (structural) qualities.
- Q. ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- R. ASTM A591/A591M - Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
- S. ASTM C645 - Non-Load Bearing (Axial) Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
- T. ASTM C754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board.
- U. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
- V. ML/SFA 540 - (Metal Lath/Steel Framing Association, Division of National Association of Architectural Metal Manufacturers) - Lightweight Steel Framing Manual.
- W. SSPC Paint 20 (Steel Structures Painting Council) - Zinc Rich Primers.

## 1.2 SYSTEM DESCRIPTION

- A. Exterior Storefront System infill: Metal stud-framing system with gypsum board specified in Section 09260.
- B. Maximum Allowable Wall Deflection: L/240.
- C. Wall System:

1. Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
2. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

### 1.3 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
  1. Indicate component details anchorage to structure, type of fasteners, and accessories or items required of other related work.
- C. Product Data: Submit data describing standard framing member materials and finish, product criteria, load charts, limitations.
- D. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

### 1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C754.
- B. Maintain one copy of each document on site.

### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years of experience.
- C. Use adequate numbers of skilled craftsmen thoroughly trained and experienced with the specified requirements and methods needed for proper performance of the work.

### 1.6 PRE-INSTALLATION MEETING

- A. Section 01039 - Coordination and Meetings: Pre-installation meeting.
- B. Convene minimum one week prior to commencing Work of this section.



## 1.7 COORDINATION

- A. Section 01039 - Coordination and project conditions.
- B. Coordinate placement of components within stud framing system.

## PART 2 PRODUCTS

### 2.1 METAL FRAMING SYSTEM

- A. Manufacturers:
  - 1. All manufacturers as listed in ICC-ESR-3064P and 3064P CBC & CRC Supplement.

All manufacturers as listed in ICC-ESR-3016.

- 1. Substitutions: Section 01300 - Submittals.  
Product must have an ICC-ESR Evaluation Report approval. A California Licensed structural engineer in compliance with A.I.S.C. standards must sign structural calculations and the California Building Code requirements shall be submitted.

### 2.2 COMPONENTS

- A. Framing System Components: ASTM C645.
- B. Tracks and Headers: Same material and thickness as studs, bent leg retainer notched to receive studs. Ceiling Runners with extended leg retainer.
- C. Top Track: Formed ASTM A446, Grade A steel, 16 gage, same width as the studs with 2-1/2" deep flanges. See drawings for specific details. For use at interior non-bearing walls only and as detailed on the drawings.
- D. Furring and Bracing Members: Of same material as studs, thickness to suit purpose.
- E. Fasteners: ASTM C1002, self-drilling, self-tapping screws.
- F. Stand Off Washers: round or rectangular steel washers with flanges sized to fit into the vertical slots of the slotted top track.
- G. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.

- H. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered, manufacturer's standard shapes, same finish as framing members.
- I. Sheet Metal Backing: Provide un-punched studs and backing plates for attachment of all items to walls as detailed on the drawings and for components listed within the specification sections requiring backing. Provide punched studs at all whiteboard locations and wall mounted light fixtures. Provide backing plates for all mirrors, door stops, and restroom accessories. This sub-contractor shall contact and coordinate with the general contractor for all locations where backing plates and un-punched studs are required to be installed for other trades to complete their work.
- J. Anchorage Devices: Power actuated or drilled expansion bolts with Acoustic Sealant: As specified in Section 09260 and detailed on the drawings.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 zinc rich.

### 2.3 SHOP FINISHING

- A. Studs: Galvanize to G60 coating class. Electro-galvanize.
- B. Tracks and Headers: Galvanize to G60 coating class. Electro-galvanized.
- C. Accessories: Same finish as framing members.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough-in utilities are in proper location.

### 3.2 INSTALLATION

- A. Align and secure top and bottom runners as detailed on drawings.
- B. Place one bead of sealant between sill track and existing substrate to achieve vapor seal.
- C. Install studs vertically at 16 inches oc.
- D. Align stud web openings horizontally.

- E. Secure studs to tracks using fastener method in accordance with manufacturer's instructions and as noted on the drawings. Do not weld unless specifically detailed on drawings.
- F. Stud splicing is not permissible, except where specifically detailed on the drawings.
- G. Fabricate corners using minimum of three studs.
- H. Place a stud not more than 2 inches from abutting walls and each side of openings.
- I. Provide double studs at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings as detailed on drawings. Install intermediate studs above and below openings to match stud spacing as detailed on the drawings.
- J. Coordinate placement of insulation in stud spaces after stud frame erection.
- K. Provide galvanized studs.

### 3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Indicated Position: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb: 1/8 inch in 10 feet.
- D. See drawings for additional requirements.

### 3.4 CLOSE OUT

- A. Upon completion of work in this section contractor shall remove all equipment, excess material and waste product from the site. Each building shall be broom clean.
- B. Provide a one (1) year warranty in accordance with Section 01700.

END OF SECTION

SECTION 09260

**GYPSUM BOARD SYSTEMS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum board.
- B. Exterior Wall Backing board.
- C. Cement Backing board.
- D. Taped and sanded joint treatment.
- E. Texture finish.

1.2 REFERENCES

- A. ASTM C36 - Gypsum Wallboard.
- B. ASTM C442 - Gypsum Backing Board and Core board.
- C. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- D. ASTM C514 - Nails for the Application of Gypsum Wallboard.
- E. ASTM C 557 - Adhesives for fastening gypsum wallboard.
- F. ASTM C-630 - Water Resistant Gypsum Backing Board.
- G. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track, and Rigid Furring Channels for Screw Application of Gypsum Board.
- H. ASTM C754 - Installation of Steel Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
- I. ASTM C834 - Standard Specification for Latex Sealants.
- J. ASTM C840 - Application and Finishing of Gypsum Board.
- K. ASTM C919 - Standard Practice for Use of Sealant in Acoustical Applications.
- L. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products to Steel Studs.
- M. ASTM C1047 - Standard Specification for Accessories for Gypsum Wall Board.
- N. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.
- O. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for use as Sheathing.

- P. ASTM C1280 - Application of Gypsum Sheathing Board.
- Q. ASTM C1658 - Standard Specification for Glass Mat Gypsum Panels.
- R. ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth using Static Environmental Chambers.
- S. ASTM E84 - Surface Burning Characteristics of Building Materials.
- T. ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- U. ASTM E119 - Fire Tests of Building Construction and Materials.
- V. ASTM E413 - Classification for rating sound insulation.
- W. GA-214-90 - Levels of gypsum board finish.
- X. UL - Fire Resistance Directory
- Y. CBC - California Building Code 2016 Edition.

### 1.3 QUALITY ASSURANCE

- A. Applicator: Company specializing in gypsum board systems work with three years documented experience.

### 1.4 REGULATORY REQUIREMENTS

- A. Conform to C.C.R. Title 24, Part 2, Chapter 7, Section 703, and Tables 721.1(1), 721.1(2), 721.1(3) for fire rated assemblies.
- B. Conform to C.C.R., Title 24, Part 2, Sections 2505, 2506, 2508 and Section 12.2.1 of ASCE 7.
- C. Conform to the UL Design Listings referenced on the drawings.

### 1.5 ENVIRONMENTAL REQUIREMENTS

- A. During cold weather, in areas receiving gypsum board installation, maintain temperature range between 55° F. to 70° F. for 24 hours before, during and after gypsum board and joint treatment application.
- B. Provide ventilation during and following adhesives and joint treatment application. Use temporary air circulators in enclosed areas lacking natural ventilation. Under slow drying conditions, allow additional drying time between coats of joint treatment. Protect installed materials from drafts during hot, dry weather.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

#### 1.6 DELIVERY, STORAGE AND PROTECTION

- A. Deliver materials to the project site with manufacturer's labels intact and legible. Handle materials with care to prevent damage. Deliver fire rated materials bearing testing agency label and required fire classification numbers.
- B. Store materials inside under cover, stack flat, off the floor. Stack gypsum board so that long lengths are not over short lengths. Avoid overloading floor system. Store adhesives, joint treatment materials, metal items and gypsum board in a dry area.

## 2 PART 2 PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS - GYPSUM BOARD SYSTEM

- A. United States Gypsum Co., (510) 792-4400.
- B. Georgia Pacific Corp., (714) 684-5393.
- C. Gold Bond Building Products Div., (415) 234-6740.
- D. Substitutions: Under provisions of Section 01300.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Moisture- and Mold-Resistant Assemblies: Provide and install moisture- and mold-resistant glass-mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C 1658 and ASTM C1177 where indicated on Drawings and in all locations which might be subject to moisture exposure during construction. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

#### 2.3 GYPSUM BOARD MATERIALS

- A. Interior Walls
  1. Standard Gypsum Board: ASTM C36; 1/2-inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges.
  2. Moisture and Mold Resistant glass-mat Gypsum Board: ASTM C1658 and ASTM C1177; 5/8-inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges.

3. Backing Board for Ceramic Tile: Moisture Resistant Glass Mat Gypsum Board: ASTM C1178; 5/8-inch thick; fire resistive type X, ASTM C36 where indicated on drawings; maximum permissible length; ends and edges square cut. Equal to G-P Gypsum Product 5/8 inch Dens-Shield fireguard tile backer.
4. Fire Rated Gypsum Board: ANSI/ASTM C36 and ASTM E119; fire resistive type, UL rated; 5/8-inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges.
5. Fire Rated Gypsum Board: ANSI/ASTM C36 and ASTM E119; two-hour assemblies, UL rated; 3/4-inch thick unless otherwise indicated, maximum permissible length; ends square cut, tapered and beveled edges. Equal to USG Ultra Code Core.
6. Sound Deadening Gypsum Board: ASTM C442; ASTM CE90; ASTM E413; 1/2-inch thick, maximum permissible length, ends square cut, tapered edges. STC rated at 55-65 per ASTM E90; One hour fire rated equivalent to Type X per ASTM E119, Class A surface flame per ASTM E84. Equal to QuietRock Model 527.
7. Abuse Resistant Gypsum Board: ANSI/ASTM C36; 1/2-inch thick, maximum permissible length, ends square cut, tapered. Equal to USG GyProc Abuse-Resistant Gypsum Board or USG Abuse Resistant Gypsum Panels.
8. Wet Locations at floor line: Moisture resistant fiberglass mat faced, moisture resistant gypsum backer board: ASTM D3273; 5/8-inch thick, ASTM C1178, ASTM D6329 and ASTM E96; where indicated on drawings; maximum permissible length, end and edges square cut. Equal to GP Densshield or acceptable equivalent.
9. Backing Board at Elevated Walkway: Moisture Resistant Glass Mat Gypsum Board: ASTM C1178; 5/8-inch thick; fire resistive type X, ASTM C36 where indicated on drawings; maximum permissible length; ends and edges square cut. Equal to G-P Gypsum Product 5/8-inch Dens-Shield fireguard tile backer.

B. Exterior Wall Substrates:

1. Backing for exterior finish system: Moisture resistant glass mat gypsum board: ASTM C1177; 5/8-inch thick, fire resistive type X; where indicated on drawings; maximum permissible length, end and edges square cut. Back cut boards as required to conform to curved walls. Equal to G-P Gypsum Board 5/8-inch dens-glass Gold Fire Guard or USG 5/8-inch fiber rock Aqua-Tough.
2. Backing for inside of parapets: Moisture resistant glass mat gypsum board: ASTM C1177; 5/8-inch thick, fire resistive type X; where indicated on drawings; maximum permissible length, end and edges square cut. Back cut boards as required to conform to curved walls. Equal to G-P Gypsum Board 5/8 - inch dens-glass Gold Fire Guard or USG

5/8-inch fiber rock Aqua-Tough.

#### 2.4 ACCESSORIES

- A. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board suitable for STC rating required. USG Acoustical sealant manufactured by United States Gypsum Company.
  - 1. At sound deadening wall assemblies use "QuietSeal" or equal to meet ASTM C919 and "QuietPutty" at all recessed electrical boxes.
- B. Corner Beads: Metal, hot dip galvanized.
- C. Radius Corner Bullnose: Metal, 1-1/2-inch Bullnose Kerf
- D. Edge Trim: GA 201 and GA 216; Type LC bead, unless otherwise indicated.
- E. Expansion Joints: Zinc control joints equal to USG No. 093.
- F. Joint Materials: ASTM C475; reinforcing tape, joint compound, adhesive, water, and fasteners. Use tapes and compound recommended by gypsum board manufacturer for the use intended. Use ready mixed, drying type compounds. Use taping compound for embedding tape and first coat over fasteners and flanges of corner beads and trim. Use topping compound for fill and finish coats.
- G. Spray Texture Finish: Equivalent to USG Spray Texture Finish manufactured by United States Gypsum Company.
- H. Fasteners:
  - 1. To Metal, Interior faces: Self-drilling, self-tapping, type S, countersunk bugle head, drywall screws, conforming to ASTM C646, for use with power driven tools.
  - 2. To Metal, Exterior faces: Self-drilling, self-tapping, type and size as detailed on the drawings and to lengths required to achieve a minimum of 3 threads penetration into the flange of the stud. Screws shall be 316 Stainless Steel No. 2 Phillips bugle head, fine thread #8 or larger conforming to ASTM B 117.
  - 2. To Wood: Self-drilling, type S as detailed on the drawings, screws, length as required to provide minimum of 1-1/2-inch penetration into the stud. Screws shall be 316 Stainless Steel No. 2 Phillips or square drive bugle head, fine thread #8 or larger or conforming to ASTM B 117.
- I. Prime Coat: Equivalent to USG first coat prime coat, and manufactured by United States Gypsum Company.



### 3 PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Examine surfaces scheduled to receive gypsum board construction for conditions that will adversely affect execution, permanence and quality of work.
- B. Do not proceed with installation until conditions are satisfactory.
- C. Beginning of installation means acceptance of existing substrate.
- D. Beware of a condition known as "critical lighting." This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but "does not" equalize smoothness or surface texture. Any corrective active of the drywall must be done by the drywall contractor prior to decorating.

#### 3.2 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with ASTM C840 and manufacturer's instructions.
- B. Framing members: Examine all surfaces to receive gypsum board. Make certain that framing is plumb and true.
  - 1. The fastening surface of any framing or furring member shall not vary more than 1/8 in. from the plane of the faces of adjacent framing or furring members.
- C. Cutting: Cut gypsum board by scoring or by sawing, working from the face side. When cutting by scoring, the face paper shall be cut with a knife.
- D. The gypsum board shall then be snapped back away from the cut face. The back paper may be broken by snapping the gypsum board in the reverse direction or the back paper may be cut.
- E. All cut edges and ends shall be sanded, where necessary, to obtain neat joining when gypsum board is erected.
- F. Cut-outs or small openings in gypsum board shall be scored in outline on the face and back before knocking out or shall be cut out with a saw or other suitable tool. Openings shall not be made by punching.
- G. Neatly cut gypsum board to fit around all outlets and switch boxes. Where gypsum board meets projecting surfaces, scribe and neatly cut.
- H. Apply gypsum board with long dimension parallel or perpendicular to framing members, and all abutting ends over framing members. Stagger end joints. Comply with UL listing requirements at fire rated walls.
- I. Erect single layer fire rated gypsum board vertically or

horizontally, with edges and ends occurring over firm bearing to comply with UL listing requirements.

- J. Gypsum board of the maximum practicable length shall be used to minimize end joints. All end joints shall be neatly fitted and staggered. Joints on opposite sides of the partitions shall be so arranged as to occur on different studs.
- K. At door openings, cut gypsum board so that no joints occur within 12 in. of the corners of door openings.
- L. In wet area rooms such as restrooms, kitchen areas, custodian rooms and where ceramic base is scheduled, provide a 12-inch high band of DensShield around the perimeter of the room at the floor line. The face of the backing board is to line with the finish surface of the substrate above.
- M. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- N. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch (1.5 mm)** of open space between panels. Do not force into place.
- O. Form control and expansion joints with space between edges of adjoining gypsum panels. See details on drawings.
- P. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide **1/4- to 1/2-inch- (6.4- to 12.7-mm-)** wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- Q. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- R. Use screws when fastening gypsum board to metal furring.
- S. Use screws when fastening gypsum board to furring or framing.
- T. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- U. Place control joints consistent with lines of building spaces as indicated. At fire rated assemblies apply fire safing on backside of joints per UL requirements to maintain fire rating.
- V. Place corner beads at external corners, whether exposed or hidden in finished areas. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

### 3.3 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings.

### 3.4 JOINT TREATMENT

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Inspect gypsum board installation prior to applying joint treatment. Correct all defects before proceeding.
- C. Taping and finishing compounds: Prepare and mix in accord with manufacturer's printed directions.
- D. Exposed surface of gypsum board in place shall be fully acceptable for application of deferred finishes to provide completed work free of flaws, with fasteners recessed and joints invisible.
- E. At Sound deadening walls apply 1/8" -3/8" bead of sound deadening sealant such as "QuietSeal" around the entire perimeter of the wall and ceiling, fill in between any seam that is not backed by a stud or joist. Apply putty behind all junction boxes or other boxes equal to "QuietPutty". Wrap the putty completely around the back side of all boxes.
- F. Spread joint compound evenly over all joints using a suitable tool and fill fastener depressions and metal trim.
- G. Center reinforcing tape on joint and press into fresh taping compound. Wipe down with sufficient pressure to remove excess compound and to leave sufficient compound under tape for proper bond, feathering and leaving free from blisters and tape wrinkles. Allow to dry.
- H. Fold reinforcing tape along center and apply to interior angles, following procedure for joints.
- I. With fine sandpaper, lightly sand the dry compound between coats to remove irregularities.
- J. Second coat of taping compound shall be applied to joints, feathering approximately 3 in. beyond edges of tape. Apply another coat to fastener heads, leaving flush with gypsum board surfaces.
- K. After sanding second coat, apply final skim coat feathering out approximately 2 in. beyond second coat. Apply a third coat to all fastener depressions and metal trim. Skim-coat all interior angles.

- L. After drying, sand lightly all surfaces; using caution not to excessively damage the face paper of the gypsum board.
- M. Apply prime coat per manufacturers requirements to all surfaces scheduled to be painted.

### 3.5 FINISHING

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.
- D. All drywall surfaces to receive paint shall receive a standard "orange-peel" texture. After the gypsum board is completely taped and sanded, apply a uniform splatter spray of finishing compound, Level 3.
- E. All drywall to receive vinyl wall covering shall be taped, sanded, and prepared for the wall finish covering, Level 4.
- F. Where one (1) and two (2) hour drywall assemblies are located above the ceiling as shown on the plans, the following applies: Drywall finish above the ceiling line does not require sanding of the taped joints or spackled screws, Level 1.
- G. Where drywall assemblies are located behind a finish surface covering, i.e., vinyl covered tack board or paneling, below the ceiling line provide a level 2 finish.
- H. Where gloss, semi-gloss, satin sheen enamel or non-textured flat paints are used or where severe lighting conditions occur provide a Level 5 finish.
- I. Treat the joints of the plywood wainscots with a Level 5 finish.
- J. Levels of gypsum board finish:
  - 1. **Level 1:** All joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
  - 2. **Level 2:** All joints and interior angles shall have a tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. Surface shall be free of excess joint

compound tool marks and ridges are acceptable provided they do not impair the installation of any wall covering.

3. **Level 3:** All joints and interior angels shall have tape embedded in joint compound and two separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. The prepared surface shall be coated with a prime coat prior to the application of final finishes. See painting specification section 09900.
  4. **Level 4:** All joints and interior angels shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. The prepared surface shall be coated with a prime coat prior to the application of final finishes. See painting specification section 09900.
  5. **Level 5:** All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angels, fastener heads, and accessories. Apply prime coat. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. The prepared surface shall be coated with a primer/sealer prior to the application of finish paint. See painting specification section 09900.
- K. Glass-Mat Gypsum Sheathing Panel: Finish according to manufacturer's written instructions for use as exposed soffit board.
- L. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- M. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.3 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

### 3.4 CLEAN-UP

- A. Remove all rubbish and surplus materials from premises and dispose of it legally away from site.

### 3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09270

**TACKABLE WALLBOARD SYSTEMS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Adhesively applied vinyl covered tackable panels. Color and pattern to match existing within the building. Field Verify prior to placing order.

1.2 REFERENCES

- A. ASTM C208 - Insulation Board (cellulose fiber).
- B. ASTM E84 - Test Method of Surface Burning Characteristics of Building Materials.
- C. ASTM C557 - Adhesive for Fastening to Wood Framing.

1.3 QUALITY ASSURANCE

- A. Applicator: Company specializing in tackable wallboard work with three years documented experience.

1.4 REGULATORY REQUIREMENTS

- A. Conform to CBC Code for flame spread and smoke developed ratings for vinyl fabric covered tack surfaces in accordance with ASTM E84.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Provide product data on vinyl coated fabric and fiberboard.
- C. Submit samples under provisions of Section 01300.
- D. Submit full range of manufacturers color selection for vinyl wall covering specified herein, for Architects selection.

2 PART 2 PRODUCTS

2.1 MATERIALS - TACKABLE WALLBOARD SYSTEMS

- A. Vinyl Wall covering: "Koroseal School Collection, Type II, all colors and patterns, conforming to the following:
  - 1. Total Weight per Linear Yard : 21 oz.
  - 2. Roll Width : 54 inches
  - 3. U.L. Rating :
    - Flame Spread : 65
    - Smoke Developed : 175
- B. Conform to G.S.A. Federal Specification CCC-W-408B for Type II wall covering.
- C. Fiberboard Homasote 440 Board: ASTM C208, cellulosic, 26-28 lb/tuft, density 1/2" thick, 4'-0" W x required length.
- D. Wall covering Adhesive: Guard FC-100.
- E. Panel Adhesive: ASTM C557.

- F. Trim: PVC "L"; "J" and "F" moldings. Factory wrapped with vinyl fabric to match panels. Provide at all exposed edges, corners, and where material returns to door and window frames.
- G. Vinyl fabric shall be selected from manufacturer's full range of colors including Group II. One color to be used throughout project.
- H. Substitutions: Under provisions of Section 01300.

### 3 PART 3 EXECUTION

#### 3.1 FABRICATION

- A. Machine apply vinyl wall covering continuous over length of fiberboard sheet. Wrap vinyl continuous around two edges. No seams permitted on individual panels. Machine apply vinyl wall covering continuous over length of all PVC trim pieces.

#### 3.2 INSPECTION

- A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Beginning of installation means acceptance of existing conditions.

#### 3.3 INSTALLATION

- A. Erect fiberboard in vertical direction. Install in full length sections with no horizontal joints.
- B. Install panels butted tight to adjacent materials; casework, chair rail, door frames, window frames, and soffits as indicated on the Drawings. Provide lap beneath other tack or chalkboard systems to conceal unfinished edges.
- C. Wrap window frames with vinyl tackboard and trim all edges.
- D. Attachment: Secure fiberboard to substrate with adhesive and sufficient support to hold in place. Apply adhesive in accordance with manufacturer's instruction.
- E. Insure backing materials are firmly attached, free from warps and surface defects and ready to receive vinyl wall covering.
- F. Install trim pieces at all exposed edges, corners and where material returns to door and window frames.
- G. Where ever possible, align vertical joints with suspended ceiling grid.

#### 3.4 TOLERANCES

- A. Maximum Variation From True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION



SECTION 09312

**CERAMIC TILE WALL FINISH**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ceramic tile wall finish using thin set application method.
- B. Ceramic tile floor base.
- C. Cementitious backing board.

1.2 REFERENCES

- A. ANSI/TCA A108.1 - Sub-Surface and preparation by Other Trades.
- B. ANSI/TCA A108.5 - Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
- C. ANSI/TCA A108.11 - Interior installation of cementitious backer units.
- D. ANSI/TCA A118.3 - Chemical Resistant, water cleanable tile-setting and grouting epoxy and water cleanable tile-setting epoxy adhesive.
- E. ANSI/TCA A118.4 - Latex-Portland Cement Mortar.
- F. ANSI/TCA A137.1 - Specifications for Ceramic Tile.
- G. TCNA (Tile Council of North America) - Handbook for Ceramic Tile Installation.
- H. ANSS (American National Standard Specifications).

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit shop drawings indicating tile layout and patterns, color arrangement, perimeter conditions, and junctions with dissimilar materials.
- C. Submit samples under provisions of Section 01300.
- D. Mount tile and apply grout on two 24 x 24-inch plywood panels, to indicate pattern, color variations, and grout joint size variations.
- E. Submit manufacturer's installation instructions under provisions of Section 01300.
- F. Submit maintenance data under provisions of Section 01700.
- G. Include recommended cleaning and stain removal methods, and cleaning materials.

1.4 QUALITY ASSURANCE

- A. Conform to ANSI/TCA A137.1.
- B. Conform to TCA Handbook for Ceramic Tile Installation.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum three years documented experience.
- B. Installer: Company specializing in applying the work of this Section with minimum three years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain 50 degrees F during installation of mortar materials.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS - TILE

- A. American Olean Tile Co., Inc., (916) 624-4843.
- B. Dal-Tile Corp., (209) 524-4711.
- C. Substitutions: Under provisions of Section 01300.

2.2 TILE MATERIAL

- A. Ceramic Wall Tile: ANSI/TCA A137.1, conforming to the following:

Moisture Absorption	0 to 0.5 percent
Size	4 ¼ x 4 ¼ x 1/8 inch
Edge	Cushioned
Surface Finish	Matte glazed
Color	Colors as selected. Minimum of three colors in each room, pattern and sheen to be determined by Architect prior to start of this work.
Price Groupings	60% Group 1 or 2, 40% Group 3
- B. Base: Match wall tile for moisture absorption, surface finish, and color; tile length 6-inch-long x 4 ¼ inch high; coved bottom. Bottom edge to be set into a continuous notch in the concrete floor. See details on drawings.

2.3 MANUFACTURERS - MORTAR AND GROUT

- A. Laticrete
- B. Custom Building Products, (213) 728-7571.
- C. Substitutions: Under provisions of Section 01300.

2.4 MORTAR MATERIALS

- A. Portland Cement Mortar Materials: ANSI/TCA A108.1.
- B. Latex-Portland Cement Mortar: ANSI/TCA A118.4 and the following:

1. Acrylic resin latex additive.
2. Dry mortar mix supplied by latex manufacturer.

## 2.5 GROUT MATERIALS

- A. Laticrete SpectraLOCK PRO Grout.
- B. Approved Equal.

## 2.6 ACCESSORIES

- A. Cleavage Membrane: 4 mil thick polyethylene film behind backing board.
- B. Backing Board: High density, cementitious, glass fiber reinforced, ½-inch thick; 2-inch wide coated glass fiber tape for joints and corners; manufacturer licensed by TCA.

## 2.7 MORTAR MIX AND GROUT MIX

- A. Mix and proportion pre-mix setting bed and grout materials in accordance with manufacturer's instructions, and referenced standards.

# 3 PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts condition of existing surfaces.

## 3.2 PREPARATION

- A. Protect surrounding work from damage or disfiguration.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level substrate surfaces to acceptable flatness tolerances.

## 3.3 INSTALLATION - THINSET METHOD

- A. Install mortar bed, tile, and grout in accordance with applicable ANSI/TCA 108 and 118 series of tile installation standards and TCA Handbook.
- B. Install backing board in accordance with manufacturer's instructions. Tape joints and corners; cover with skim coat of dry-set mortar to a feather edge.
- C. Lay tile to pattern indicated on Drawings, or if not indicated, request from Architect. Do not interrupt tile pattern around openings.
- D. Cut and fit tile tight to penetrations through tile. Form corners and bases neatly. Align floor, base, and wall joints.
- E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- F. Form internal angles coved and external angles bull nosed.
- G. Sound tile after setting. Replace hollow sounding units.

- H. Keep control joints free of mortar or grout.
- I. Allow tile to set for a minimum of 48 hours prior to grouting.
- J. Grout tile joints.

### 3.5 CLEANING

- A. Clean work under provisions of 01700.
- B. Clean tile surfaces.

END OF SECTION

SECTION 09511

**SUSPENDED ACOUSTICAL CEILINGS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustic panels.
- C. Non-fire rated assembly.
- D. Perimeter trim.

1.2 REFERENCES

- A. CCR - California Code of Regulations, Title 24, Chapter 25, and IR 25-2.
- B. CBC - Chapter 25, 2019 Edition.
- C. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
- D. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- E. FS HH-I-521 - Insulation Blankets, Thermal Mineral Fiber, for Ambient Temperatures.
- F. UL - Underwriter's Laboratories System Ratings.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacture of ceiling suspension system and ceiling panels with five years minimum experience.
- B. Installer: Company with five years minimum documented experience, approved by manufacturer.

1.4 REGULATORY REQUIREMENTS

- A. Conform to CCR Title 24 and CBC for suspension system requirements.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate on shop drawings, grid layout and related dimensioning, junctions with other work or ceiling finishes, and interrelation of mechanical and electrical items related to system.
- C. Provide product data on metal grid system components and acoustic

units.

- D. Submit samples under provisions of Section 01300.
- E. Submit two samples 6 x 6 inch in size, illustrating material and finish of acoustic units.
- F. Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and edge trim.

#### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and humidity of 20 to 40 percent prior to, during and after installation.

#### 1.7 SEQUENCING/SCHEDULING

- A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested and approved.
- B. Schedule installation of acoustic units after interior wet work is dry.

#### 1.8 EXTRA STOCK

- A. Provide extra quantity of acoustic units to Owner under provisions of Section 01700.
- B. Provide quantity equal to 2% of units installed.

## 2 PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS - SUSPENSION SYSTEM - NON RATED

- A. Commercial Construction Supply distributors of Chicago Metallic Corporation, (510) 680-4315.
  - 1. Main runner; 1870-01
  - 2. Cross runner; 1824-01
- B. USG Interior Systems, (DONN), (415) 460-8470.
  - 1. Main runner; DX26
  - 2. Cross tees; DX0424
- C. Substitutions: Under provisions of Section 01300.

### 2.2 SUSPENSION SYSTEM MATERIALS

- A. Grid: ASTM C635, heavy duty, non-fire rated, exposed T; components die cut and interlocking. Catalog numbers of acceptable manufacturer are indicated on drawings.
- B. Accessories: Stabilizer bars, clips, splices and edge moldings required for suspended grid system.
- C. Grid Materials: Commercial quality cold rolled steel with galvanized coating.

- D. Grid Finish: Color as noted below.
  - 1. 2 x 4 grid: Off-white color, baked enamel.
- E. Support Channels and Hangers: Galvanized steel; size and type to suit application, to rigidly secure acoustic ceiling system including integral mechanical and electrical components, as detailed on drawings.
- F. Compression Strut: Steel studs, one end secured to roof/floor framing and the other end secured to the ceiling grid. See drawings for specific information.
- G. Fire rated ceiling panels: Install two proper type hold down clips per locking cross tee.

2.3 ACCEPTABLE MANUFACTURERS - ACOUSTIC UNITS

- A. Armstrong Ceiling Systems, (714) 680-7200.
- B. Celotex Building Products Division, (415) 490-0250.
- C. USG Interiors, Inc., (714) 978-0909
- D. Substitutions: Under provisions of Section 01300.

2.4 ACOUSTIC UNIT MATERIALS

- A. Acoustic Panels: Conforming to the following:
  - 1. Equivalent to Cortega, item number 769 panel, manufactured by Armstrong.
    - a. Size : 24 x 48 inches
    - b. Thickness : 5/8 inches
    - c. Composition : Wet formed mineral fiber.
    - d. Density : 0.63lb/cu ft
    - e. Light Reflectance : 0.82 percent
    - f. NRC Range : 0.55
    - g. STC Range : 35
    - h. Edge : Square
    - i. Surface Color : White
    - j. Surface Finish : Non-directional fissured
    - k. Flame Spread : (0-25) Class I, UL 25 or under.
    - l. Smoke Density : Maximum of 450 when tested in accordance with U.B.C. standard No. 8-1.

3 PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that existing conditions are ready to receive work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Beginning of installation means acceptance of existing

conditions.

### 3.2 INSTALLATION

- A. Install system in accordance with ASTM C636 as supplemented in this Section and with "Suspended Acoustic Grid: Notes and Installation Details" drawing sheet.
- B. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- C. Hang system independent of columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Compression struts to be installed at each main runner not exceeding 12'-0" o.c. and not more than 8" from end of main runner. Secure crimped end of tubes to structural framing with wood screws and to main runner with pop rivet.
- E. Locate system on room axis according to reflected plan.
- F. Do not eccentrically load system, or produce rotation of runners.
- G. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.
- H. Field rabbett cut edge of perimeter tiles to match factory rabbetted edge. Paint cut surface if necessary to match surface of tile.
- I. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- J. Lay directional patterned units one way in room. Fit border neatly against abutting surfaces.
- K. Install acoustic units level, in uniform plane, and free from twist, warp and dents.

### 3.3 TOLERANCES

- A. Variation From Flat and Level Surface: 1/8 inch in 10 ft.
- B. Variation From Plumb of Grid Members Caused by Eccentric Loads: Two degrees maximum.

END OF SECTION



SECTION 09512

**ADHESIVE APPLIED ACOUSTICAL CEILINGS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Acoustical tile.
- B. Metal Edge trim.

1.2 REFERENCES

- A. ANSI/ASTM - D1779 - Adhesive for Acoustical Materials.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacture of ceiling tile with three years minimum experience.
- B. Installer: Company with three years minimum documented experience.

1.4 SUBMITTALS

- A. Submit product under provisions of Section 01300.
- B. Provide product data on acoustic units.
- C. Submit samples under provisions of Section 01300.
- D. Submit two samples 12 x 12 inch in size, illustrating material and finish of acoustic units.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 65 degrees F (16 degrees C), and humidity of 20 to 40 percent 48 hours prior to, during and 48 hours after installation.

1.6 EXTRA STOCK

- A. Provide extra quantity of acoustic units to Owner under provisions of Section 01700.
- B. Provide extra quantity equal to 2% of units installed.

2 PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Armstrong Ceiling Systems, (714) 680-7200.
- B. Celotex Building Products Division, (415) 490-0250.
- C. USG Interiors, Inc., (714) 978-0909.
- D. Substitutions: Under provisions of Section 01300.

## 2.2 MATERIALS

- A. Acoustic Tiles: Equivalent to Baltic pattern, model 1132 as manufactured by Armstrong, and conforming to the following.
1. Size : 12 x 12 inches
  2. Thickness : 1/2 inches
  3. Composition : Mineral Fiber
  4. Light Reflectance : .80 percent
  5. CAC Range : 30
  6. Flame Spread : (0-25) Class I, UL 25 or under.
  7. Joint : Interlocking.
  8. Edge : Square
  9. Surface Pattern : Texture Style
  10. Surface Finish : white color
  11. Smoke Density : Maximum of 450 when tested in accordance with C.B.C. standard No. 8-1.
- B. Adhesive: ANSI/ASTM D1779; waterproof, gun or knife grade; type recommended by tile manufacturer.
- C. Edge moldings and trim: Metal of types and profiles of manufacturers standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail required.

## 3 PART 3 EXECUTION

### 3.1 INSPECTION

- A. Verify that existing conditions are ready to receive work.
- B. Beginning of installation means acceptance of existing conditions.

### 3.2 INSTALLATION

- A. Install system in accordance with manufacturer's instructions and as supplemented below.
- B. Locate system on room axis according to reflected plans.
- C. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- D. Lay directional patterned units one way in room. Fit border units neatly against abutting surfaces.
- E. Install acoustic unit's level, in uniform plane, and free from twist, warp and dents.
- F. Install metal edging trim to seal off all exposed edges.

### 3.3 TOLERANCES

- A. Variation from Flat and Level Surface: 1/8 inch in 10 ft.

END OF SECTION

SECTION 09650

**RESILIENT FLOORING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring.

1.2 REFERENCES

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. FS L-F-1641 - Floor Covering, Translucent or Transparent Vinyl Surface, with Backing.
- C. FS L-F-475 - Floor Covering, Vinyl Surface (Tile and Roll), with Backing.
- D. FS RR-T-650 - Treads, Metallic and Non-Metallic, Non-Skid.
- E. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.
- F. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.3 REGULATORY REQUIREMENTS

- A. Conform to CBC code for flame/fuel/smoke rating requirements in accordance with ASTM E84.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Provide seaming plan.
- C. Submit samples under provisions of Section 01300.
- D. Submit two samples 3 x 3 inches in size, illustrating color and pattern for each floor material specified.
- E. Submit two 2-inch long samples of base and stair material for each color specified.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01700.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

#### 1.7 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental requirements:
  - 1. Temperature: Maintain temperature in space to receive products at seventy (70) degrees Fahrenheit for two (2) days prior, during installation, and two (2) days following installation.
    - a. After this period, maintain a temperature of not less than sixty-five (65) degrees Fahrenheit.
    - b. Maintain the ambient relative humidity between 40% and 60% during installation.
  - 2. Moisture content of concrete substrates shall be determined by the results of the following tests:
    - a. Moisture Bond Test, in accordance with Tarkett's Published requirements.

#### 1.8 SEQUENCING AND SCHEDULING

- A. Do not install tiles over concrete substrates until the substrates have cured and are sufficiently dry to bond with adhesive as determined by the "Moisture Bond Test".

#### 1.9 MAINTENANCE

- A. Extra Materials:
  - 1. Furnish not less than one box for each 50 boxes or fraction thereof, of each class, wearing surface, color, pattern and size of resilient floor tile installed.
  - 2. Furnish not less than 100 lineal feet of each type of base and stair materials installed.

## 2 PART 2 PRODUCTS

#### 2.1 MANUFACTURERS - TILE FLOORING

- A. Tarkett, Inc. (800) 899-8191. [www.tarkettna.com](http://www.tarkettna.com)
- B. Armstrong World Industries, (714) 680-7200.
- C. Azrock Industries, Inc., (714) 522-0211.
- D. Substitutions: Under provisions of Section 01300.

#### 2.2 TILE FLOORING MATERIALS

- A. Homogeneous Resilient Tile: ; 12 x 12-inch size, 0.080 inches thick; varied design. Minimum of two colors in each room. Design layout to be furnished. Colors as selected from manufacturers standard colors.

- B. Pattern equivalent to iQ Optima manufactured by Tarkett.
- C. The coefficient of friction for resilient tile shall be > 0.6 per ASTM D2047.
- D. Resilient flooring and accessories shall have a minimum Radiant Flux of 0.45 Watts/Sq. Centimeter.
- E. Resilient tile shall be stable, firm and slip resistant.

### 2.3 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Edge Strips: Provide the following transitions equal to the listed product for each condition.
  - 1. Between carpet and Resilient Flooring: Roppe #50
  - 2. Between Resilient Flooring and Concrete: Roppe #172
- D. Sealer and Wax: Types recommended by flooring manufacturer.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft and are ready to receive work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning of installation means installer accepts condition of existing substrate and site conditions.
- C. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- D. Verify that finishes of substrates comply with tolerances and other requirements specified in other sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturers published written instructions to ensure proper adhesion of resilient flooring and base.
- B. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, other defects and irregularities with good quality Portland cement-based underlayment leveling and patching compound. Produce a uniform and smooth substrate.
- B. Prepare concrete substrates in accordance with ASTM F710.

- C. Concrete floors must be free of dust, solvent, paint, wax, grease, residual adhesive, adhesive removers, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitance, mold, mildew, and other foreign materials that may affect dissipation rate of moisture from the concrete, discoloration or adhesive bonding.
- D. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pends, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.
- E. Perform moisture testing as recommended by the manufacturer. Proceed with installation only after substrates have been tested and meet the minimum requirements from the manufacturer in accordance with ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride or ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs using in situ Probes.
- F. A pH test for alkalinity must be conducted on the concrete floor prior to installation with results between 7 and 9. If the test results are not within the acceptable range, then installation must not proceed until the problem has been corrected.
- G. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
- H. Prohibit traffic from area until filler is cured.
- I. Sweep and Vacuum clean substrates to be covered by resilient products immediately before installation.

### 3.3 INSTALLATION - TILE MATERIAL

- A. Install in accordance with manufacturer's instructions.
- B. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- C. Mix tile from container to ensure shade variations are consistent.
- D. Spread only enough adhesive to permit installation of materials before initial set.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Install tile to square grid pattern with all joints aligned with

pattern grain parallel for all units and parallel to length of room. Allow minimum 1/2 full size tile width at room or area perimeter.

- G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- H. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- B. Install flooring under movable partitions without interrupting floor pattern.
- K. Floor covering shall not be installed over expansion joints.

#### 3.4 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.

#### 3.5 CLEANING

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period.
  - 1. No traffic for 24 hours after installation.
  - 2. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.
- D. Wait 72 hours after installation before performing initial cleaning.
- E. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09651

**RESILIENT BASE**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient base.

1.2 REFERENCES

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.3 REGULATORY REQUIREMENTS

- A. Conform to CBC code for flame/fuel/smoke rating requirements in accordance with ASTM E84.
- B. Provide a slip resistant finish surface with a friction coefficient of 0.6 minimum.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Submit samples under provisions of Section 01300.
- C. Submit two samples in size, illustrating color and pattern for each edge strip material specified.
- B. Submit two 2-inch long samples of base material for each color specified.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01700.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.7 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental requirements:
  - 1. Temperature: Maintain temperature in space to receive products at seventy (70) degrees Fahrenheit for two (2) days prior, during, and two (2) days following installation.
    - a. After this period, maintain a temperature of not less than fifty-five (55) degrees Fahrenheit.



## 1.8 SEQUENCING AND SCHEDULING

- A. Do not install tiles over concrete substrates until the substrates have cured and are sufficiently dry to bond with adhesive as determined by the "Moisture Bond Test".

## 1.9 MAINTENANCE

- A. Extra Materials:
  - 1. Furnish not less than 100 lineal feet of each type of base installed.

## 2 PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS - BASE MATERIALS

- A. Armstrong World Industries, (714) 680-7200.
- B. Azrock Industries, Inc., (714) 522-0221.
- C. Burke Flooring Products, (213) 724-0330.
- D. Johnson Rubber Co., (818) 957-4885.
- E. R.C. Musson Rubber Co., Inc., (216) 773-7651.
- F. Substitutions: Under provisions of Section 01300.

### 2.2 BASE MATERIALS

- A. Base: FS SS-W-40, Type I rubber; 4-inch high, 1/8-inch thick; top set coved; pre-molded external corners.
- B. Base Accessories: Pre-molded end stops and external corners, of same material, size, and color as base.
- C. Colors: Colors to be selected from manufactures full line of colors. A minimum of two separate colors required. One to match the existing color and one a new color selection.
- D. Resilient base and accessories shall have a minimum Radiant Flux of 0.45 Watts/Sq. Centimeter.

### 2.5 ACCESSORIES

- A. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft, and are ready to receive work.
- B. Beginning of installation means installer accepts condition of existing substrate and site conditions.

### 3.2 PREPARATION

- A. Vacuum clean substrate.

### 3.3 INSTALLATION - BASE MATERIAL

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

- B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends use pre-molded units.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

#### 3.4 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.

#### 3.5 CLEANING

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

END OF SECTION

SECTION 09652  
VINYL SHEET FLOORING

PART 1 GENERAL

1.01 THIS SECTION INCLUDES

- A. Flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.

1.02 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work of this section.

1.03 RELATED SECTIONS

- A. Other Division 9 sections for floor finishes related to this section but not the work of this section.
- B. Division 6 Wood and Plastics; not the work of this section.
- C. Division 7 Thermal and Moisture Protection; not the work of this section.

1.04 QUALITY ASSURANCE AND REGULATORY REQUIREMENTS

- A. Select an installer who is competent in the installation of Armstrong resilient sheet flooring using heat-welded seams.
- B. If required, provide types of flooring and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.
- C. If required, provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:
  - a. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
  - b. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

1.05 SUBMITTALS

- A. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation and maintenance instructions (latest edition of "Armstrong Guaranteed Installation System," F-5061.) for flooring and accessories.
- B. Submit the manufacturer's standard samples showing the required colors for flooring, welding rods, and applicable accessories.
- C. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and

complies with the required fire tests.

#### 1.06 ENVIRONMENTAL CONDITIONS

- A. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.
- B. Store materials in a clean, dry, enclosed space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.
- C. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65°F (18°C) and a maximum temperature of 100°F (38°C) [85°F (29°C)] for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55°F (13°C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.
- D. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.

#### PART 2 PRODUCTS

##### 2.01 RESILIENT SHEET FLOORING MATERIALS

- A. Provide MEDINTONE™ Homogeneous Vinyl Sheet Flooring, non-layered and non-backed, manufactured by Armstrong World Industries, Inc., in Refresh Green Light, 72 in. (1.83 m) wide, having a nominal total thickness of 0.080 in. (2.0 mm). The polyurethane-coated wear surface shall be composed of polyvinyl chloride resin, plasticizers, stabilizers, fillers, and pigments comprising a through-grain vinyl chip visual with pattern and color uniformly dispersed throughout the entire thickness. The design shall merge soft, tonal, low-contrast chips providing a monolithic appearance. Vinyl sheet flooring shall meet ASTM F 1913, "Standard Specification for Vinyl Sheet Floor Covering Without Backing."
- B. Provide solid color vinyl weld rod as produced by Armstrong World Industries, Inc., and intended for heat welding of seams. Color shall be compatible with field color of flooring or as selected by Architect to contrast with field color of flooring. Color selected from the range currently available from Armstrong World Industries, Inc.]

## 2.02 WALL BASE MATERIALS

- A. Integral flash cove base: Provide integral flash cove wall base by extending sheet flooring minimum of 6 in. (15.24 cm) up the wall using adhesive, welding rod, and accessories recommended and approved by the flooring manufacturer.

## 2.03 ADHESIVES

- A. Provide Armstrong S-543 Premium Plus Commercial Sheet Flooring Adhesive for field areas and Armstrong S-580 Flash Cove Adhesive at flash coving as recommended by the flooring manufacturer.
- B. For High-Moisture Installation Warranty, Full Spread: Provide Armstrong S-543 Premium Plus Commercial Sheet Flooring Adhesive for field areas and Armstrong S-580 Flash Cove Adhesive at flash coving as recommended by the flooring manufacturer.

## 2.04 ACCESSORIES

- A. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong S-183 Fast-Setting Cement-Based Underlayment or S-184 Fast-Setting Cement-Based Patch and Skim Coat. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.
- B. Provide top edge trim caps of anodized aluminum for integral flash cove as approved by the Architect.]
- C. Provide a fillet support strip for integral cove base with a minimum radius of 1 in. (2.54 cm) of wood or plastic.]
- D. Provide transition/reducing strips tapered to meet abutting materials.
- E. Provide threshold of thickness and width as shown on the drawings.
- F. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.
- G. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
- B. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- C. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- D. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

### 3.02 PREPARATION

- A. Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with Armstrong [S-183 Fast-Setting Cement-Based Underlayment][S-184 Fast-Setting Cement-Based Patch and Skim Coat][S-194 Fast-Setting Cement-Based Patch and Underlayment] as recommended by the flooring manufacturer.
- B. Remove paint, varnish, oils, release agents, sealers, and waxes. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.
- C. Perform subfloor moisture testing in accordance with [ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes"] [ASTM F 1869, "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"] and Bond Tests as described in publication F-5061, "Armstrong Guaranteed Installation System," to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. [Relative humidity shall not exceed 80%.][MVER shall not exceed 5 lbs./1000 sq. ft./24 hrs.] On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with

the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

- D. For High-Moisture Installation Warranty, perform subfloor moisture testing in accordance with ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes" and Bond Tests as described in publication F-5061, "Armstrong Guaranteed Installation System," to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Relative humidity of the slab shall not exceed 90%. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.
- E. Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.
- F. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.

### 3.03 INSTALLATION OF SHEET FLOORING

- A. Install flooring in strict accordance with the latest edition of "Armstrong Guaranteed Installation System", F-5061.
- B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
- C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
- D. Scribe, cut, and fit or flash cove to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
- E. Adhere flooring to the subfloor without cracks, voids, raising and puckering at the seams. Roll with a 100-pound (45.36 kilogram) roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer.
- F. Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for color shading and pattern at the seams in compliance with the manufacturer's recommendations.
- G. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written

instructions. Observe the recommended adhesive trowel notching, open times, and working times.

Prepare heat-welded seams with special routing tool supplied for this purpose and heat weld with vinyl welding rod in seams. Use methods and sequence of work in conformance with written instructions of the flooring manufacturer. Finish all seams flush and free from voids, recesses, and raised areas..

- H. Provide integral flash cove wall base where shown on the drawings, including cove fillet support strip and top edge cap trim. Construct flash cove base in accordance with the flooring manufacturer's instructions. Heat-weld seams as specified for those on the floor.]

### 3.04 INSTALLATION OF ACCESSORIES

- A. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- B. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
- C. Apply butt-type metal edge strips where shown on the drawings, before flooring installation. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

### 3.05 CLEANING AND PROTECTION

- A. Perform initial maintenance according to the latest edition of "Armstrong Guaranteed Installation System," F-5061.
- B. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. (See Finishing The Job in "Armstrong Guaranteed Installation System," F-5061.)

### 3.06 MAINTENANCE TRAINING

- A. Contractor shall provide a maintenance training to the custodial staff at the school site, which shall include demonstrating the proper equipment to be used and methods required to clean and protect the flooring system.

END OF SECTION



## SECTION 09689

### CARPETING

#### 1.0 GENERAL

All technical and non-technical specifications, general and supplementary conditions and requirements apply to the work specified in this section.

#### 2.0 SCOPE OF WORK

Furnish all materials, labor, tools, equipment, services and other incidentals required to perform work as listed.

Remove existing carpet and base in all areas defined on attached drawings, and replace with new carpet and base as specified.

Prepare the sub floor surface to receive the carpeting. Remove all excess glue. Remove any existing ridges and bumps. Fill low spots, cracks, joints, holes and other defects with a sub-floor filler material compatible with the manufactures adhesive products.

#### 3.0 PERFORMANCE REQUIREMENTS

- 1) No edge ravel wet or dry - Seam sealer not required to guarantee no edge raveling at seams under normal use during **Lifetime Warranty** period
- 2) Secondary Backing Adhesion - guaranteed not to delaminate for a **Lifetime Warranty** period.
- 3) Wear Guarantee - no more than 10% face yarn loss for **Lifetime Warranty** period.
- 4) Guaranteed to maintain a 20lb average tuft bind wet or dry during the **Lifetime Warranty** period.
- 5) Carpet glued direct to floor requires use of no chair pads.
- 6) Carpet impervious to water damage.
- 7) The stain resistant properties must be permanent and cannot be removed by commercial cleanings or abrasive wear. Test data as follows:  
  
Red Dye 40 must be released by water only, after exposure to 150,000+ cycles in a tetrapod walker and after sample is allowed to soak in 10:1 solution of water and ammonia.
- 8) Topical stain resistant treatments will not be acceptable. Stain resistant properties must be inherent.

#### 4.0 PROTECTION

It will be the Flooring Contractor's responsibility to protect all furniture, walls, doors, etc. from damages during installation of the new carpeting and base, and removing existing carpet and base. Any items moved shall be placed in original position at the end of work period. Flooring Contractor will be responsible for all damages.

#### 5.0 BIDDER'S RESPONSIBILITY

All prospective bidders are required to visit the job site to familiarize themselves with the work on hand, in preparation of their bid.

#### 6.0 JOB CONDITIONS

Substrate: Flooring Contractor must examine the substrate, and the conditions under which the carpeting is to be installed, and notify the contractor, in writing, of the conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Flooring Contractor.

#### 7.0 TEST REQUIREMENTS

- 1) Flame / Smoke Resistant Standards  
Provide carpet complying with ratings as indicated for the following:
  - A. Flooring Radiant Panel Test - ASTM E-648-78 and/or NFPA 253  
Carpeting shall have a minimum critical radiant flux of forty-five-hundredths (0.45) watts per square centimeter (cm<sup>2</sup>).
  - B. Methenamine Tablet Test - DOC-FF-1-70 and/or ASTM D 2859-76.  
Carpet shall meet the "Standards for the Surface Flammability of Carpets"
  - C. Smoke Density Test - NFPA 258 and/or ASTM E 662-83  
Carpet shall have a specific optical density (DM) of four hundred fifty (450) or less (flaming).
- 2) Fade Resistance:  
Lightfastness - AATC 16E-1982 Dark Color; Gray scale rating of four or better after 180 standard fading hours as compared to AATC Gray Scale for evaluation change in color.  
Ozone and Gas - AATCC 129-1298 - Rating 3 or better per color AATCC transference scale.
- 3) Static Resistance:  
Provide carpet construction to provide a minimum of 3.0 KV resistance for 20% R. H. at 70 degrees, AATCC 134.
- 4) Carpet and installation procedures shall meet or exceed requirements as set forth by the provisions of the American Disability Act.

- 5) Stain Resistance:  
Provide carpeting with permanent stain resistant properties, which cannot be removed by wear or commercial cleanings. Must also pass Acid Red 40 spot test AATCC 175-1991 after removal of any topical treatments.
- 6) Carpet must meet or exceed qualifications for environmental standards of the Carpet and Rug Institute's Green Label Program.

## 8.0 CARPET SPECIFICATION

A. The following specifications are based on specific performance requirements for quality, durability and design to match the Lees Commercial Carpets, Work Force Series 12' Broadloom product grouping.

- 1) Face Pile - DuPont Antron Legacy Type 6.6 Continuous Filament Nylon with DuraTech.
- 2) Construction- Tufted
- 3) Yarn Count - 4 ply
- 4) Dye Method - Yarn Dyed 4 ply in a combination of Short Space Dyed, and KDK solid ends with Duracolor Permanent Stain and Fade Resistant Technology.
- 5) Style - Performance Level Loop Integrated tufted pattern - no overprints acceptable
- 6) Pile Height - .187" avg (4.7 mm)
- 7) Stitch Count - 8.4 per inch
- 8) Gauge - 5/64" inch
- 9) Pile Face Weight - 22 oz. per square yard
- 10) Backing System - Unibond (see performance specifications)
  - Primary Backing Synthetic Woven Polypropylene
  - Secondary Backing Synthetic Woven Polypropylene applied with hot melt thermoplastic to **assure Lifetime Warranty** of no delamination, no edge raveling, and average 20 lb. tuft bind of face of yarns.

**NOTE: LATEX UNITARY OR DOUBLE LOCK WITH LATEX BACKING SYSTEMS ARE NOT ACCEPTABLE**

- 11) Size- 12' width
- 12) Total Weight 71.2 oz. per square yard

13) Color to be selected by architect - must be acceptable so as to meet established design requirements

14) **All carpets meeting or exceeding the specifications must be submitted to the architect with detailed specifications and specific warranties from the manufacturer 14 days prior to bid date. Consideration will not be given to any substitutes that are not approved in writing prior to bid. Any bid with carpet not approved by the architect 10 days prior to bid time will be disqualified.**

A) Request for substitutions must be submitted to the architect in writing. Approval or denial will be at the architect's discretion as to equality of the product and ability to meet color requirements.

B. The following specifications are based on specific performance requirements for quality, durability and design to match the Lees Commercial Carpets, Stepup II Modular product grouping.

- 1) Construction- Face pile
- 2) Surface Textured Performance Tip Repair
- 3) Dye Method - yarn dyed
- 4) Stitch Count - 8.5 per inch
- 5) Finished Pile .144" average thickness
- 6) Gauge - 5/32 inch
- 7) Pile Face Weight - 38 oz. per square yard
- 8) Backing System - Ecoflex ICT

**NOTE: LATEX UNITARY OR DOUBLE LOCK WITH LATEX BACKING SYSTEMS ARE NOT ACCEPTABLE**

9) Size- 24" x 24"

10) Color to be selected by architect - must be acceptable so as to meet established design requirements

11) **All carpets meeting or exceeding the specifications must be submitted to the architect with detailed specifications and specific warranties from the manufacturer 14 days prior to bid date. Consideration will not be given to any substitutes that are not approved in writing prior to bid. Any bid with carpet not approved by the architect 10 days prior to bid time will be disqualified.**

- B) Request for substitutions must be submitted to the architect in writing. Approval or denial will be at the architect's discretion as to equality of the product and ability to meet color requirements.

## 9.0 GUARANTEES AND WARRANTY

Flooring Contractor must guarantee installation workmanship for a minimum of 2 years and supply carpeting warranted by the manufacturer for the following:

- 1) **Wear:** Warrant that the carpet will lose no more than 10% by weight of pile face fiber during the **Life of the Carpet** when installed and maintained in accordance with manufacturer's procedures.
- 2) **Static Protection:** Warrant that the carpet will give protection from static discharges in excess of 3.0 KV when tested under Standard Shuffle test method ( at 70 degrees Fahrenheit and 20 degrees RH) during the **Life of the Carpet**.
- 3) **Backing Delamination:** Warrant that the secondary backing of the carpet will not delaminate during the **Life of the Carpet**. Chair pads are not required whether the carpet is installed direct to the floor or by conventional tackless method.
- 4) **Edge Ravel:** Warrant that under normal use the carpet will not edge ravel at the seams either wet or dry for the **Life of the Carpet**. No Seam Sealer will be required.
- 5) **Tuft Bind** A 20lb. average Tuft Bind must be maintained wet or dry during the **Life of the Carpet** when tested using ASTM D - 1335-67.

## 10.0 QUALITY ASSURANCE

- 1) The school district will approve Flooring Contractor. Experience of the Flooring Contractor shall be at least five years in the supervision of carpet installation and five years in the installation of carpet similar to type specified herein.
- 2) Carpet manufacturer shall have at least five years production experience with the carpet type specified herein. Carpet manufacturer shall be required to provide a minimum of 10 school districts and contacts utilizing carpet with the same performance features specified herein with a wear period of at least 4 years.

## 11.0 SUBMITTALS

- 1) Carpet manufacturer's written guarantees: Submit as described in part 8.0 - Guarantees and Warranties.
- 2) Samples: Submit a 12 x 18-inch sample of the carpet to be bid in a sealed, separate envelope. The name of the manufacturer and the specifications for the product shall be included in the bid.

- 3) Shop drawings: submit a drawing showing the layout of each area to be carpeted and the location of seams, molding and edge strips. Cross Seams should be minimized and are subject to the approval of the school district.
- 1) Maintenance manual: submit manual of carpet manufacturer's recommendations for the care, cleaning, and maintenance of carpeting.
- 2) Certificates of compliance: submit certified test reports that carpet meets the tuft bind, static control, edge ravel, secondary backing delamination, stain resistance, CRI Green Label Certification and flammability properties.

#### 12.0 DELIVERY AND STORAGE

Deliver carpet to the site in original protective wrapping with registration numbers and tags attached. Store in a safe, clean, dry and well ventilated area. Store rolls flat and do not stack anything on top of rolls. In cool weather deliver carpet to the jobsite minimum 24 to 48 hours before installation to allow carpet to adjust to room conditions.

#### 13.0 CARPET ACCESSORY MATERIALS

- 1) Carpet Edge Guard: Manufacturer's standard type of heavy commercial molded vinyl or metal edge guard stripping.
- 2) Adhesive for carpet: Provide a hot melt adhesive as recommended by the carpet manufacturer. Provide an adhesive, which contains no solvents to minimize odors, and that which complies with flame spread rating required for the carpet installation.
- 3) Miscellaneous Materials: Provide the types of accessory items as recommended by the carpet manufacturer and installer for the conditions of installation and use.

#### 14.0 EXTRA OR SURPLUS MATERIALS

Carpet overrun: Limit production overrun on each carpet to amount necessary to ensure complete installation and a minimum quantity of 3% for owner's attic stock. Deliver all unused carpet and large scraps to the school district.

#### 15.0 PREPARATION

Measure each space to receive carpeting, as a basis of supplying, cutting and seaming the carpet. Do not scale the Architect's drawings or calculate sizes from dimensions shown. Vacuum substrate immediately prior to carpet installation and remove all deleterious substances, which would interfere with the installation or be harmful to the work.

#### 16.0 BEFORE INSTALLATION

Meet with the contractor several days before installation. Discuss with him the various areas of responsibility and scheduling to assure a smooth transition of work.

## 17.0 EXAMINATION

1. Verify that surfaces are smooth and flat and are ready to receive work.
2. Verify concrete floors are dry to a maximum moisture content of 7 percent; and exhibit negative alkalinity, carbonization, or dusting.
3. Beginning of installation means acceptance of existing substrate and site conditions.

## 18.0 PREPARATION

1. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.
2. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
3. Fill voids and unevenness between new and existing concrete flatwork.
4. Prohibit traffic from area until filler is cured.
5. Vacuum clean substrate.

## 19.0 INSTALLATION

1. Apply carpet and adhesive in accordance with manufacturer's instructions.
2. Lay out rolls of carpet.
3. Verify carpet match before cutting to ensure minimal variation between dye lots.
4. Double cut carpet, to allow intended seam and pattern match. Make cut straight, true, and unfrayed.
5. Locate seams in areas of least traffic.
6. Let seams straight, not crowded or peaked, free of gaps.
7. Lay carpet on floors with run of pile in same direction as anticipated traffic.
8. No butt joints allowed unless approved by the Architect.
9. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
10. Cut and fit carpet around interruptions.
11. Fit carpet tight to intersection with vertical surfaces without gaps.

12. Cross seams shall be held to an absolute minimum.

## 20.0 CLEANING

Remove excess adhesive from floor, base and wall surfaces without damage to the surfaces. Clean the floor and base materials in accordance with the manufacturers instructions. Prohibit traffic on floor finish for 24 hours after installation. Vacuum carpet clean.

## 21.0 WARRANTY

1 Provide manufacturer's warranty for the broadloom carpet.

2. Provide manufacturer's warranty for the walk off carpet

## 22. GUARANTEE

1. Provide contractors one-year guarantee.



SECTION 09826  
FIBERGLASS WALLBOARD

1 PART 1 GENERAL

1.1 WORK INCLUDED

- A. Fiberglass reinforced polyester panels.
- B. Fiberglass panel accessories.
- C. Adhesive accessories.

1.2 REFERENCES

- A. ASTM Test 0543.72.
- B. ASTM E84

2 PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fiberglass reinforced polyester panels shall be as manufactured by Marlite, a division of Masonite Corporation.
- B. Fiberglass panel accessories: As manufactured by Marlite.
- C. Adhesive: Construction adhesive Type F solvent as manufactured by Miracle Adhesives Corporation or approved equal.
- D. Substitutions: Under provisions of Section 01300.

2.2 MATERIALS

- A. Fiberglass reinforced polyester panels 3/32" thick in 4'x 10' sheets, color to match existing within each room.
- B. Fiberglass panel accessories in 10' lengths, color as selected by Architect.
  - 1. #350 inside corner.
  - 2. #365 division molding.
  - 3. #370 Edge molding.
  - 4. #360 Outside corner.
  - 5. Stainless Steel "J" molding adjacent to epoxy base.
- C. The flame spread rating shall be 0-25. The smoke density shall be no greater than 450.
- D. Adhesive: Standard panel or construction adhesive.

3 PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate work with other trades to prevent undue delay in job progress.
- B. Inspect both existing and new substrate prior to commencing work. Report to Architect in writing any condition that may affect proper application.
- C. Commencing work constitutes acceptance of substrate.

- D. Remove existing panels back to existing joint lines around areas of new work.
- E. Clean substrate and panel surfaces of contaminants detrimental to adhesive and panel performance.
- F. Remove existing mastic, trim edges, screws and caps to allow for the new work to occur.
- G. Verify the color and texture of the new panels match the existing FRP panels on the ceiling.

### 3.2 INSTALLATION

- A. Install fiberglass panels and all required accessories over backing wallboard as described in Section 09260, in strict accordance with manufacturer's recommendations or over the existing backing board.
- B. Prepare existing surfaces to receive the new finish as required.
- C. Panel adhesive shall be applied at 6" o.c. maximum over entire field of panels.
- D. Finished panels shall lay flush with the substrate, without air pockets or warpage.
- E. Remove and replace panels not conforming to manufacturer's installation guidelines.

### 3.3 CLEANING

- A. Immediately remove any adhesive from face of panels using a solvent recommended by the adhesive manufacturer.
- B. Keep faces and trim pieces clean during application.

### 3.4 CLOSEOUT

- A. Upon completion of work of this Section, Subcontractor shall remove all equipment, excess materials, and waste products from the site.
- B. Provide one (1) year warranty in accordance with Section 01700.
- C. Provide two (2) 4'x 8' sheets extra to maintenance and operations for future use or replacement purposes.

END OF SECTION

SECTION 09900

**PAINTING**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide all material, labor, equipment, and services necessary to furnish and install Painting, accessories, and other related items necessary to complete the Project. Buildings and Site improvements as indicated by the Contract Documents unless specifically excluded.
  - 1. Materials and Equipment to be Painted: Paint all piping, unwrapped and exposed ductwork, electric conduits where exposed to view. Paint all exposed structural steel framing and decking exposed to view from the exterior or interior of the building. Prime and paint all exposed factory finished mechanical and electrical equipment and accessories which are exposed to view on the exterior including roof mounted equipment and/or in the interior of buildings except as specifically excluded.
  - 2. Material and Equipment not to be Painted: Do not paint piping, ductwork, equipment, and machinery located in attic spaces, above furred or suspended ceilings, in furred pipe or duct spaces. Do not paint factory finished equipment or machinery located in mechanical room or mechanical buildings, (unless specifically specified in the plumbing, mechanical and electrical sections or on the drawings), furred or above suspended ceilings.
  - 3. All other finish surfaces calling for Paint shall be painted to complete the Project as indicated by the Contract Documents.
  - 4. All site amenities requiring paint as indicated by the Contract Documents.

1.2 REFERENCES

- A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
- B. ASTM D2016 - Test Method for Moisture Content of Wood.
- C. SSPS (Steel Structures Painting Council) - Steel Structures Painting Manual.
- D. PDCA - Painting and Decorating Contractors of America, latest edition of the Architectural Specification Manual, as prepared by Specification Services, Inc. Washington State Council of the PDCA - (206) 343-7774.

1.3 DEFINITIONS

- A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

#### 1.4 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three-years experience.
- B. Applicator: Company specializing in commercial painting and finishing with three years documented experience.
- C. Regulatory Requirements: Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specifications, comply with the more stringent provisions.

Regulatory changes may affect the formulation, availability, or use of specified coatings. Confirm availability of coatings to be used prior to job going out to bid and before start of painting project.

- 1. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).
- D. Field Sample: When and as directed by the Architect, apply one complete coating system for each color, gloss and texture required. When approved, the sample panel areas will be deemed incorporated into the work and will serve as the standards by which the subsequent work of this Section will be judged.

#### 1.5 SUBMITTALS

- A. Submit samples under provisions of Section 01300.
- B. Submit two samples 8 x 10 inch in size of each paint color and texture applied to cardboard. Resubmit samples until acceptable color, sheen and texture is obtained.
- C. On actual wood surfaces, submit two 4 x 8 inch samples of natural wood.
- D. Submit M.S.D.S. sheets on each type of paint and finish product to be used on this project.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site and store and protect under provisions of Section 01500.
- B. Deliver products to site in new, original, sealed and labeled containers; inspect to verify acceptance.
- C. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
- D. Store paint materials at minimum ambient temperature of 45

degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.

- E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

#### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of interior finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply exterior coatings during fog, rain, mist or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and Urethane Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
- F. Avoid painting surfaces when exposed to direct sunlight.
- G. No exterior or interior painting shall be done until the surfaces are thoroughly dry and cured.

#### 1.8 EXTRA STOCK

- A. Provide a one-gallon container of each color and surface texture to Owner.
- B. Label each container with color, texture, and room locations, and in addition to the manufacturer's label.

### 2 PART 2 PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS - PAINT

- A. Sherwin Williams Paint, Local (916)267-3232
- B. Kelly-Moore Paints, (800) 874-4436.
- C. Benjamin Moore Paints, (408) 727-3565.
- D. Substitutions: Under provisions of Section 01300.

## 2.2 MATERIALS

- A. Coatings: Ready mixed, except field-catalyzed coatings. Pigments shall be fully ground maintaining a soft paste consistency, capable of being readily and uniformly dispersed to complete a homogeneous coating.
- B. Coatings: Good flow and brush properties; capable of drying or curing free of streaks or sags.
- C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated, but required to achieve the finishes specified, of commercial quality and approved by manufacturer.

## 2.3 FINISHES

- A. Refer to schedule at end of Section for surface finish schedule.

## 3 PART 3 EXECUTION

### 3.1 INSPECTION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Beware of a condition known as "critical lighting." This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but "does not" equalize smoothness or surface texture. Any corrective action of the drywall must be done by the drywall contractor prior to decorating.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Plaster and Gypsum  
Wallboard : 12 percent
  - 2. Masonry, Concrete and  
Concrete Unit Masonry : 12 percent
  - 3. Interior Located Wood : 15 percent, measured in  
accordance with ASTM D2016
  - 4. Exterior Located Wood : 15 percent, measured in  
accordance with ASTM D2016
- E. Beginning of installation means acceptance of existing surfaces.

### 3.2 PREPARATION

- A. Perform preparation and cleaning procedures in strict accordance with manufacturer's instructions for each substrate condition.

- B. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
- C. Correct minor defects and clean surfaces which affect work of this Section.
- D. Shellac and seal marks, which may bleed through, surface finishes.
- E. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and mildewcide to remove spores. Rinse with clean water and allow surface to dry.
- F. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Gypsum Board Surfaces: In accordance with PDCA Chapter 3 or Chapter 3R. Clean surfaces of dirt, laitance, excess mortar and foreign matter. Primer-seal coat: Coordinate with Specification Section Gypsum Board Systems. Apply primer-sealer coat for drywall finishes from this specification section prior to application of Specification Section Gypsum Board Systems textured finish coats. Latex fill minor defects, holes, pits, and screw heads. Spot prime defects after repair. Perform all necessary minor sanding.
- J. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: In accordance with PDCA Chapter 3 or Chapter 3R. Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Test block for moisture content. Do not coat if moisture is present. Concrete Blocks are to be thoroughly dry and cured prior to coating. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- K. Cementous Wall and Soffit Surfaces: In accordance with PDCA Chapter 3 or Chapter 3R. Fill hairline cracks, small holes and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces. Perform all necessary minor sanding.
- L. Metal Substrates: In accordance with PDCA Chapter 3 or 3R
  - 1. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a

treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Touch up imperfections, scratches, surface damage, etc., with the appropriate primer. Spot prime paint after repairs.

2. Shop Primed Steel Surfaces: Shop Primed or Factory Primed Surfaces are considered "un-primed" due to their mil thicknesses provided, and the common compatibility issues involved with what is usually specified for "Finish Coats", and are suitable only for protection during shipment and storage until incorporated into the Project. Sand thoroughly and scrape to remove films, loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
  3. Coil-Coated Product Surfaces: Coil-Coated Surfaces are considered "un-primed" due to their mil thicknesses provided, and the common compatibility issues involved with what is usually specified for "Finish Coats", and are suitable only for protection during shipment and storage until incorporated into the Project. Sand thoroughly and scrape to remove films, loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
  4. Un-Primed Surfaces: Remove dust, rust, mill scale, grease and foreign matter by sand blasting or wire brushing. Surfaces to be smooth and ready to receive coatings.
  5. Galvanized Surfaces: In accordance with PDCA Chapter 3 or Chapter 3R. Remove surface contamination and oils and wash with solvent. Apply coat of etching primer. The same day that cleaning has been performed. Prime at exterior installations with the appropriate primer.
- M. Interior Wood Items Scheduled to Receive Finish: In accordance with PDCA Chapter 3 or Chapter 3R. Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes, spot prime, cracks and other defects repairs when fully cured after primer has dried; sand between coats.
- N. Thoroughly back-paint all surfaces of exterior and interior finish lumber and millwork, including doors and window frames, trim, cabinet work, etc., that will be concealed after installation. Back-paint items to be painted or enameled with the priming coat. Use a clear sealer for back-priming where transparent finish is required.
- O. All drywall surfaces must be completely dry and dust free from decorating. Skim coated drywall must be sealed with an alkyd based sealer. Textured and non-textured drywall surfaces can be sealed with a waterborne sealer provided they are completely dry and dust free. Otherwise an alkyd-based sealer should be used.
- P. Wood Doors Scheduled for Painting: Seal top and bottom edges with primer.



- Q. Metal door and window frames and metal doors shall be re-primed with a rust inhibitive primer compatible with the shop primer and subsequent coats specified.

### 3.3 PROTECTION

- A. Protect pre-finished surfaces, lawns, shrubbery and adjacent surfaces surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish sufficient drop cloths, shields, protective methods and equipment to prevent spray, splatter or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.
- E. Protect surfaces, equipment, and fixtures from damage resulting from use of fixed, movable and hanging scaffolding, planking, and staging.
- F. Provide WET PAINT signs, barricades, and other devices required to protect newly finished surfaces. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.
- G. Mask off areas where necessary.
- H. Cover fixtures and remove hardware not to be painted.
- I. Replace hardware only when paint finishes are thoroughly dry.

### 3.4 APPLICATION

- A. Apply products in accordance with manufacturer's instructions. Do not apply coatings to surfaces that are not dry.
- B. Brush applications:
  - 1. Brush out and work the brush coats onto the surface in an even film.
  - 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sabs, ropiness and other surface imperfections will not be acceptable.
- C. Spray applications:
  - 1. Except as specifically otherwise approved by the Architect, confine spray application to metal framework and similar surfaces where hand brushwork would be inferior.
  - 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats. Back roll all sprayed applications with roller 90° to direction paint was applied.

3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
- D. Use applicators and techniques best suited for the material and surfaces to which applied.
- E. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.
- F. All undercoats shall be tinted slightly to approximate the color of the finish coat.
- G. Apply each material at not less than the manufacturer's recommended spreading rate:
  1. Provide a total dry film thickness of not less than 1.2 mils for each required coat.
- H. Apply prime coat to material, which is required to be painted or finished.
- I. Finish exterior doors on tops, bottoms, and edges same as exterior faces, after fitting. Where opening into rooms having different finishes, finish door edges as directed.
- J. Do not apply finishes to surfaces that are not dry.
- K. Apply each coat to uniform finish.
- L. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- M. Sand lightly between coats to achieve required finish.
- N. Allow applied coat to dry before next coat is applied.
- O. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- P. Prime back surfaces of interior and exterior woodwork with primer paint.
- Q. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

### 3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to Sections 22000, 23000, and Division 26 for schedule of color-coding and identification banding of equipment, ductwork, piping and conduit.
- B. Paint shop primed equipment. Do not paint shop pre-finished items.

- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are pre-finished.
- E. Replace identification markings on mechanical or electrical equipment when painted accidentally.
- F. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit of sight line. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- G. Paint exposed conduit and electrical equipment occurring in finished areas.
- H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- I. Color code equipment, piping, conduit, and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows, names and numbering.
- J. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

### 3.6 CLEANING

- A. As work proceeds, promptly and carefully remove paint where spills, splashes, spattering's, spots and blemishes have occurred surfaces throughout the project.
- B. During progress of work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material, which may constitute a fire hazard, place in closed metal containers and remove daily from site.
- D. Upon completion of painting work remove all rubbish, paint cans, and accumulated materials resulting from work in each space or room. All areas shall be left in a clean, orderly condition.
- E. Runs, sags, misses, holidays, stains and other defects in the painted surfaces, including inadequate coverage and mil thickness shall be satisfactorily touched up, or refinished, or repainted as necessary.

### 3.7 SCHEDULES -

- A. Refer to Exterior and Interior Finish Schedules on Drawings for applicable finishes used. This is a guide only and paint sub-contractor is responsible to check all drawings and be responsible for all paint work required to cover the complete

painting and finishing of the interior and exterior of each building and site items including specialty items.

- B. It is the intent of the specifications and drawings to cover the complete painting and finishing of the interior and exterior of all the buildings whether or not it is specifically called for in the Specifications, Schedules of Paint Finishes, or indicated on the Drawings. Paint reference numbers indicated in the following Paint Finishes Schedule refer generally to "Sherwin Williams" Paint reference numbers or (other companies listed are identified herein). Surfaces not specified in the Paint Finishes Schedule shall be in accordance with the manufacturer's recommendations.
1. The following schedule was prepared in December 2002, and was compliant with CARB Air Quality Standards at that time. Installer will provide products compliant with CARB Air Quality Standards at the time of installation, and will inform the Architect of any changes caused by stricter Air Quality Standards as part of his submittal process.
  2. Minimum overall Dry Film Thickness (ODFT) for each system is listed along with the paint reference number. Each coat shall be made up of equal increments to total the Overall Dry Film Thickness of the system being applied.

C. EXTERIOR SURFACES

1. Concrete - Minimum ODFT 3.2 MILS
  - (1) one coat: Sherwin Williams Loxon Masonry Primer A24 Primer-Sealer.
  - (2) two coats: Sherwin Williams A-100 A6 Exterior 100% Acrylic Flat Finish.
3. Concrete Masonry Units - Minimum ODFT 3.2 MILS
  - (1) one coat: Sherwin Williams PrepRite B25W25Vinyl Acrylic Block Filler.
  - (2) two coats: Sherwin Williams A-100 A6 Exterior 100% Acrylic Flat Finish.
4. Cement Plaster - Minimum ODFT 4.0 MILS
  - (1) one coat: Sherwin Williams Loxon Masonry Primer A24
  - (2) two coats: Sherwin Williams A-100 A6 Exterior 100% Acrylic Flat Finish.
5. Steel - Primed or Unprimed - Minimum ODFT 4.2 MILS
  - (1) one coat: Sherwin Williams ProCryl Metal Primer B66-310
  - (2) two coats: Sherwin Williams Pro Industrial Acrylic B66 100% Acrylic Semi-gloss Finish.
6. Steel - Galvanized - Minimum ODFT 4.2 MILS
  - (1) one coat: Sherwin Williams ProCryl Primer B66-310 Finish Int/Ext. Waterborne Primer and Finish.
  - (2) two coats: Sherwin Williams Pro Industrial Acrylic B66 100% Acrylic Semi-gloss finish.
7. Wood - Primed - Minimum ODFT MILS
  - (1) one coat: Sherwin Williams Primer
  - (2) two coats: Sherwin Williams A-100 A6 Exterior 100% Acrylic Flat Finish.

8. Cementitious Wall and Soffit Panels and Siding - Primed - Minimum ODFT 4.0 MILS
  - (1) one coat: Sherwin Williams Primer
  - (2) two coats: Sherwin Williams A-100 A6 Exterior 100% Acrylic Flat Finish.

D. INTERIOR PAINT SCHEDULE

1. Wood, Painted - Minimum ODFT 3.3 MILS
  - (1)one coat: Sherwin Williams Premium Wall & Wood Primer B28W08111 Primer
  - (2)two coats: Sherwin Williams Solo SG A76 Latex Semi-gloss Interior Wall and Trim Enamel.
2. Wood - Transparent, Varnish
  - (1)one coat: Sherwin Williams Minwax Interior Wood Finishing Stain.
  - (2)two coats: Sherwin Williams Minwax Interior Polyurethane Satin Varnish.
2. Wood - Transparent, Lacquer - Minimum ODFT 4.0 MILS
  - (1)one coat: Sherwin Williams Minwax Interior Wood Finish Lacquer Stains.
  - (2)one coat: Sherwin Williams Minwax Hi-Build Sanding Sealer.
  - (3)two coats: Sherwin Williams Minwax Hi-Build Clear Lacquer Gloss.
3. Steel - Primed or Unprimed - Minimum ODFT 4.2 MILS
  - (1)one coat: Sherwin Williams ProCryl Metal Primer B66-310 Finish Int/Ext Waterborne Primer and Finish.
  - (2)two coats: Sherwin Williams Pro Industrial Acrylic B66 Latex Semi-gloss Interior Wall and Trim Enamel.
5. Steel - Galvanized - Minimum ODFT 4.2 MILS
  - (1) one coat: Sherwin Williams ProCryl Metal Primer B66-310 Finish Int/Ext. Waterborne Primer and Finish.
  - (2)two coats: Sherwin Williams Pro Industrial Acrylic B66 Series Interior/Exterior Semi-gloss Enamel.
6. Gypsum Board - Minimum ODFT 4.5 MILS
  - (1)one coat: Sherwin Williams ProMar 200 Zero B28W2600 Int Primer Interior Primer- Sealer.
  - (2)two coats: Sherwin Williams Pro Industrial Acrylic B66 Interior/Exterior SG Enamel
7. Tectum Wall Panels - Minimum ODFT
  - (2) coats: Sherwin Williams Waterborne Acrylic Dry Fall (B42W1) MPI #118

E. SPECIALTY PAINT SYSTEMS

1. General Notes:  
A fourth and/or fifth coat may be required to achieve uniform chromatic hue selected without undercoat or substrate ghosting; especially on deep tone colors, or over dark primers. The Contractor shall consider all Metal Paint Finishes (exterior and interior) that is noted "Ultra-color" as requiring as many as five

- (5) total coats.
2. Space above Vents or Grilles - Minimum ODFT 1.5 MILS  
(1) one coat: Sherwin Williams Solo A76 100% Acrylic Flat Black Paint (1.5 mils)
  3. Piping Black Steel or Cast Iron - Minimum ODFT 4.0 MILS  
(1)one coat: Sherwin Williams ProCryl Metal Primer B66-310 Multi-purpose metal primer.  
(2)two coats: Sherwin Williams Solo SG B66 Acrylic Gloss Finish Gloss (2.0 mils)
  4. Piping - Galvanized Minimum ODFT 4.0 MILS  
(1)one coat: Sherwin Williams ProCryl Metal Primer B66-310 primer (2.0 mils)  
(2)two coats: Sherwin Williams Pro Industrial Acrylic B66 Gloss (2.0 mils)
  5. Machinery and Equipment (Coil Coated Products) Minimum ODFT 5.0 MILS  
(1)one coat: Sherwin Williams Interior Wood Finish Lacquer Stains.  
(2)one coat: Sherwin Williams Sanding Sealer.  
(3)two coats: Sherwin Williams Clear Lacquer Gloss.
  6. Sheet Metal Ducts - Minimum ODFT 4.0 MILS  
(1)one coat: Sherwin Williams ProCryl Metal Primer B66-310 Metal Primer (2.0 mils)  
(2)two coats: Sherwin Williams Pro Industrial Acrylic B66 Gloss Enamel Finish (1.5 mils)
  7. Fire Hydrants - Minimum ODFT 4.0 MILS  
(1) one coat: Sherwin Williams ProCryl B66-310 metal Primer (2.0 mils)  
(2)two coats: Sherwin Williams Pro Industrial Acrylic B66 Gloss Enamel Finish (1.5 mils)
  8. Louvers, Grilles, Access Panels - Minimum ODFT 4.0 MILS  
(1)one coat: Sherwin Williams ProCryl Metal Primer (2.0 mils)  
(2)two coat: Sherwin Williams Solo A74 100% Acrylic Flat Finish (1.5 mils).

END OF SECTION

SECTION 10100

**WHITEBOARDS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Markerboards.
- B. Marker rail and accessories.

1.2 REFERENCES

- A. ANSI A208.1 - Mat Formed Wood Particleboard.
- B. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- C. ASTM A424 - Steel Sheets for Porcelain Enameling.
- D. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- E. FS CCC-W-408 - Wall Covering, Vinyl-Coated.
- F. Porcelain Enamel Institute - Performance Specifications for Porcelain Enamel Chalkboards.

1.3 REGULATORY REQUIREMENTS

- A. Conform to 2016 CBC code for flame/fuel/smoke rating of 25/0/25 for vinyl fabric covered tackboards in accordance with ASTM E84.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate on shop drawings, wall elevations, dimensions, joint locations.
- C. Provide product data on markerboards, trim and accessories.
- D. Submit samples under provisions of Section 01300.
- E. Submit two samples 4 x 4 inch in size, illustrating materials and finish, color, texture of markerboard.

1.5 MAINTENANCE DATA

- A. Submit maintenance data under provisions of Section 01700.
- B. Include maintenance information on regular cleaning and stain removal.

1.6 WARRANTY

- A. Provide five year warranty under provisions of Section 01700.
- B. Warranty: Include coverage of markerboard surface from discoloration due to cleaning, crazing or cracking and staining.

## 2 PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Claridge Products and Equipment, Inc., (415) 351-8183.
- B. Greensteel, (415) 952-4600.
- C. Nelson-Adams Co., , (714) 598-2779.
- D. Substitutions: Under provisions of Section 01300.

### 2.2 MATERIALS

- A. Steel Sheet: ASTM A424, Type I, Commercial quality.
- B. Aluminum Extrusions: ANSI/ASTM B221, 6061 alloy temper.
- C. Cork: Fine grain natural cork, homogeneous composition.
- D. Particle Board: ANSI A208.1; wood shavings set with waterproof resin binder, sanded faces.
- E. Foil Backing: Aluminum foil sheet, 0.002 inch thick.
- F. Conform to FS CCC-W-408, Type II.
- G. Adhesives: Type recommended by manufacturer.

### 2.3 ACCESSORIES

- A. Map Supports: Formed aluminum hooks, sliding type to fit map rail, one for every three feet of map rail.
- B. Protective Cover: Sheet polyethylene, 8 mil thick.
- C. Map Rail: No. 74ES map rail ends. No. 76M metal display hooks (furnish one hook for each two feet of rail) No. 76FH flag holer (one per room).

### 2.4 FABRICATION - MARKER BOARDS

- A. Outer face sheet: Steel, 24 gage thick. equivalent to Claridge LCS24.
- B. Core: 3/8 inch thick.
- C. Back surface: Aluminum foil, 0.005 inch thick.

### 2.5 FRAME AND TRIM

- A. Frame: Extruded aluminum, equivalent to Claridge Series 1 profile; concealed fasteners; map rail with cork insert over chalkboard surfaces.
- B. Trough: Extruded aluminum, equivalent to Claridge 317A profile; one piece, full length of whiteboard; concealed fasteners.

### 2.6 FINISHES

- A. Porcelain Enamel: Glass fibered enamel, baked to vitreous surfaces; Porcelain Enamel Institute Type A; color as selected from manufacturer's standard range.
- B. Aluminum Frame and Accessories: Anodized to clear finish.



### 3 PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Verify that surfaces and internal wall blocking are ready to receive work, and opening dimensions are as indicated on shop drawings.
- B. Beginning of installation means acceptance of substrate construction.

#### 3.2 INSTALLATION

- A. Install markerboards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.
- C. Butt panels tight with concealed spline to hairline joint.
- D. Carefully cut holes for thermostats and other items.
- E. Upon completion of installation, all writing surfaces shall be well cleaned and approved before final acceptance.

#### 3.3 CLEANING

- A. Clean whiteboard surfaces in accordance with manufacturer's instructions.
- B. Cover whiteboard surfaces with protective cover, taped to frame.
- C. Remove protective cover at Date of Substantial Completion.

#### 3.4 SCHEDULE

- A. Style of Units
  - 1. Type A: Fixed panel, size as indicated on drawings.

END OF SECTION

SECTION 10155

**SOLID PLASTIC TOILET COMPARTMENTS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid plastic high density polyethylene polymer. Toilet compartments, floor-mounted, overhead braced.

1.2 REFERENCES

- A. ANSI A117.1 - Specifications for making buildings and facilities accessible to and usable by disabled people.
- B. CCR - California Code of Regulations, Title 24, Parts 2, 3 and 5.
- C. ANSI/ASTM B456 - Electrodeposited coatings of copper plus nickel plus chromium and nickel plus chromium.
- D. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, sheet and Strip.
- E. ASTM A269 - Seamless and welded austenitic stainless-steel tubing for general service.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 REGULATORY REQUIREMENTS

- A. Conform to California Code of Regulations for installing work in conformance with equipment for the disabled.
- B. Conform to the Americans with Disabilities Act.

1.4 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments. The Contractor shall take all field measurements necessary for fabrication at the job site and shall be responsible for their correctness.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate on shop drawings, partition plans and elevation views, dimensions, details of supports and door swings.
- C. Provide product data on panel construction, hardware and accessories.
- D. Submit samples under provisions of Section 01300.
- E. Submit two samples 4 x 4 inches in size, illustrating panel finish, color and sheen.
- F. Submit manufacturer's installation instructions under provisions of Section 01300.

1.6 WARRANTIES

- A. Provide manufacturer's 25 year warranty against breakage, corrosion, and delamination under normal conditions.

2 PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Scranton Products, Hiny Hiders
- B. Substitutions: Under provisions of Section 01300.

2.2 MATERIALS

- A. Partitions: Floor-mounted, over-head braced with non-corrosive panels.
- B. Attachment screws and bolts: Stainless steel; tamper proof type; full length continuous plastic wall brackets.

2.3 ACCESSORIES

- A. Attachments, screws and bolts: Stainless steel; tamper proof type; full length continuous plastic wall brackets.
- B. Pilaster Shoe: Stainless Steel shoe with one-way theft proof stainless steel sex bolts.
- C. Wall Brackets: Continuous Plastic brackets.
- D. Stirrup Brackets: Stainless Steel.
- C. Attachments, Screws, and Bolts: Stainless steel, theft proof type, heavy duty extruded aluminum brackets.
- D. Through Bolts and Nuts: Stainless steel with tamper-proof heads.
- E. Steel Plate Reinforcement: Carbon steel, prepared for fasteners, 1/8 inch thick.
- F. Aluminum Extrusions: ASTM B221, 6463-T5 alloy and temper.
- G. Stainless Steel: ASTM A167, Type 304.

2.4 HARDWARE

- A. Hardware: Chrome plated wire pulls at both sides of handicap accessible stall doors, and pull side on standard stall doors. handicap accessible stall doors shall be self-closing completely and standard doors shall have adjustable door close positioning; nylon bearings; slide bolt door latch; door strike and keeper with rubber bumper; cast alloy chrome plated coat hook and bumper. Door hardware to be mounted at 30" to 44" above finish floor.
- B. Hinges: Stainless steel type 304 continuous surface mounted institutional grade.
- C. Latch and Keeper: Slide bolt door latch, door strike and keeper with rubber bumper, stainless steel type 304, institutional grade.
- D. Coat Hook: Stainless steel type 304, institutional grade, hook with rubber bumper tip.
- E. Pilaster Sleeves: 3 inches high, 20 gage stainless steel, secured to pilaster with stainless steel tamper resistant Torx head sex bolt.

- F. Wall Brackets: 54 inches long, Extruded PVC fastened to pilasters and panels with stainless steel tamper resistant Torx head sex bolts.
- G. Headrail: Heavy-duty extruded aluminum, anti-grip design, clear anodized finish, fastened to headrail bracket with stainless steel tamper resistant Torx head sex bolt and at top of pilaster with stainless steel tamper resistant Torx head screws.
- H. Headrail Brackets: 20 gage stainless steel, satin finish, secured to wall with stainless steel tamper resistant Torx head screws.

## 2.5 FABRICATION

- A. Fabricate components of 1-inch thick high-density polyethylene polymer. Flame spread of 50.
- B. Doors and Panels: 1-inch thick x 24-inch wide x 55-inch high, high density polyethylene polymer; 36-inch wide door swinging out on stalls for handicapped use. Aluminum edging strips shall be fastened to the bottom edge of all panels full length.
- C. Pilasters: 1 inch thick, constructed same as doors, of sizes required to suit cubicle width and spacing. Aluminum edging strips shall be fastened to the bottom edge of all pilasters full length.
- D. Pilaster Shoes: Stainless Steel.
- E. Door, Panels and Pilasters: 1 inch thick and all edges machined to a radius of .250 inches and all exposed edges to be free of saw marks.
- F. All alternate partition manufacturers products shall have a homogeneous color throughout.
- G. Provide custom fabricated pilasters to accommodate the transitions between existing panels and new panels.

## 2.6 FINISH AND COLOR

- A. Finish shall be as selected from manufactures standard finish options by the Architect.
- B. Color shall be Paisley Black.
- B. All panels, door and pilasters shall arrive at job site with special protective plastic covering.

# 3 PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify correct spacing of plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing where required.
- D. Beginning of installation means acceptance of substrate construction.

## 3.2 INSTALLATION

- A. Install partitions secure, plumb, and level in accordance with

- manufacturer's instructions.
- B. Install two (2) door pulls, (one on outside and one on inside) of all handicap accessible stall doors.
  - C. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
  - D. Attach panel brackets securely to walls using anchor devices.
  - E. Attach panels and pilasters to bracket with through sleeve tamper-proof bolts and nuts. Locate head rail joints at pilaster center lines.
  - F. Where the unbraced length of the wall panels exceeds 5 feet, furnish and install a strong back along the top bracket to stiffener the panels and prevent lateral movement.
  - G. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster. Conceal floor and ceiling fastenings with pilaster shoes.
  - H. Equip each door with two hinges, one door latch and one coat hook and bumper.
  - I. Install door strike and keeper with door bumper on each pilaster in alignment with door latch.
  - J. Adjust hinges to locate doors in partial opening position when unlatched. Return out-swing doors to close position.
  - K. Conceal evidence of drilling, cutting and fitting to room finish.
  - L. Wall Mounted Screens: Attach to wall with anchoring devices and wall brackets - position, level, and tighten units.

### 3.3 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

### 3.4 CLEANING

- A. Remove protective masking. Clean surfaces.
- B. Replace damaged or scratched materials with new materials.
- C. After completion of work remove all rubbish, debris and excess materials from the premises and dispose of legally. Leave rooms broom clean.
- D. After completion on installation and cleanup of rooms, clean and polish exposed surfaces and touch-up minor scratches to match factory finish.

**END OF SECTION**

SECTION 10350

**FLAGPOLES**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum flagpoles.
- B. Ground mount.
- C. Halyards, accessories, and flag.

1.2 REFERENCES

- A. AASHTO M-36 - Corrugated Metal Culvert Pipe.
- B. ANSI/ASTM B221 - Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
- C. ASTM B241 - Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.

1.3 SYSTEM DESCRIPTION

- A. Type: Ground set; fixed type.
- B. Pole Design: Cone tapered.
- C. Nominal Height: 30 ft measured from ground.
- D. Halyard: External type.

1.4 PERFORMANCE

- A. Pole with Flag Flying: Resistant without permanent deformation, 90 miles/hr wind velocity, non-resonant, safety design factor of 2.5.

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Indicate on shop drawings, detailed dimensions, base details, anchor requirements, and imposed loads.
- C. Provide product data on pole, accessories, and configurations.
- D. Submit samples under provisions of Section 01300.
- E. Submit two samples illustrating material, color and finish.
- F. Submit manufacturer's installation instructions under provisions of Section 01300.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01500.
- B. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.
- C. Protect flagpole and accessories on site from damage or moisture.

## 2 PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Aabec Pole Division, Morgan Francis Co., (714) 945-9391.
- B. American Flagpole, (213) 945-8951.
- C. Concord Industries, Inc., (714) 541-2300.
- D. Substitutions: Under provisions of Section 01300.
- E. Aabec Pole Division, Morgan Francis Co., (714) 945-9391.
- F. The Flag Center, Inc., (800) 367-3710.
- G. PLP Composite Technologies, Inc., (800) 262-6075.

### 2.2 POLE MATERIALS

- A. Aluminum: ASTM B241, 6063 alloy, T6 temper.

### 2.3 COMPONENTS AND ACCESSORIES

- A. Finial Ball: Aluminum; 6-inch diameter.
- B. Truck Assembly: Stainless steel; revolving; stainless steel ball-bearings, non-fouling.
- C. Flag: American & California designs, 72 x 100 inch size, polyester fabric.
- D. Cleats: 9 inch size, aluminum with stainless steel fastenings, two per halyard.
- E. Halyard: 5/16 inch diameter polypropylene, braided, white. Clips for three flags to be attached.
- F. Connecting Sleeves for Multiple Section Poles: Same material as pole, precision fit for field assembly of pole, concealed fasteners.

### 2.4 MOUNTING COMPONENTS

- A. Foundation Tube Sleeve: AASHTO M-36, corrugated 16 gage steel, galvanized, depth as indicated.
- B. Pole Base Attachment: Sleeve, with base cover.
- C. Lightning Ground Rod: 18-inch long copper rod, 3/4 inch diameter.

### 2.5 POLE FABRICATION

- A. Outside Butt Diameter: 7 inches.
- B. Outside Tip Diameter: 3 ½ inches.

### 2.6 FINISHES

- A. Metal Surfaces in Contact with Concrete: Asphaltic paint.
- B. Aluminum: Mill finish. Anodized to Bronze color.
- C. Glass Fiber Pole: Shop finished, painted to white color.
- D. Finial: Spun finish.

3 PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.3 INSTALLATION

- A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.
- B. Electrically ground flagpole installation.

3.4 TOLERANCES

- A. Maximum Variation from Plumb: One inch.

3.5 ADJUSTING AND CLEANING

- A. Clean surfaces.
- B. Adjust operating devices so that halyard with flags function smoothly.

END OF SECTION



SECTION 10440

**SPECIALTY SIGNS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fixed Frameless Acrylic In-Laid ADA compliant tactile signage.
- B. Accessible Building Entrance, room identification and tactile exit signs and symbols as required for the project.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit shop drawings listing sign styles, lettering and locations, spacing and installation method.
- C. Submit samples under provisions of Section 01300.
- D. Submit two samples illustrating full size sample sign, of type, style and color specified including method of attachment.
- E. Submit manufacturer's installation instructions under provisions of Section 01300.
- F. Include installation templates and hardware.
- G. Certification from the proofreader for Braille identification.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products under provisions of Section 01500.
- B. Package signs in boxes and have protective wrap to prevent damage during delivery and storage. Label each box in name groups for easy identification of contents in the field.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesive mounted signs when ambient temperature is below 70 degrees F. Maintain this minimum during and after installation of signs.

1.5 REGULATORY REQUIREMENTS

- A. Conform to 2019 California Building Code for installing work in conformance with signage for the disabled.
- B. Conform to Title III of the American Disability Act of 1990, (ADA), Department of Justice and the 2010 ADA requirements for signage for the disabled.
- C. Finish and Contrast
  - 1. Characters, symbols and their background shall have a non-

glare finish. Characters and symbols shall contrast with their background, either light on a dark background or dark on a light background.

D. Proportions

1. Characters shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".
2. Raised Characters: Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character.
3. Visual Characters: Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character.

E. Character Height

1. Characters on signs required to be accessible by Section 11B-703 of the California Building Code shall be sized according to the following table. The minimum height is measured using an uppercase letter "I". Lowercase characters are permitted. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign.

**VISUAL CHARACTER HEIGHT**

<b>HEIGHT TO FINISH FLOOR OR GROUND FROM BASELINE OF CHARACTER</b>	<b>HORIZONTAL VIEWING DISTANCE</b>	<b>MINIMUM CHARACTER HEIGHT</b>
40 INCHES TO LESS THAN OR EQUAL TO 70 INCHES	LESS THAN 72 INCHES	5/8 INCH
	72 INCHES AND GREATER	5/8 INCH PLUS 1/8 INCH PER FOOT OF VIEWING DISTANCE ABOVE 72 INCHES
GREATER THAN 70 INCHES TO LESS THAN OR EQUAL TO 120 INCHES	LESS THAN 180 INCHES	2 INCHES
	180 INCHES AND GREATER	2 INCHES PLUS 1/8 INCH PER FOOT OF VIEWING DISTANCE ABOVE 180 INCHES
GREATER THAN 120 INCHES	LESS THAN 21 FEET	3 INCHES
	21 FEET AND GREATER	3 INCHES PLUS 1/8 INCH PER FOOT OF VIEWING DISTANCE ABOVE 21 FEET

- F. **Raised Characters and Pictorial Symbol Signs**  
 When raised characters are required or when pictorial symbols (pictograms) are used on such signs, they shall conform to the following requirements:
1. **Character Type:** Characters on signs shall be raised 1/32 inch minimum and shall be sans serif uppercase characters accompanied by contracted (Grade 2 Braille complying with paragraph G below.
  2. **Character Size:** Raised characters shall be a minimum of 5/8 inch and a maximum of 2 inches high.
  3. **Pictorial Symbol Signs (Pictograms):** Pictorial symbols signs (pictograms) shall be accompanied by the verbal description placed directly below the pictogram. The outside dimension of the pictogram field shall be a minimum of 6 inches in height.
  4. **Character Placement:** Characters and Braille shall be in a horizontal format. Braille shall be paced a minimum of 3/8 inch and a maximum of 1/2 inch directly below the tactile characters; flush left or centered. When tactile text is multi-lined, all Braille shall be placed together below all lines of tactile text.
- G. **Braille:** Contracted (Grade 2) Braille shall be used wherever Braille is required in other portions of this specification. Braille dots shall be domed or rounded and comply with table below CBC (11B-703.3.1).

**CBC TABLE 11B-703.3.1  
 BRAILLE DIMENSIONS**

MEASUREMENT RANGE	MINIMUM IN INCHES MAXIMUM IN INCHES
Dot base diameter	0.059 to 0.063
Distance between two dots in the same cell measured center to center	0.100
Distance between corresponding dots in adjacent cells measured center to center	0.300
Dot Height	0.025 to 0.037
Distance Between corresponding dots from one cell directly below measured center to center.	0.395 to 0.400

## 2 PART 2 PRODUCTS

### 2.1 MANUFACTURERS

#### A. Acrylic Panel Signs:

1. Signs of Success, Inc. (805) 925-7545  
[www.signsofsuccess.net](http://www.signsofsuccess.net)
2. Rowmark Signs
3. Best Sign Systems, (800) 235-best.
4. Mohawk Sign Systems, (518) 370-3433.
5. Substitutions: Under provisions of Section 01300.

### 2.2 Materials - Acrylic Panel Signs

A. Exterior Room Identification Signage: Equal to Gravo-Tac Exterior, matte finish, ADA compliant for color contrast and surface finish. Profile material is to be 1-ply 1/32 inch with a matte finish. The substrate material is to be 1-ply 1/32 inch, chemically bonded to a ¼ inch clear cast acrylic sheet to provide an inlaid method of fabrication. After the two 1-ply 1/32 inch pieces of substrate have been bonded together and cut to size, cut inline text/graphics through top ply and weed immediately. Cut outline text/graphics from the 1/16 inch profile material and adhere text/graphics to the substrate with Weldon 16. Colors to be selected from manufacturer's standard colors. See drawings for additional requirements.

#### B. Interior Signs and Room Control Signage: Equal to Gravo-Tac

Exterior, matte finish, ADA compliant with a color contrast and surface finish. Profile material is to be 1-ply 1/32 inch with a matte finish. The substrate material is to be 1-ply 1/8 inch, chemically bonded to a ¼ inch clear cast acrylic sheet to provide an inlaid method of fabrication. After the two 1-ply pieces of substrate have been bonded together and cut to size, cut inline text/graphics through top ply and weed immediately. Cut outline text/graphics from the 1/16 inch profile material and adhere text/graphics to the substrate with Weldon 16. Colors to be selected from manufacturer's standard colors. See drawings for additional requirements.

1. At each interior exit door: On the latch side of each exit door provide a sign identifying the door as an "EXIT" with raised tactile white letters and grade 2 contracted Braille on a contrasting background. The sign shall be installed on the wall adjacent to the latch side, including at double leaf doors, signs shall be placed on the nearest adjacent

wall, preferably on the right. Mounting height shall be 60 inches above the finish floor to the center line of the sign. Mounting location shall be determined so that a person may approach within 3 inches of signage without encountering protruding objects or standing within the swing of the door.

2. Building Entrance Signs: Contractor shall provide Accessible Entrance Signs at entry doors with word

"Entrance" below the International Accessibility Symbol. Furnish "Directional Arrow" below symbol as required to be visible to persons along approaching pedestrian ways. Mount sign where indicated on drawings.

C. Accessibility Signage:

1. At restroom Doors: Model No. RFH12RR, 12" circle and equilateral triangle with international symbol of Accessibility as manufactured by Flags and Banner or equal.
2. At each exterior door: On the latch side of each door provide a sign identifying the use of the room with raised letters, grade 2 contracted Braille and pictogram. The sign shall be installed on the wall adjacent to the latch side, including at double leaf doors, signs shall be placed on the nearest adjacent wall, preferably on the right. Tactile characters on signs shall be located 48-inches minimum above the finish floor or ground surface, measured from the baseline of the lowest Braille cells and 60-inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.
3. Where a tactile sign is provide 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 of the right hand door. Where there is not wall space at the latch side of a single door or at the right side of 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 degree open position. Where permanent identification signage is provided for rooms and spaces they shall be located on the approach side of the door as one enters the room or space. Signs that identify exits shall be located on the approach side of the door as one exits the room or space.

- D. Acrylic Panel Signage, interior and exterior. Wording lettering and color must be obtained in writing from Architect prior to placing order with manufacturer. The signs are to be frameless, inlaid method (3-piece construction) ADA-specific Gravo-Tac Exterior acrylic signs with integral color, tactile text and Grade 2 contracted Braille equal to "Signs of Success System 100A." See drawings for specific requirements for each sign type. Lettering - Helvetica Medium. Lettering shall be raised 1/32" to produce letters and contracted grade 2 Braille copy per Article 1.5 of this Specification Section. See Article 1.5.G for Braille dimension requirements per CBC Table 11B-703.3.1.

2.3 SOURCE QUALITY CONTROL

- A. Proofreading: Vendors are to obtain independent certification.

Certified proofreaders shall verify that the Braille is correct by review of the sign fabricators text proofs prior to fabrication, and/or review of signs after fabrication. Proofreading will confirm that the Braille segment is in accurate Grade 2 contracted Braille that adheres to the California Building Codes and ADA requirements and accurately reflects the intent of the communication for the Braille reader. Signs determined to be in error shall be replaced and proofread at no cost to the Owner. Submit certification with submittal package to the Architect.

- B. All signage shall be field verified after installation. (CBC 11B-703.1.1.2.)

### 3 PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means installer accepts existing surfaces.

#### 3.2 INSTALLATION

- A. Install all signs in conformance with the Americans with Disabilities Act and the California Building Code.
- B. Install acrylic signs in accordance with manufacturer's instructions. Use minimum of four sex head screws, one per corner.
- C. Install true, plumb, level and adequately secured to substrate.
- D. Clean and polish.

#### 3.2 SCHEDULES

- A. EXTERIOR IDENTIFICATION SIGNS:  
See Site Plans and building floor plan for locations of signage required.
- B. INTERIOR IDENTIFICATION SIGNS:  
See floor plans for locations of signage required.
- C. GAS LINE IDENTIFICATION SIGN  
1. Provide a sign adjacent to each gas line entering a building stating "Caution: Gas pipe concealed within wall." See Site Plan for location of the existing gas line.
- D. SCHEDULE OF SIGNS  
1. See Site Plan and building floor plan for locations, types and quantities of signs required.

END OF SECTION

SECTION 10522

**FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher Cabinets.
- C. Accessories.

1.2 REFERENCES

- A. NFPA 10 - Portable Fire Extinguishers.
- B. Title 19, California Code of Regulations, Chapter 3.
- C. ANSI/UL 1479
- D. ASTM E814

1.3 QUALITY ASSURANCE

- A. Conform to NFPA 10 requirements for extinguishers.

1.4 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Include physical dimensions, operational features, color and finish, wall mounting brackets with mounted measurements, anchorage details, rough-in measurements, location and details.
- C. Submit manufacturer's installation instructions under provisions of Section 01300.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit manufacturer's operation and maintenance data under provisions of Section 01700.
- B. Include test, refill or recharge schedules, procedures, and recertification requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperatures may cause freezing.

## 2 PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. J.L. Industries, (612) 835-6850.
- B. Potter-Roemer, Inc., (310) 404-3753.
- C. Watrous, Inc., (800) 323-2265.
- D. Substitutions: Under provisions of Section 01300.

### 2.2 EXTINGUISHERS

- A. Dry Chemical Type: Equivalent to J.L. Industries Cosmic 5E, UL 2A-10BC.

### 2.3 CABINETS

- A. Recessed Applications:
  - 1. Fire Rated Walls: Equivalent to J.L. Industries, Cosmopolitan Model No. 1837V10FX2 with V doors, 10-inch glazing for recessed application.
  - 2. Non-Rated Walls: Equivalent to J.L. Industries, Cosmopolitan Model No. 1837V10 with V doors, 10-inch glazing for recessed application.

### 2.5 FABRICATION

- A. Form body of cabinet with tight inside corners and seams.
- B. Predrill holes for anchorage.
- C. Form perimeter trim by welding, filling and grinding smooth.
- D. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch.
- E. Glaze doors with resilient channel gasket glazing.
- F. Fire rated cabinets to be fabricated in accordance with UL label for one and two hour combustibile wall assembly per ANSI/UL1479 (ASTM E814).

### 2.6 FINISHES

- A. Extinguisher: Red enamel.
- B. Cabinet Trim and Door: Type 304 with No. 4 finish.

### 2.7 ACCESSORIES

- A. Wall mounted bracket equivalent to J.L. Industries, MB817C.



3 PART 3 EXECUTION

3.1 INSPECTION

- A. Verify rough openings for cabinet are correctly sized and located.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings.
- B. Secure rigidly in place in accordance with manufacturer's instructions.
- C. Fire rated cabinet installation must be strictly adhered to the manufacturers published installation requirements and ANSI/UL 1479 and ASTM E814 requirements.
- D. Mount surface fire extinguisher using mounting bracket as detailed on drawings.

3.3 SCHEDULE

- A. See floor plans for locations.

END OF SECTION

SECTION 10800

**TOILET AND BATH ACCESSORIES**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Toilet and washroom accessories.
- B. Concealed anchor devices and backing plate reinforcements furnished to other Sections.
- C. Attachment hardware.

1.2 REFERENCES

- A. CCR - California Code of Regulations, Title 24, Parts 2, 3 and 5.
- B. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- C. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.
- D. ANSI/ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- E. ANSI/ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.
- F. ANSI/ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- G. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- H. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- I. NEMA LD-3 - High Pressure Decorative Laminates.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Provide product data on accessories describing size, finish, details of function and attachment methods.
- C. Submit manufacturers installation instructions under provisions of Section 01300.

1.4 KEYING

- A. Supply two (2) keys for each accessory to Owner.
- B. Master key all accessories.

1.5 REGULATORY REQUIREMENTS

- A. Conform to California Code of Regulations 2019 CBC for installing work in conformance with equipment for the disabled.
- B. Conform to the 2010 Americans with Disabilities Act and CBC 2019 for conformance with accessibility for the disabled.

## 1.6 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

## 2 PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. American Specialities, Inc. (914) 476-9000
- B. Bobrick Washroom Equipment, Inc. (415) 927-0200.
- C. Bradley Corporation, (415) 658-2727.
- D. Foundations Worldwide, Inc. (330) 722-5033.
- E. Substitutions: Under provisions of Section 01300.

### 2.2 MATERIALS

- A. Sheet Steel: ANSI/ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel.
- D. Adhesive: Two component epoxy type waterproof.
- E. Fasteners, Screws and Bolts: Hot dip galvanized, tamperproof.
- F. Expansion Shields: Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate.

### 2.3 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Back paint components where contact is made with building finishes to prevent electrolysis.  
  
Shop assemble components and package complete with anchors and fittings.
- E. Provide steel anchor plates, adapters and anchor components for installation.
- F. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

### 2.4 FACTORY FINISHING

- A. Galvanizing: ASTM A123 to 1.25 oz/sq.yd.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.

- D. Chrome/Nickel Plating: ASTM B456, Type SC2 satin finish.
- E. Stainless Steel: No. 4 satin luster finish.
- F. Mirror Glass: FS DD-G-451 Type I, Class 1, Quality of 2, 1/4" thick with silver coating, copper protective coating and non-metallic paint coating complying with FS DD-M-411.

**3 PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.

**3.2 PREPARATION**

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.

**3.3 INSTALLATION**

- A. Install fixtures, accessories and items in accordance with manufacturer's instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.

**3.4 SCHEDULE**

- A. Model numbers refer to American Specialties items. The changing station model number is Foundations Worldwide.
- B. The District will furnish some items for the contractor to install and are identified under the note column as "O.F.C.I." Owner Furnished Contractor Installed.
- C. Items identified under the note column as "C.F.C.I." are Contractor furnished and Contractor Installed.
- D. The following are required to be furnished and installed as listed below. Components will be furnished by the district and installed by the contractor as noted below.

**1. Building A**

**Rooms A8 and A10**

Furnish and install the following in each room:

QUANTITY	PRODUCT	MODEL NO.	NOTE
1	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
1	Mirror - 15" x 24"	0605	C.F.C.I.
1	Electric Hand dryer	0199 - White	C.F.C.I.
1	Toilet Paper Dispenser		O.F.C.I.
1	Soap Dispenser		O.F.C.I.

**Rooms A9 and A12**

1	Soap Dispenser		O.F.C.I.
1	Paper Towel Dispenser		O.F.C.I.

## **2. Building H**

### **Room H1**

Furnish and install the following in each room:

<u>QUANTITY</u>	<u>PRODUCT</u>	<u>MODEL NO.</u>	<u>NOTE</u>
1	Mop Rack	8215-4	C.F.C.I.
1	Paper Towel Dispenser		O.F.C.I.

### **Room H2**

Furnish and install the following in each room:

<u>QUANTITY</u>	<u>PRODUCT</u>	<u>MODEL NO.</u>	<u>NOTE</u>
1	Soap Dispenser		O.F.C.I.
1	Electric Hand Dryer	0199 - White	C.F.C.I.

### **Room H3**

<u>QUANTITY</u>	<u>PRODUCT</u>	<u>MODEL NO.</u>	<u>NOTE</u>
1	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
3	Mirror - 15" x 24"	0605	C.F.C.I.
2	Electric Hand dryer	0199 - White	C.F.C.I.
4	Toilet Paper Dispenser		O.F.C.I.
3	Soap Dispenser		O.F.C.I.

### **Room H4**

<u>QUANTITY</u>	<u>PRODUCT</u>	<u>MODEL NO.</u>	<u>NOTE</u>
1	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
3	Mirror - 15" x 24"	0605	C.F.C.I.
2	Electric Hand dryer	0199 - White	C.F.C.I.
2	Toilet Paper Dispenser		O.F.C.I.
3	Soap Dispenser		O.F.C.I.

### **Room H13**

Furnish and install the following in each room:

<u>QUANTITY</u>	<u>PRODUCT</u>	<u>MODEL NO.</u>	<u>NOTE</u>
1	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
1	Mirror - 15" x 24"	0605	C.F.C.I.
1	Electric Hand dryer	0199 - White	C.F.C.I.
1	Diaper Changing Table	100-SSE-SM	C.F.C.I.
1	Napkin Disposal		O.F.C.I.
1	Toilet Paper Dispenser		O.F.C.I.
1	Soap Dispenser		O.F.C.I.

### **Rooms H5, H6, H7, H8, H9, H10, H11, H12**

Furnish and install the following in each room:

<u>QUANTITY</u>	<u>PRODUCT</u>	<u>MODEL NO.</u>	<u>NOTE</u>
1	Soap Dispenser		O.F.C.I.
1	Paper Towel Dispenser		O.F.C.I.

## **3. Building J**

### **Rooms J1 and J2**

Furnish and install the following in each room:

<u>QUANTITY</u>	<u>PRODUCT</u>	<u>MODEL NO.</u>	<u>NOTE</u>
2	Soap Dispenser		O.F.C.I.
2	Paper Towel Dispenser		O.F.C.I.

**Rooms J3 and J5**

QUANTITY	PRODUCT	MODEL NO.	NOTE
1	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
1	Mirror - 15" x 24"	0605	C.F.C.I.
1	Electric Hand dryer	0199 - White	C.F.C.I.
1	Toilet Paper Dispenser		O.F.C.I.
1	Napkin Disposal		O.F.C.I.
1	Soap Dispenser		O.F.C.I.

**Rooms J4 and J6**

Furnish and install the following in each room:

QUANTITY	PRODUCT	MODEL NO.	NOTE
1	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
1	Mirror - 15" x 24"	0605	C.F.C.I.
1	Electric Hand dryer	0199 - White	C.F.C.I.
2	Toilet Paper Dispenser		O.F.C.I.
1	Soap Dispenser		O.F.C.I.
1	Paper Towel Dispenser		O.F.C.I.

**4. BUILDING K****Room K1**

Furnish and install the following in each room.

QUANTITY	PRODUCT	MODEL NO.	NOTE
3	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
4	Mirrors - 15" x 24"	0605	C.F.C.I.
2	Electric Hand dryer	0199 - White	C.F.C.I.
6	Toilet Paper Dispenser		O.F.C.I.
4	Soap Dispenser		O.F.C.I.

**Room K2**

Furnish and install the following in each room:

QUANTITY	PRODUCT	MODEL NO.	NOTE
1	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
1	Mirror - 15" x 24"	0605	C.F.C.I.
1	Electric Hand dryer	0199 - White	C.F.C.I.
1	Toilet Paper Dispenser		O.F.C.I.
1	Napkin Disposal		O.F.C.I.
1	Soap Dispenser		O.F.C.I.

**Room K3**

Furnish and install the following in each room:

QUANTITY	PRODUCT	MODEL NO.	NOTE
1	Mop Rack	82515-4	C.F.C.I.
1	Paper Towel Dispenser		O.F.C.I.

**Room K4**

Furnish and install the following in each room:

QUANTITY	PRODUCT	MODEL NO.	NOTE
3	Grab Bar - 48 inch	3800	C.F.C.I.
1	Grab Bar - 36 inch	3800	C.F.C.I.
4	Mirrors - 15" x 24"	0605	C.F.C.I.
2	Electric Hand dryer	0199 - White	C.F.C.I.
2	Toilet Paper Dispenser		O.F.C.I.
2	Napkin Disposal		O.F.C.I.
4	Soap Dispenser		O.F.C.I.

END OF SECTION

SECTION 11005

**MISCELLANEOUS EQUIPMENT**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

A. Knox Padlocks.

1.2 SUBMITTALS

A. Submit product data and manufacturer's installation instructions for each item under provisions of Section 01300.

1.3 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01700.

2 PART 2 PRODUCTS

2.1 KNOX BOX:

A. MANUFACTURES:

1. Knox Box (866) 625-4563

B. Furnish and install four Knox Padlocks, one at each pair of gate locations Model 3770, labeled fire department.

C. Furnish and install one Knox Box model

D. Obtain order form from City of Turlock Fire Marshall. Confirm model number with City of Turlock prior to placing order.

3 PART 3 EXECUTION

3.1 INSTALLATION

A. Install all equipment in accordance with manufacturer's printed instructions and as indicated on the drawings.

B. Furnish all necessary hardware, anchors, inserts, connections, and embedded items conduit and wiring necessary for a complete and proper installation. Coordinate with work of other sections.

END OF SECTION



**SECTION 12513**

**VERTICAL LOUVER BLINDS**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vertical slat louver blinds.
- B. Operating hardware.

1.2 SYSTEM DESCRIPTION

- A. Vertical vinyl slat louver blinds installed at window openings, manual control of traversing by cord; blade rotation adjustable by control wand. Blinds shall be inherently flame retardant.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Submit shop drawings indicating opening sizes, tolerances required, installation of blind at window opening, method of attachment, clearances and operation.
- C. Submit product data under provisions of Section 01300.
- D. Submit product data indicating physical and dimensional characteristics and operating features.
- E. Submit samples under provisions of Section 01300.
- F. Submit two samples 12 inches long illustrating slat materials, finish and color.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing vertical louver blinds with five years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Blinds shall be inherently flame retardant per Title 19 CCR Division 1, chapter 8.
- B. Conform to applicable requirements of Title 19 CCR Division 1, Chapter 8.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and protect products to site under provisions of Section 01500.
- B. Deliver blinds wrapped and crated in a manner to prevent damage to components or marring of surfaces.
- C. Store in a clean, dry area, laid flat and blocked off ground to prevent sagging, twisting or warping.

1.7 EXTRA MATERIALS

- A. Furnish fifty (50) additional slats under provisions of Section 01700.

## 2 PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Levelor Lorentzen, Inc., (800) 221-6803.
- B. Hunter Douglas, Inc., (714) 947-8571.
- C. Carey-McFall Corporation, (800) 544-4749 Model Bali.
- D. Louverdrape, Inc., (213) 450-6100.
- E. Graber Industries, Inc., (800) 356-9102.
- F. Substitutions: Under provisions of Section 01300.

### 2.2 MATERIALS

- A. Louver Slats: 3-1/2 inch wide; 0.030 inch thick flat resistant integral colored, extruded, polyvinyl chloride, with 0.050 inch thick beaded edges.
- B. Heavy Duty Type Track: Extruded aluminum channel track section with an overall width of not less than 1-15/16" painted in selected colors.
- C. Pivot Mechanism: Manufacturer's standard geared rotating mechanism providing full synchronous 180° rotation for each blade.
- D. Wand Operation: Rotate blades by means of manufacturer's standard clear plastic wand of adequate length to be within 48" of finish floor.
- E. Heavy Duty Type Carriers: Acetal resin molded plastic carriers with wheels of the same material, or metal carriers with metal ball-bearing type wheels.
- F. Cord Operation: Traverse blinds by means of pulley and rope-type system. Provide rope of synthetic braided fiber jacket over synthetic fiber non-stretch core, with a breaking strength of not less than 200 lbs.
- G. Brackets and Fittings: Manufacturer's standard brackets designed to suit application indicated and provide secure mounting of tracks, including all hardware, fittings, and fasteners necessary for secure attachment of brackets and tracks to adjoining construction. Design brackets to support safely the weight of blind assemblies plus load applied to operate blinds.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that openings are ready to receive work.
- B. Do not commence fabrication until field measurements are confirmed.
- C. Ensure structural supports are correctly placed.
- D. Beginning of installation means installer accepts existing surfaces.

3.2 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with flush countersunk or concealed fasteners.

3.3 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust blinds for smooth operation.

3.4 CLEANING

- A. Clean work under provisions of Section 01700.

END OF SECTION

SECTION 13123

RELOCATION OF MODULAR RELOCATABLE BUILDINGS

1      PART 1      GENERAL

1.1 SECTION INCLUDES

- A.      Disassembly of existing modular relocatable buildings for relocation.
- B.      Disassembly and disposal of the existing modular landings and ramps.
- C.      Removal and disposal of the original skirting and foundation system for each building.
- D.      Staging and transporting of each modular unit to its new location.
- E.      Installation of new wood foundation and skirting system for each building as shown on drawings.
- F.      Reassembling and leveling of each modular relocatable building as shown on drawings.
- G.      Alterations to cabinetry within each building to comply with accessibility requirements.
- H.      Reinstalling interior and exterior trims reusing existing or installing new as required.
- I.      Removal and installation of new interior finishes as shown on drawings and described in other specification sections.
- J.      Furnishing and installation of new pre-manufactured metal landing and ramp at each exterior door as shown on the drawings.
- K.      Reconnection of power, communications, fire alarm, plumbing lines.
- L.      Installation of new grounding and bonding of modular units and landing/ramps.

1.2 REFERENCES

- A.      AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
- B.      ASTM A36 - Structural Steel.
- C.      ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

### 1.3 QUALIFICATIONS

- A. Manufacturer: Company specializing in relocating prefabricated modular buildings with minimum three years documented experience.
- B. Qualifications:
  - 1. Fabricator: Company specializing in performing the work of this section with minimum 5 years documented experience.
  - 2. Erector: Company specializing in performing the work of this section with minimum 5 years documented experience, certified by AISC Quality Certification Program.
  - 3. Qualifications for Welding Work: Qualify welding operators in accordance with AWS Standard Qualification Procedures. Qualify welders and welding operators in accordance with governing AWS Welding Code. Welders and welding operators shall also perform the Fillet Weld test per Figure 4.36 of AWS D1.1 and Figure 4.2A of AWS D1.3. All welders, welding operators, and tack welders shall be qualified with the largest diameter electrodes to be used in the work.

### 1.4 REGULATORY REQUIREMENTS

- A. Conform to California Administrative Code:
  - 1. Title 24, Part 2, State Building Code.
  - 2. Title 21, Public Works, Subchapter 1, Division of the State Architect.
  - 3. Title 19, Public Safety, California Fire Marshall.
- B. Conform to California Building Code, 2019.
- C. The contractor shall obtain and pay for all permits required by governing agencies, except for the Division of the State Architect, to disassemble, transport and reassemble the relocatable classroom buildings as may be required.

## 2 PART 2 PRODUCTS

### 2.1 MATERIALS

- A. See specification section 06112 for new wood foundation
- B. All new bolts shall be ASTM A307.

## 3 PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Field verify each building is ready to be disassembled. Notify owner if any furniture exists within the buildings.

- B. Start of work means acceptance of existing conditions.
- C. Disassemble and dispose of ramps and landings. Dispose of off-site. Disconnect bond wires.
- D. Remove existing perimeter plywood skirting and dispose of off-site. Remove and dispose of existing wood foundation material off-site.
- E. Remove flooring and top set base from each room within the building.
- F. Disconnect all utilities from the building.
- G. Disassemble roof and ceiling trims at module lines.
- H. Unbolt building at module lines.
- I. Disconnect electrical and communication lines across module lines at an existing J-Box.
- J. Transport each module to new location. Clean pad at original location of all construction debris.
- K. Install new wood foundation system per building plans.
- L. Set modules on new wood foundation and bolt units together per building plans. Shim and adjust for tight fit to adjacent module. Secure steel floor frame to new foundation system per building plans.
- M. Field weld components indicated on Drawings.
- N. Install bond wire between modules, ramps and landings per building plans.
- O. Install new wood closure trim and skirting on exterior walls. Caulk joints and paint.
- P. Construct under floor venting per building plans.
- Q. Reinstall roof flashing assembly, caulk joints and paint. Provide new sheet metal flashings on roof where existing is damaged or missing.
- R. Reconnect electrical circuits, power and communication, across modular lines. Restore continuity to all circuits within building.
- S. Reinstall trim at suspended ceilings per building plans. Replace any damaged ceiling grid. Install new ceiling tiles where existing have been damaged to match the existing tiles.
- T. Reinstall interior trim at module lines, caulk joints. Seal and trim joints.

- U. Reinstall filler plates at bolt access holes in floor, per building plans.
- V. Perform all other miscellaneous items required to make building ready for occupancy.
- X. Clean building interior and remove construction debris.
- Y. Construct new improvements within the building as detailed on the drawings.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by District's inspector.
- B. Contractor to follow and comply with all requirements for building installation as shown on building plans for each specific building.

END OF DOCUMENT

SECTION 13140

**Pre-Engineered Free Standing Shade Structure**  
**(Increment No. 2 Approval with DSA)**

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. DSA pre-checked and approved metal shade structure with downspouts. Structure shall be delivered to the project site for installation by the general contractor.
- B. Structural steel framing members, support members, with required bracing, welds, and fasteners.
- C. Metal roof decking, fascia panels with built in gutter and downspouts
- D. Base plates and anchor bolts.
- E. Grouting under base plates.
- F. Concrete footing design shall be as shown on the DSA approved plans for this shade structure.

1.2 REFERENCES

- A. California Building Code Chapter 22A, 2019 Edition.
- B. ASTM A36 - Structural Steel.
- C. ASTM A53 - Black Hot-Dipped, Zinc-Coated Welded and Seamless Steel Pipe.
- D. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
- E. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- F. ASTM A325 - Structural Bolts, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- G. ASTM A992 - Steel for Structural Shapes for use in Building Framing.
- H. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- I. AWS A2.4 - Standard Welding Symbols.
- J. AWS D1.1 - Structural Welding Code - Steel.
- K. AWS D1.3 - Structural Welding Code - Sheet Steel.
- L. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings



- M. AISC - Code of Standard Practice - Manual of Steel Construction - Allowable Stress Design (ASD).
- N. AISC - Specification for Architectural Exposed Structural Steel.
- O. ASTM F1544 - Specifications for anchor bolts, steel, 36, 55 and 105 ksi yield strength.

### 1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings:
  - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
  - 2. Submit shop standards for each type of connection required, corresponding to structural drawings.
  - 3. Submit erection and placing drawings showing size and piece mark of each member and its location.
  - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
  - 5. Prepare and obtain Architect's review of submittals in a timely manner so as not adversely affect construction schedule. Allow Architect 10 working days for review.
  - 6. Corrective work (both costs and time delays) to work fabricated or installed for which submittals have not had Architects review, shall be born by the Contractor.
- C. Assurance/Control Submittals:
  - 1. Erection Procedure: Submit descriptive data to illustrate structural erection procedure including sequence of erection and temporary staying and bracing.
  - 2. Prequalified Welding Processes will be acceptable only for the SMAW process. All other processes shall be qualified by testing in accordance with the governing AWS Welding Code. Weld test plates shall be a minimum thickness to meet a "Base Metal Thickness to Qualification Range" of 0.5t to 1.5t.
  - 3. Field Welding Equipment: Submit descriptive data for field welding equipment including type, voltage, and amperage.
  - 4. Test Reports: Submit the following reports directly to Architect from Testing Laboratory, with copy to Contractor. Prepare reports in conformance with Section 01450 - Quality Control:
    - A. Welding inspection.
    - B. High Strength Bolted connection inspection.
  - 5. Certificates:
    - A. Submit certified mill analysis and test reports of all steel including fastenings in accordance with CBC Section 2203.

1. Mark steel so it matches mill tests and can be identified in shop.
  2. Reject delivery of material to jobsite, which is not accompanied by mill certificates and test reports.
- B. Certify welders employed on Work, verifying AWS qualification within previous 12 months.
6. Qualification Documentation: Submit documentation of fabricator and erector experience indicating compliance with specified qualification requirements.

#### 1.4 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with CBC and AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
- B. Perform work in accordance with AISC - Specification for Architectural Exposed Structural Steel.
- C. Qualifications:
1. Fabricator: Company specializing in performing the work of this section with minimum 5 years documented experience.
  2. Erector: Company specializing in performing the work of this section with minimum 5 years documented experience, certified by AISC Quality Certification Program.
  3. Qualifications for Welding Work: Qualify welding operators in accordance with AWS Standard Qualification Procedures. Qualify welders and welding operators in accordance with governing AWS Welding Code. Welders and welding operators shall also perform the Fillet Weld test per Figure 4.36 of AWS D1.1 and Figure 4.2A of AWS D1.3. All welders, welding operators, and tack welders shall be qualified with the largest diameter electrodes to be used in the work.
- D. Allowable Tolerances: Straightness, levels, alignment and plumb in accordance with AISC Code of Standard Practice.
- E. Survey: Employ Professional Engineer registered in State in which Project is located, experienced in survey work, to establish permanent bench marks as shown and as necessary for accurate erection of structural steel. Check elevations of concrete bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

#### 1.4 REGULATORY REQUIREMENTS

- A. Prior to the start of fabrication for this structure, the Contractor shall secure approval from the Division of the State Architect. Design structural calculations, drawings, and specifications to be used to construct the shade structure included in this D.S.A. application shall be prepared and sealed by a California licensed Civil or Structural Engineer. The

entire packaged shall be prepared and submitted to D.S.A. for review and approval through the Architect of Record.

- B. The Contractor shall incorporate all DSA plan check comments into their design at no additional cost to the school district. It is the responsibility of the shade structure vendor to meet all requirements of DSA in order to obtain an approved design for installation of their product on this project.

#### 1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Drawings.

### 2 PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Structural Steel Plates and other shapes: ASTM. A36.
- A. Structural Tubing: ASTM A500, Grade B.
- C. Bolts, Stud Anchors, Nuts, and Washers: AISC Specification Section A3.4:
  - 1. Unfinished Bolts and Machine Bolts: ASTM A 307.
  - 2. High Strength Bolts: ASTM A 325.
  - 3. Anchor Bolts and Nuts: ASTM F1554, Grade 36.
- D. Electrodes:
  - 1. Filler metals shall conform to the requirements of the latest edition of ANSI/AWS Specifications for Electrodes as listed herein and shall meet a Charpy V-Notch Impact Energy of 20 Ft-Lbs at 20° F.
    - a. SMAW: A5.1 or A5.5, E70XX Low Hydrogen.
    - b. SAW: A5.17 or A5.23, E7X-EXXX.
    - c. GMAW: A5.18 or A5.28, E70S-X.
    - d. FCAW: A5.20 or A5.29, E7XT, except 8K6.
- E. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.

#### 2.2 FABRICATION

- A. Fabricate structural steel members in accordance with AISC Specification.
- B. Cooperate with in-plant Project Inspector providing access to shop for inspection and non-destructive testing of welding and provide for proper identification of steel products.
- C. Shop and Field Connections:
  - 1. Detail, furnish, fabricate and erect in accordance with AISC Manual of Steel Construction, 9th Edition.
  - 2. For connections not shown on design drawings, either: detail to develop full strength of member, or request

- design from Architect in writing.
3. Weld run-off tabs shall be removed, affected area ground smooth, and magnetic particle tested.
  4. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
  5. All materials shall be free from scale and rust and in new condition when fabricated.
  6. Bolt holes shall be punched with a diameter 1/16" greater than the corresponding bolt diameter.

D. Fabricator's Responsibility:

1. Errors of detailing, fabrications, and for correct fitting of structural steel members.
2. Do not splice structural steel members. Members having splice not indicated on Drawings will be rejected.

2.3 MANUFACTURERS

A. The shade structure shall be furnish by a manufacturer with a current Division of the State Architect Pre Checked and approved drawings for a shade structure conforming the requirements contained in this specification.

B. ACCEPTABLE MANUFACTURERS

1. David Bang Associates, Inc. Model Meramec (800) 669-2585 Shade structure shall be 20' x 42' in size with downspouts at each corner of the structure. Color shall be selected from the manufacturer's standard color chart.
2. Substitution under Section 01300.

2.3 FINISH

A. Colors shall be selected from the manufacturer's standard color chart.

2.4 SOURCE QUALITY CONTROL AND TESTS

A. Testing and analysis of components will be performed under provisions of Section 01410.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION

A. Supply templates and items required to be cast into concrete or embedded in masonry with setting diagrams to appropriate Sections.

- B. Coordinate the work of other trades in preparation for erection of structural steel work.

### 3.3 ERECTION

- A. Erect structural steel in accordance with AISC Code of Standard Practice, Section 7, and AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings." Section 1.25, except as specified herein and manufacturer's requirements.
- B. Make provision for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Do not field cut or alter structural members without approval of Architect, Structural Engineer and DSA.
- D. Field connect members with threaded fasteners; torque to required resistance.
- E. After erection, repair all damages to the factory finish using factory match paint. Apply per the manufacturer's requirements.
- F. Anchor Bolts: Install anchor bolts and other connectors required for securing structural steel to foundations and other in-place work. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.
- G. Setting Bases and Bearing Plates: Clean concrete bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surfaces of base and bearing plates.
  - 1. Set loose and attached base plates and bearing plates for structural members on steel wedges or other adjusting devices.
  - 2. Tighten anchor bolts after the supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to grouting.
  - 3. Grout solidly between bearing surfaces and bases of plates immediately after erecting member and before additional load is placed on member. Finish exposed surfaces, protect installed materials, and allow to cure. For proprietary grout materials, comply with manufacturer's installation instructions.
- H. High-strength Bolting: Comply with specifications for Structural Joints using ASTM A 325.
- I. Erection Bolts:
  - 1. Comply with ASTM A 307.
  - 2. On exposed welded construction, remove erection bolts, fill

holes with plug welds, and grind smooth at exposed surfaces.

- J. Surfaces in contact with non-compatible metals shall be separated therefrom with chrome-lock impregnated felt tape 1/16" thick, No. 165.
- L. Touch-up Painting: Immediately after erection, clean all surfaces damaged during transport and erection. Apply new paint to damaged areas as furnished by the manufacturer of the shade structure per their requirements.

#### 3.4 CONSTRUCTION

##### A. Site Tolerances:

1. Maximum Variation From Plumb: 1/4 inch.
2. Maximum Offset From True Alignment: 1/4 inch.

#### 3.5 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01410.

END OF SECTION

DIVISION 22 00 00

**PLUMBING**

1 PART 1 GENERAL

1.1 GENERAL CONDITIONS

- A. Requirements of the General Conditions of these Specifications apply to all work. The Contractor shall consult them in detail and assume all obligations or conditions therein which affect this work.

1.2 SCOPE OF WORK

- A. This Contractor shall furnish all plant, labor, equipment, and shall perform all operations relating to the plumbing systems as outlined below, in strict accordance with these conditions of the Contract. Any incidental work not shown or specified which can reasonably be inferred or taken as belonging to the work and necessary to provide the system described and shown shall be the Contractor's responsibility. The work shall be complete and ready for service as shown and/or specified and shall be satisfactory to the Architect.

1.3 WORK INCLUDED

- A. The work includes, in general, the following:
  - 1. Sanitary sewer piping and vent piping.
  - 2. Hot and Cold water piping.
  - 3. Gas piping.
  - 4. Condensate piping.
  - 5. Vent flashing.
  - 6. Testing and adjustment of the Plumbing System.
  - 7. Other items as may be specified or shown on the Drawings.

1.4 WORKMANSHIP

- A. Where other instructions are not given, equipment shall be installed in accordance with the recommendations of the manufacturer and the best standard practice for this type of work.

1.5 DRAWINGS

- A. The Drawings form a part of this specification and contract, and any work or material shown on the Drawings and not mentioned in the Specifications, or vice versa, shall be executed the same as if specifically mentioned in both. The work shall be installed as indicated on the Drawings; however, in certain instances, arrangements are schematic, indicating only general arrangements. Should it be necessary to deviate from the arrangement shown to meet structural conditions, such additions shall be made without expense to the Owner.

1. The data given herein and on the Drawings is as exact as could be secured, but extreme accuracy is not assured. The Drawings and Specifications are for the assistance of the Contractor; exact locations, distances, elevations and levels must be established by the Contractor, who shall accept the Contract with this understanding.
2. Whenever there appears to be a discrepancy between Drawings and/or specifications, the Contractor shall base his bid on the most expensive alternate, and after award of Contract, shall consult the Architect for further instructions.

#### 1.6 RULES, REGULATIONS, AND CODES

- A. All work and materials shall be in full accordance with the latest codes, rules, and regulations of the following:
  1. National Fire Protection Association.
  2. Part - 5, T-24 California Code of Regulations.
  3. State Health Department.
  4. State Industrial Accident Commission's Safety Orders.
  5. Rules of Local Utility.
  6. California Mechanical Code.
  7. California Building Code.
  8. California Plumbing Code.
  9. California Electric Code.
- B. Rulings and interpretations of the enforcing agency will be considered part of the regulations.
- C. Nothing in these Specifications is to be construed to permit work not conforming to the above, and expense in compliance with the above shall be borne by the Contractor.
- D. Whenever the Specifications and Drawings require higher standards or larger sizes than those required by the ordinances and statutes, the Specifications and Drawings shall take priority over the specific ordinances and statutes.

#### 1.7 SITE EXAMINATION AND CONDITIONS

- A. This Contractor shall examine the site, verify dimensions and locations against the Drawings and inform himself of all conditions under which work is to be done before submitting his Proposal. No allowance will be made in his behalf for extra expense because of error.

#### 1.8 AS BUILT DRAWINGS

- A. Supplementing the requirements of the General Conditions and Supplementary General Conditions, As-Built Drawings shall show invert elevations of sanitary sewers, rain water leaders and storm sewers of critical locations, locations of



shut-off valves and stub outs for future, and all changes made during the course of the work. Furnish reproducible Drawings when work is complete.

- B. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein.
- C. Dimensions, sizes, and capacities shown are a minimum and shall not be changed without permission of the Architect.

#### 1.9 MATERIAL LIST AND SUBSTITUTIONS

- A. Prior to commencement of work, and within 15 days after signing of the Contract by the Owner and General Contractor, this Contractor shall submit in quintuple to the Architect for approval a complete list of equipment and materials to be furnished, including all substitutions. Partial or incomplete lists of materials will not be considered. No substitutions will be considered thereafter. Only one (1) request for substitution will be considered on each item of material or equipment.
- B. If the Contractor desires to make a substitution, he shall submit complete information or catalog data to show the equality of the equipment or material offered to that specified. No substitution will be allowed unless requested and approved in writing. Materials of equal merit and appearance in the opinion of the Architect/Engineer will be approved for use. Architect/Engineer reserves the right to require originally specified items.
- C. Installation of approved substitution is the Contractor's responsibility. Any changes required for installation of approved substituted equipment must be made without additional cost.
- D. Submit to Architect for approval, within a reasonable time after award of contract and in ample time to avoid delay of construction, shop drawings or submittals on all items of equipment and materials covered in list mentioned above. Shop drawings shall be submitted in five (5) copies and in a complete package. Partial submittals will not be considered.

#### 1.10 FEES, PERMITS, AND UTILITY SERVICES

- A. This Contractor shall arrange to obtain and to pay for all permits and service charges required in the installation of his work, arrange for required inspections, and secure approvals from authorities having jurisdiction. Contractor shall arrange for utility connections and pay charges incurred, including excess Service charges, if any.

#### 1.11 GUARANTEE

- A. The Contractor shall be responsible for all work done and materials installed under these Plans and Specifications.
- B. He shall repair or replace, as may be necessary, at his expense, any defective work, material, or part which may show itself within one (1) year of the date of filing of

Notice of Completion, and be responsible for all damage to other materials, furnishings, equipment, or premises caused by such defects during this period if, in the opinion of the Architect, said defect is due to imperfection of materials or workmanship.

## 2 PART 2 PRODUCTS

### 2.1 MATERIALS

#### A. Pipe:

1. Sanitary sewer piping shall be service weight cast iron No-Hub cast iron soil pipe and fittings.
  - a. Underground Piping to 5 Feet Outside Building Line: 10 Inches and Smaller: "No Hub" cast iron soil pipe and fittings with heavy-duty stainless-steel couplings and neoprene gaskets.
  - b. Aboveground Piping - 10 Inches and Smaller: "No Hub" cast iron soil pipe and fittings with standard-duty stainless steel couplings and neoprene gaskets.
2. Sanitary sewer piping 5'-0" outside the building and rainwater leaders shall be Manville non-pressure transite pipe, Class 1500.
3. Domestic Water Piping:
  - a. Above Ground: Type "L" copper tubing. Wrought copper or cast bronze sweat fittings.
    - 1) Piping 3 Inches and Above: Brazed.
    - 2) Piping 2-1/2 Inches and Smaller: Soldered (95/5 solder) joints.
    - 3) Approved Fillers:
      - a) Pressure Range 81 to 150 PSI and Temperatures 151 Degrees F to 200 Degrees F: 95/5 tin-antimony or silver-bearing solders, i.e., Allstate 430, Harris Stay Brite 5 or 8.
      - b) Use appropriate flux per manufacturer's recommendations. Use of corrosive fluxes is prohibited.
  - b. Below Ground: Type "K" copper tubing with brazed joints. Approved Fillers: "Phos 0", "Silfos 5", "Aircosil 15", "Braze 450(DE)". Use appropriate flux per manufacturer's recommendations.

- c. Provide "ECOFF" dielectric unions at all copper to steel connections.
4. Natural gas piping shall be seamless or lap welded black steel, 125 psig working pressure. Fittings shall be 125 psig to suit piping material. Thread paste shall be insoluble in water. All gas valves shall be rated for natural gas fuel. Steel pipe buried below grade shall have an applied high density polyethylene wrap, X-Tru-Coat, or equal, applied and installed all per the manufacturer's instructions.
- a. Gas piping shall be graded toward the regulator wherever possible. Piping trapped by change of grade shall be supplied with a drip line at the low point brought out to an accessible location. Provide dirt pockets at bottoms of vertical pipe risers, consisting of tee fittings plugged with capped nipples. High pressure pipe shall be welded (see Steel Pipe Joints and Connections).
  - b. All exposed gas pipe shall be painted.
  - c. Underground Exterior Gas Pipe:
    - 1) Underground exterior natural gas piping shall be polyethylene plastic, tubing, and fittings, and shall be only those specific types designated as PE 2406, or PE 3408 and meeting the appropriate requirements of ASTM D 2513.
    - 2) A hydrostatic design basis of 1000 psi shall be used in the design of the polyethylene piping systems for propane gas distribution at pipe temperatures of 73 F or lower. The long-term hydrostatic strength measurements should be made in accordance with ASTM D 2837.
    - 3) Gas piping shall be graded toward the regulator wherever possible. Piping trapped by change of grade shall be supplied with a drip line at the low point brought out to an accessible location. Provide dirt pockets at bottoms of vertical pipe risers, consisting of tee fittings plugged with capped nipples.
    - 4) Gas piping shall be Plexco Yellowpipe PE 2406 gas pipe and fittings are listed by IAPMO (International Association of Plumbing and Mechanical Officials) for yard gas piping and LPG gas service.
5. Condensate Lines:
- a. Condensate lines shall be Type M copper with wrought copper fittings, Schedule 40 galvanized steel pipe with galvanized iron fittings.

B. Pipe Insulation:

1. Interior of the building, all hot water supply and return piping above slab except unions and valves shall be covered with insulation. The pipe insulation shall have a minimum wall thickness of not less than the diameter of the pipe for a pipe up to 2 inches in diameter. Insulation wall thickness shall be not less than 2 inches for a pipe of 2 inches or more in diameter.

Exceptions:

- Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration.
- Hot water piping between the fixture control valve or supply stop and the fixture or appliance shall not be required to be insulated.

The insulation shall be Manville Flame Safe; one-piece construction preformed fiberglass pipe insulation, or approved equal, with a "K" factor of .28 maximum at 105 degrees mean temperature.

2. All condensate pipe below the roof shall be covered with one (1) inch of insulation. The insulation shall be Manville Flame Safe; one-piece construction preformed fiberglass pipe insulation, or approved equal, with a "K" factor of .28 maximum at 105 degrees mean temperature.
  3. Provide GVB glass cloth vapor barrier on all exposed piping and VB vapor barrier on all concealed piping. Jacket to be secured per manufacturer's instructions.
  4. Fittings shall be covered with Manville Uni-Fit, pre-molded one-piece PVC insulated covers, or equal. Proper factory pre-cut Uni-Fit insulation shall be applied to the fittings all per manufacturer's instructions. Do not insulate piping buried below slab.
  5. Provide insulation on the hot water line and waste for handicap lavatories and sinks in accordance with the handicap Code Title 24 and as scheduled on the construction documents.
  6. The insulation product shall have a maximum flame spread of 25, and smoke production of 50.
- C. Dielectric Unions: Connections, joints, and like connections at water heaters, equipment, etc., shall be provided with dielectric unions or couplings, Vallett, Epco, or equal. At the Contractor's option, galvanized steel pipe with galvanized malleable iron fittings may be used in place of copper pipe.
- D. Floor, Wall, and Ceiling Plates: All pipes passing through floors, finished walls, or finished ceilings shall be fitted with chromium plated wall and floor plates, Beaton Cadwell #3, or equal.

E. Pipe Sleeves:

1. Where pipes pass through concrete floors or walls, install galvanized metal or plastic sleeves having not less than 1/2 inch or more than 1 inch clearance around all sides of the pipe or pipe covering for the full thickness of the concrete. Sleeves shall be "Adjustocrete", Sperzel "Crete-Sleeve", or equal.
  - a. These sleeves shall be secured to metal or wood forms in such a manner that they will not become displaced during pouring of concrete. Sleeves on decks shall be filled with sand. After forms have been removed from concrete, sleeves shall be removed from the openings.
  - b. The space between pipe and sleeves shall be caulked with oakum and mastic for openings through floors or walls below grade and made watertight.
  - c. Sleeves for pipe sizes 1/2 inch to 3 inches shall be 26 gauge. Sleeves for pipe sizes 3-1/2 inches or larger shall be 24 gauge.

F. Pipe Flex Connections:

1. Provide flexible expansion loops of size and material noted on the drawings.
  - a. Flexible loops shall be designed to impart no thrust loads on the anchors.
  - b. The loop shall consist of two flexible sections of hose and braid, two 90 degree elbows, and a 180 degree return.
  - c. Loops shall be installed in a neutral, pre-compressed, or pre-extended condition as required for application.
    - 1) Loops installed hanging down shall have a drain plug. Loops installed straight up may be fitted with an automatic air release valve to purge air from the high point of the loop. Loops installed in any position other than hanging down must have the 180 degree return supported.
    - 2) Install Flexonics within four-pipe diameters, both upstream and downstream, from a pipe guide or anchor.
  - d. Flex connection shall accommodate 5-1/4 inches of seismic settlement.

G. Pipe Hangers:

1. Pipe Hangers shall be rod with adjustable "J" hanger or iron type complete with rods, turn buckles, and brackets, clips, or concreted inserts. Hangers

shall have means of vertical adjustment for leveling of lines after piping is in place.

2. Horizontal steel piping shall have hangers or supports every 10 feet except that piping one-inch in diameter and under shall have hangers or support every 6 feet.
3. Horizontal cast-iron No-Hub piping shall have hangers or supports for each pipe length; 5 feet maximum intervals between supports.
4. Spacing of hangers or supports for copper tubing shall be 8 feet for pipe 1-1/4 inches in diameter or larger and 5 feet for small sizes.
5. Branches from all lines shall have separate supports. No branch 6 feet in length or longer shall be installed without a hanger.
6. All piping shall be firmly held in place. No piping shall be supported by wire, rope, wood, perforated tape, or other makeshift devices. Hanger rods shall be fastened to structural members or as otherwise directed.
7. Hangers on insulated piping shall be installed in a manner which will not produce damage to insulation. Provide piping covering protection shields as required. Hangers on piping shall be completely around the insulation. Shields shall consist of 270 degrees of arc of 11 gauge galvanized sheet metal, 19 inches long, on bottom of insulation (see Detail).
8. Pipe hangers for dissimilar metals (copper/galvanized) shall be provided with plastic coated hanger or the pipe shall be wrapped with 10 mil. plastic tape.
9. Strap water piping with copper clad straps, with felt insulators in walls to prevent vibration and noise.

H. Unions:

1. Unions shall be furnished and installed at each threaded or soldered connection to all equipment, tanks, valves, etc.
2. Unions shall be located so that piping can easily be disconnected for removal of equipment, tank or valve and shall be of type specified in the following schedule:

<u>Type of Pipe</u>	<u>Union</u>
Steel pipelines, 2" and smaller	150 lb. screwed malleable ground joint, brass to iron seal; black for black pipe lines, galvanized for galvanized lines.
Screwed black or galvanized sizes 2-1/2" or larger	125 lb. cast iron screwed flanged union, flat faced full faced gasket, black for black pipe lines,

galvanized for galvanized lines.

Copper tubing, 2-1/2" and smaller Brass ground joint sweat connections.

Copper tubing, 2-1/2" and larger 150 lb. cast bronze, flat faced flange with silver brazing threadless ends.

I. Valves:

1. Provide all valves shown and all other valves necessary to segregate branches of units. Valves shall be full size of line in which installed.
2. Furnish discs suitable for service intended. Furnish a brass tag with identification or service controlled for each valve. All valves shall be properly packed and lubricated. Unions shall be placed adjacent to each threaded valve. Install valves with stems vertical wherever possible. Stems shall not be placed below the horizontal. All shut off valves in water lines shall be gate valves unless otherwise shown.
3. Valves shall be full size of pipe, Crane Co., Walworth, Nibco-Scott, or approved equal.
  - a. Gate Valves: Crane 438, 2 inches and under. Crane 461 2-1/2 inches and over.
  - b. Solder - Joints valves in copper lines. Crane 1324 or 438 with adapters.
  - c. Cocks: Crane 252. Provide level handle at gas connection to equipment. Provide gas shut-off cock at each branch connection to appliance for piece of equipment.
  - d. Ball Valves: Crane 9201, 2 inches and under. Bronze body, stainless steel ball, Teflon seats and stuffing box ring, lever handle and balancing stops, threaded ends with union.

J. Flashings:

1. A waterproof flashing and counter-flashing shall be furnished and installed for each pipe, duct and flue passing through a roof or outside wall. The flashing shall extend a minimum of 9 inches in all directions from the outside of the pipe, flue, or duct.
  2. Sewer vents shall have four pound sheet lead flashings and Semco, Smith, Josam or equal to Semco #1100-2 or #1100-4 counter-flashing sleeves installed as detailed.
- K. Back Syphonage Protection:
1. Plumbing fixtures shall have their water supplies protected against possible back syphonage if the normal water pressure in the building piping system or parts thereof is succeeded by a vacuum.
  2. Outlets of all supply faucets shall clear overflow rim of lavatories and sinks by at least one half inch (1/2"). Water closets and urinal flush valves shall have approved vacuum breakers.
- L. Cleanouts:
1. Cleanouts of the same diameter of pipe shall be installed in all horizontal soil and waste lines where indicated and all points of change in direction. Cleanouts shall be located not less than 18 inches from building construction to provide sufficient space for rodding. No horizontal run below floor over 50 feet shall be without a cleanout, whether shown on the Drawings or not, but no cleanouts shall occur in the carpeted areas or public areas. Cleanouts shall be Zurn, Smith, Josam, or Wade, equal to Smith numbers specified.
  2. Types:
    - a. Tile Floor Cleanouts: (ZN1400-VP-NH) Adjustable floor cleanout, Dura-Coated cast iron body, with gas and watertight ABS tapered thread plug, and round scoriated secured top with nickel bronze top, adjustable to be finished floor, with vandal proof screws.
    - b. Carpeted Floor Cleanout: (ZN1400-CF-VP-NH) Adjustable floor cleanout, Dura-Coated cast iron body, with gas and watertight ABS tapered thread plug, and round scoriated secured top with nickel bronze top, adjustable to the finished floor, with vandal proof screws, carpet flange cover.
    - c. Concrete Floor Cleanout (General): (ZA1400-VP-NH) Adjustable floor cleanout, Dura-Coated cast iron body, with gas and watertight ABS tapered thread plug, and round scoriated secured top with nickel bronze top, adjustable to the finished floor, with vandal proof screws.



- d. Concrete Floor Cleanout (Heavy Load): (ZA1400-HD-VP-NH) Adjustable floor cleanout, Dura-Coated cast iron body, with gas and watertight ABS tapered thread plug, and round heavy duty scoriated secured top with nickel bronze top, adjustable to the finished floor, with vandal proof screws.
  - e. Wall Cleanout: (ZS14689-VP) Round Stainless Steel wall access cover complete with vandal proof securing screw and bronze raised Hex head plug.
  - f. Outside Area Walks and Drives: (ZN1400-VP-BP-NH) Adjustable floor cleanout, Dura-Coated cast iron body, with gas and watertight Bronze tapered thread plug, and round scoriated secured top with nickel bronze top, adjustable to the finished floor, with vandal proof screws.
3. Manufacturers: Zurn, J. R. Smith, Wade, Watts, or approved. Zurn model numbers are used as a basis of selection.

## 2.2 FIXTURES

- A. Fixtures shall be American Standard, Kohler, or equal. Submit five (5) portfolios with full description and cuts of fixtures and trim proposed for use to Architect for written approval.
- B. Fixtures shall be as scheduled on the Drawings.
- C. Plate numbers are to be complete as illustrated and described unless otherwise noted. Provide stops as hereinbefore specified for all concealed supplies.

## 2.3 EQUIPMENT

- A. Water Heaters: Shall be glass lined storage tanks with five year warranty. All other components guaranteed against defects in material and workmanship for one year. The tanks shall be designed for 125 lbs. per square inch working pressure and shall have been tested to 300 lbs. per square inch hydrostatic pressure without visible change of shape or distortion. The water heater shall be energy efficient and State Energy approved and listed.

## 3 PART 3 EXECUTION

### 3.1 GENERAL REQUIREMENTS FOR PLUMBING FIXTURES

- A. All fixtures shall be first class in every respect. All finished plumbing shall be accurately lined up and where batteries of fixtures occur special care shall be taken with roughing in and finished plumbing.
- B. The number and position of all plumbing fixtures are shown on the plumbing drawings. Consult architectural drawings for location, dimensions, and mounting heights for fixtures.

- C. Roughing in connections shall follow schedule on plumbing drawings and shall be set exactly as per measurements furnished by the manufacturers of the fixtures used. Roughing in for lavatories shall be brought in through the wall under the fixture and as close to the fixture as possible.
- D. All water supplies to fixtures shall be provided with compression shut-off stops. Combination fixtures shall have compression stop of each water supply fitting.
- E. Concealed stops shall be Brass Craft R 1520DLS/R1520AS.
- F. Except where otherwise specified, all finishes for exposed metal trim on any fixture shall be polished chromium plated. Porcelain caps secured with putty shall be provided and installed for all exposed bolt heads. Handles on all faucets and stops shall be all chromium plated.
- G. All fixtures shall be properly and securely installed and supported as required and approved. Fixtures secured to wooden partitions shall be securely bolted to wood backing, minimum size 2 inches x 8 inches, or as directed by Architect.
- H. Connection between fixtures and flanges on soil pipe shall be made absolutely gas tight and water tight with graphite type gaskets or Feder's closet setting compound. Rubber gaskets or putty will not be permitted.
- I. Fixtures not having integral traps shall be provided with "P" traps of chromium plated cast brass with trap screw at bottom and connected to concealed waste in wall with sanitary fittings. All tailpieces shall be 17 gauge minimum.
- J. Unions on waste pipes on fixture side of traps may be slip or flange joints with soft rubber or lead gaskets.
- K. Floor Drains or Floor Sinks: Shall be placed parallel to room surfaces, set level, flush with floor, and adjusted to proper height to drain. Cover openings during construction to keep all foreign matter out of drain line.
- L. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. "Sanitary 1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).
- M. Floor Mounted Fixtures: Shall be provided with proper support plates. Grout at the floor with waterproof ceramic tile grout.
- N. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

### 3.2 ACCESSIBILITY

- A. Contractor shall be responsible for the sufficiency of size and thickness of partitions for adequate installation of his work. Any equipment requiring access for operation of services shall be made accessible using access doors as required.

### 3.3 CUTTING AND PATCHING

- A. Unless otherwise required by trade custom or specified under another section of the Specifications, cutting and patching will be done by the appropriate trade; but each Contractor shall furnish sketches showing the location and size of all openings, chases, etc., required for the installation of his work.
- B. Each Contractor shall furnish and locate all sleeves and inserts required before the floors and walls are built or shall be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers.
- C. No structural members shall be cut without the approval of the Architect, and all such cutting shall be done in a manner directed by him.

### 3.4 DAMAGE TO PREMISES

- A. Each Contractor shall be responsible for all damage to any part of the premises caused by leaks, breaks in work, storage of materials, or from any other cause as a result of his work in connection with this contract. The responsibility shall extend for a period of one year (1) after acceptance by the Architect.

### 3.5 PIPING INSTALLATION

#### A. General:

1. No piping shall be permanently covered by construction before inspection and approval.
2. Install water generally level, free of traps and unnecessary bends to conform with building requirements and provide space for other work.
3. Piping shall be concealed in all locations unless otherwise noted on Drawings.
4. Install piping, promptly capping and plugging open ends.
5. All outside natural gas piping shall be buried 24 inches minimum.
6. All outside water piping shall be placed at 24 inches minimum depth.

#### B. Solder:

1. Joints in copper tubing for all installations (heating/refrigeration/plumbing) shall be made with Sil-Fos silver brazing alloy. Surfaces to be jointed shall be free of oil, grease, rust and oxides. After cleaning and before assembly or heating, supply Handy-Flux to each joint surface and spread evenly. Heat shall be applied carefully with an oxy-acetylene torch to avoid overheating fittings, valves, etc. The 95% tin - 5% antimony solder may be permitted on plumbing lines above slab or ground only with prior approval for piping sizes 2 inches and smaller only.

C. Welding:

1. General: Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer to conform to the Contract Documents.
2. Welding: The Contractor shall be responsible for the quality of welding done. The quality of the welding procedures and the quality of the welding shall be determined by testing and the welder's ability to make sound welds, under standard working conditions with the equipment to be used in the work on this project, all in conformance with ANSI Standard B31.8 and American Welding Society Standard B3.0.
3. Qualification of Welders: Each welder shall be qualified in accordance with the applicable portions of the American Petroleum Institute Standard A.P.I. Std. 1104 and ST 5L and American Welding Society Standard Institute, Inc. Welders shall hold a valid certificate of competency from a recognized testing laboratory based on the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.
4. Inspection of Welding: All welds shall be inspected visually in accordance with the requirements of ANSI Standard B.31.8. Defective welds shall be removed and replaced at no additional cost to the Owner. Repairing of defective welds by adding new material over the defects or by peening will not be permitted.
5. Welded Joints: Changes in direction of piping shall be made with welded fittings or forged branch connection fittings. Mitering or notching pipe to form elbows and tees, or other similar fittings, will not be permitted.
6. Beveling: Field and shop bevels shall be in accordance with the recognized standards and shall be done by mechanical means or flame cutting. Where beveling is done by flame cutting, surfaces shall be cleaned of scale and oxidation prior to welding.
7. Alignment: Before welding, the component parts to be welded shall be aligned so that no strain is placed on the weld when finally positioned. Height shall be so aligned that no part of the pipe wall is offset by more than 20 percent of the wall thickness. Flanges and branches shall be set true. This alignment shall be preserved during the welding operation. If tack

welds are used, welds shall be of the same procedure as the completed weld. Otherwise, tack welds shall be removed after the welding operation.

8. Erection: Where the temperature of the component parts being welded reaches 32 Degrees F or lower, the pipe shall be heated to approximately 100 Degrees F before welding, and the weld shall be finished before the material cools to 32 Degrees F.
9. Electrodes shall be stored in a dry heated area and shall be kept free of moisture or dampness during fabrication operations. Electrodes that have lost part of their coating will be discarded.

D. Steel Pipe Joints and Connections:

1. Shall have ends reamed to full inside diameter and beveled before being made up into fittings.
2. All changes in direction to be made with proper fittings.
3. All screwed connections to be metal to metal tight.
4. Joints between pipe and fittings to be made with threads fully coated with Key's Thread Paste. Paste is to be applied to male thread.
5. Unions to be placed adjacent to all screwed valves, check valves, or equipment which has no union connections. Unions on water pipes on fixtures side of traps may be slip flange joints with soft rubber or lead gaskets.

E. Cast Iron Pipe Joints and Connections:

1. Joints shall be made with stainless steel coupling No-Hub Type.
2. Cleanouts inside and outside building shall be installed to come flush with finished yard surface or floor surface. Exterior cleanouts shall be encased in concrete pads.
3. Cleanouts placed at bottoms of waste and soil stacks shall be made accessible by either being brought up within 1 inch of the finished floor and provided with a brass floor plate, or to the face of a wall with "T" or "Y" branches.
4. Cleanouts to be located not less than 18 inches from building construction for ease of rodding.
5. Use graphite on all cleanout threads.

### 3.6 TEST OF PIPING

- A. All piping shall be tested at completion of roughing in, in accordance with the following schedule and should show no loss in pressure or visible leaks after a minimum duration of four hours at the test pressures indicated.

Test Schedule		
<u>System Tested</u>	<u>Test Pressure Psig</u>	<u>Test With</u>
All soil, waste, drain, & vent piping within building.	Fill with water to top of highest vent, allow to stand two (2) hours or longer as directed by Inspector.	Water
All cold water.	100 lb. for 15 min. without leaks.	Water
Gas piping.	75 lbs. for 30 min. with no perceptible drop in pressure.	Air

- B. Testing equipment, materials and labor shall be furnished by this Contractor.

### 3.7 CLOSING IN OF UNINSPECTED WORK

- A. This Contractor shall not allow or cause any of the work installed by him to be covered up or enclosed before it has been inspected, tested and approved.
- B. Should any of the work be enclosed or covered up before it has been approved, he shall, at his expense, uncover the work. After it has been tested, inspected, and approved, he shall make all repairs necessary to restore the work of other Contractors to the condition in which it was found at the time of cutting.

### 3.8 PAINTING AND IDENTIFICATION

- A. Identification of pipe systems shall conform to American National Standard A13.1, latest edition.
1. All exposed piping and insulated piping systems furnished and installed under this work shall be completely painted and identified with the direction of flow and type of material indicated by means of legends and flow arrows, all as specified herein. The markings shall be applied after all painting, priming and cleaning of the piping and insulation is completed. Identification markers shall be applied at 20' (twenty foot) intervals and at valve locations.

2. Paint: All exposed piping and insulated piping shall be provided with two coats consisting of Rustolem paint with Federal safety coatings as scheduled below.
3. Piping paint schedule, legend and paint type:

<u>Legend</u>	<u>Marker Black Letters/Code</u>	<u>Tentative Color</u>
Cold Water	SW/C15	Green
Tempered	TW/	Green
Soil & Waste	W/W2	Green
Acid Waste	ACID/A4	Yellow
Vents	V/V4	Green
Storm, Roof Drains	S/S12	Green
Condensate(AC Unit)	COND/C19	Green
Hot Water Supply	HW/D6	Yellow
Hot Water Recirc Ret	HWR/D6	Yellow
Fire Protection	F/S9	Red
Natural Gas	G/N1	Yellow
High Pressure Steam	HPS/H8	Yellow
Low Pressure Steam	LPS/H8	Yellow
Heating Water Supply	HWS/H14	Yellow
Heating Water Return	HWR/H13	Yellow
Condensate Return	COND.R/C27	Yellow
Boiler Feed	BFW/B4	Yellow
Instrument	AIR/14	Green
Medical Air	MED.AIR/A012	Black
Oxygen	OXY/03	Green
Nitrogen	NITROGEN/N2	Green
Nitrous Oxide	NITR.OXY/N2	Blue
Vacuum	VAC/Y2	White
Compressed Air	AIR/A012	Black

- B. The size, in inches, of the lettering and flow arrows shall be per American National Standard A13.1, latest edition, and shall be set mark pipe markers.

### 3.9 CARE AND CLEANING

- A. All broken, damaged, or otherwise defective parts of this work shall be repaired or replaced by this Contractor, at his expense, and the entire work left in a condition satisfactory to the Architect. At the completion of the work this Contractor shall carefully clean and adjust all equipment, fixtures, and trim which are installed as part of his work and the systems and equipment left in satisfactory operating condition.

END OF SECTION

SECTION 23 00 00

**HEATING, VENTILATING AND AIR CONDITIONING**

1 PART 1 GENERAL

1.1 GENERAL CONDITIONS

- A. Requirements of the General Conditions of these Specifications apply to all work. The Contractor shall consult them in detail and assume all obligations or conditions therein which affect this work.

1.2 SCOPE OF WORK

- A. This Contractor shall furnish all material and provide all labor, equipment, tools and services to complete the heating and air conditioning work as shown on the Drawings and as hereinafter described, ready for service to the entire satisfaction of the Architect.
- B. The work includes, in general, the following:
  - 1. Packaged rooftop gas/electric air conditioning units.
  - 2. Split system heat pump units.
  - 3. Exhaust fans.
  - 4. Air distribution supply, return ductwork, and exhaust duct.
  - 5. Temperature control system, complete.
  - 6. Testing and adjusting of the complete system.
  - 7. Other items as may be specified or shown on the Drawings.

1.3 WORK NOT INCLUDED

- A. The following is not included in this work:
  - 1. Painting, except as herein specified or as indicated on the Drawings.
  - 2. Electrical Contractor shall provide all line voltage wiring, and all line voltage conduit, disconnects, manual starters, wiring of smoke detectors, and connect up all motors complete. AC Contractor to provide wiring diagram as requested.

1.4 WORKMANSHIP

- A. Where other instructions are not given, equipment shall be installed in accordance with the recommendations of the manufacturer and the best standard practice for this type of work.

1.5 DRAWINGS

- A. The Drawings form a part of this specification and contract, and any work or material shown on the Drawings and not mentioned in the Specifications, or vice versa, shall be executed the same as if specifically mentioned in both. The work shall be installed



as indicated on the Drawings; however, in certain instances, arrangements are schematic, indicating only general arrangements. Should it be necessary to deviate from the arrangement shown in order to meet structural conditions, such additions shall be made with the approval of the Architect and without expense to the Owner.

- B. The data given herein and, on the Drawings, is as exact as could be secured, but extreme accuracy is not assured. The Drawings and Specifications are for the assistance of the Contractor; exact locations, distances, elevations and levels must be established by the Contractor prior to submission of his proposal. The Contractor shall accept the Contract with this understanding.
- C. Whenever there appears to be a discrepancy between Drawings and/or specifications, the Contractor shall base his bid on the most expensive alternate, and after award of Contract, shall consult the Architect for further instructions.

#### 1.6 ORDINANCES AND REGULATIONS

- A. All work and materials shall be in full accordance with the latest codes, rules, and regulations of the following:
  - 1. National Fire Protection Association.
  - 2. Part - 5, T-24 California Code of Regulations.
  - 3. State Health Department.
  - 4. State Industrial Accident Commission's Safety Orders.
  - 5. Rules of Local Utility.
  - 6. California Mechanical Code.
  - 7. California Building Code.
  - 8. California Plumbing Code.
  - 9. California Electric Code.
- B. Rulings and interpretations of the enforcing agency will be considered part of the regulations.
- C. Nothing in these Specifications is to be construed to permit work not conforming to the above, and expense in compliance with the above shall be borne by the Contractor.
- D. Whenever the Specifications and Drawings require higher standards or larger sizes than those required by the ordinances and statutes, the Specifications and Drawings shall take priority over the specific ordinances and statutes.

#### 1.7 SITE EXAMINATION AND CONDITIONS

- A. This Contractor shall examine the site, verify dimensions and locations against the Drawings and inform himself of all conditions under which work is to be done before submitting his proposal. No allowance will be made in his behalf for extra expense on account of error.

## 1.8 AS-BUILT DRAWINGS

- A. Supplementing the requirements of the General Conditions and Supplementary General Conditions, As-Built Drawings shall show any changes made to the construction documents. Furnish reproducible Drawings when work is complete.
- B. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein.
- C. Dimensions, sizes, and capacities shown are a minimum and shall not be changed without written approval from the Architect.

## 1.9 MATERIAL LIST AND SUBSTITUTIONS

- A. Prior to commencement of work, and within 35 days after the signing of the contract by the Owner and General Contractor, this Contractor shall submit in quintuple to the Architect for approval a complete list of equipment and materials to be furnished, including all substitutions. Partial or incomplete lists of materials will not be considered. No substitutions will be considered thereafter. Only one (1) request for substitution will be considered on each item of material or equipment. The engineer shall review the original submittal only as part of their contract.
- B. If the Contractor desires to make a substitution, he shall submit complete information or catalog data showing the equality of the equipment or material offered to that specified. No substitutions will be allowed unless requested and approved in writing. Materials of equal merit and appearance in the opinion of the Architect/Engineer will be approved for use. Architect/Engineer reserves the right to require originally specified items.
- C. Installation of approved substitution is the Contractor's responsibility. Any changes required for installation of approved substituted equipment must be made without additional cost.
- D. Submittals: Submit in accordance with Section 01300 Submittals.
  - 1. Submit to Architect for approval, within a reasonable time after award of contract and in ample time to avoid delay of construction, shop drawings or submittals on all items of equipment and materials covered in list mentioned above. Shop Drawings and submittals shall be submitted in five (5) copies and in a complete package. Partial submittals will not be accepted.

## 1.10 FEES, PERMITS, AND UTILITY SERVICES

- A. This Contractor shall arrange to obtain and to pay for all permits and service charges required in the installation of his work, arrange for required inspections, and secure approvals from authorities having jurisdiction. Contractor shall arrange or utility connections and pay charges incurred, including excess Service charges, if any.

#### 1.11 DAMAGE BY LEAKS

- A. This Contractor shall be responsible for all damage to any part of the premises caused by leaks or breaks in the work furnished and/or installed by him for a period of one (1) year after date of filing of Notice of Completion.

#### 1.12 GUARANTEE

- A. This contractor shall be responsible for all work done and materials installed under these plans and specifications. Any defective work, material, or part which may show itself within one (1) year of the date of filing of Notice of Completion shall be repaired or replaced by him, as may be necessary, and he is also responsible for all damages to other materials, furnishings, equipment or premises caused by such defects during this period if, in the opinion of the Architect, said defect is due to imperfection of materials or workmanship.
- B. Contractor shall replace refrigerant, lubricants, or gases lost as the result of defects, breaks or leaks in his work.

#### 1.13 ACCESS

- A. This Contractor shall continuously check the Drawings for clearance and accessibility of the equipment specified herein to be placed. No allowance of any kind shall be made for negligence on the part of the Contractor to foresee means of installing his equipment into proper position inside the building.

#### 1.14 SHOP DRAWINGS

- A. Submit descriptive data on all material and equipment including "as specified" items as well as proposed substitutions.
- B. Data on each item shall be marked with the applicable specification paragraph and any identifying mark from equipment schedules shown or specified.
- C. Certified Drawings showing fabrication details, complete dimensions, date of certification and all other pertinent information shall be submitted for approval for all items proposed as substitutions.
- D. Ductwork fabrication drawings shall be made available for all areas that have been modified from the original Drawings.

#### 1.15 MAINTENANCE AND OPERATING INSTRUCTIONS

- A. Furnish the Owner with two copies of manuals, bound between hard covers and titled "AIR CONDITIONING", properly indexed and sectioned, operating sheets and parts list for each and every mechanical system and piece of equipment furnished under these specifications. Deliver same to Architect prior to work's completion.
- B. The "AIR CONDITIONING" materials shall be separated into three sections:

1. Complete operating instructions: Including starting, stopping, and description of emergency manual operation methods for all individual diagrams for the air conditioning system.
  2. Maintenance Instructions: Covering under each item of individual equipment pertinent maintenance data such as lubricants to be used, frequency of lubrication, inspection required, adjustments, etc.
  3. Parts Bulletins: Containing manufacturer's bulletins with parts numbers, instructions, etc., for each item of equipment. Bulletins shall be properly stripped so that useless bulk is avoided.
- C. Service telephone numbers and/or addresses shall also be posted in an appropriate place as designated by the Architect.

## 2 PART 2 PRODUCTS

### 2.1 GENERAL

- A. Materials will be specified herein and as indicated on the Drawings and Schedules.

### 2.2 WEATHERPROOFING

- A. Provide all equipment, ductwork, controls, motor, bearings, V-belts or other materials requiring protection from weather, when located outside of building with adequate weatherproof protection. Obtain approval of Architect in writing prior to installation of protection. Construct weatherproof protection to prohibit water from standing or puddling on equipment ductwork.

### 2.3 DUCTWORK INSULATION

- A. Insulation applied to exterior surface of the ducts located in buildings shall have a flame spread of not more than 25 and a smoke-developed rating of not more than 50 when tested as a composite installation including insulation, facing materials, tapes and adhesives as normally applied.
- B. All insulation shall be applied by those who are licensed contractors in the insulation industry, who employ only skilled personnel.
- C. All diffuser boots, drops, and concealed supply and return ducts, unless indicated otherwise, shall be wrapped with a minimum installed "R" value of 8.0, adjust thickness as required. The insulation shall be Manville, Fiberglas, or equal to Manville Microlite fiberglass foil faced duct insulation lapped 4 inches and held in place by copper clad wire tied on 12 inch centers of 1/2 inch long staples on 2 inch centers. Before wrapping insulation around ducts, Contractor shall apply adhesive on all four sides of ducts to prevent sagging of insulation.
- D. Internal duct lining shall be provided on all exposed supply and return ducts and for a minimum distance of 10 feet 0 inches of the packaged gas/electric unit's inlet, discharge, and elsewhere shown. The installed "R" value shall be a minimum 8.0 when located exterior and in non-conditioned space and 4.2 at interior areas, adjust thickness as required. It shall be Manville, Fiberglas, or equal to Manville Microcoustic

duct liner with NFPA film facing. Adjust duct sizes to accommodate liner and to give new dimensions shown on Drawings. Cement lining in place with Foster's No. 85-20 non-flammable adhesive and fasten to sheet metal with Type B Stick-klips.

- E. Point up exposed edges and leading edges of all cross points of the liner with Benjamin Foster's 30-36 Seal-Fas adhesive.
- F. Duct seams shall be taped as hereinafter specified.
- G. All insulation shall be UL approved and bear UL stamp on the insulation material at 5'-0" intervals.

## 2.4 DUCTWORK

- A. All sheet metal ductwork shall be made of commercial grade galvanized steel.
- B. Material exposed within ducts or plenums shall have a flame spread rating of not more than 25 and a smoke-developed rating of not more than 50.
- C. Broken pieces in coating made in forming shall be completely soldered over. Weights of sheets shall not be less than the following:

<u>Size of Ducts</u>	<u>US Gauge Galv. Iron</u>
0 inch to 12 inches	26
13 inches to 30 inches	24
31 inches to 54 inches	22
55 inches and larger	20

- D. Ducts less than 14 inches in greatest dimension shall have government clip or pocket slip seams at centers not to exceed 94 inches. Ducts over 14 inches in greatest dimension shall have government clip or slip pocket seams at 34 inches centers. Duct shall be diagonally creased on all four sides. Longitudinal seams shall be double crimped, bent and hammered tight. In addition, all ducts over 61 inches in greatest dimensions shall have 1-1/2 inches x 1-1/2 inches x 1/8 inch galvanized angle iron bracing around the entire duct, placed midway between the seams.
- E. Elbows shall be made with a center line radius of 1.5 times the duct width parallel to the radius. Where space does not permit the above radius, or where square elbows are indicated on the drawings, they shall be equipped with turning vanes of an approved type. The turning vanes shall be thick double wall vane type, H.E.P. Vane, or equal.
- F. The slopes in the sides of transition pieces shall be approximately one to five. No abrupt changes or offsets of any kind in the duct system will be permitted.
- G. Ducts shall be provided with supports to prevent any bending or sagging. Supports shall be as detailed on the construction documents. Spacing shall not to exceed 5 feet.
- H. Ducts and plenums lined with insulation shall be increased in size to allow for the insulation thickness so that dimensions shown on the Drawings will be net inside dimensions.

## 2.5 DUCT CONNECTIONS

- A. All standing seams and transverse joints in all ductwork shall be covered with the rectangular duct connection system as follows:
1. General: Prefabricated slide-on transverse duct connectors and components shall be used on all exterior ductwork. Duct constructed using prefabricated systems will refer to the manufacturer guidelines for sheet gauge, intermediate reinforcement size and spacing, and proper joint reinforcements.
  2. Installation: Installation and reinforcement of the Ductmate flange connection system shall be in accordance with the manufacturer's printed instruction and installation manual.
  3. Components:
    - a. Flange angle: Complete with integral mastic.
    - b. Corner Piece: For insertion into the hollow web of flange angle.
    - c. Cleat: Snaps or drives onto flange.
    - d. Ductmate 440 Flange Gasket.
    - e. Corner Clips or Bolts: Used to fasten flange angle corners.
  4. Testing: Connector system shall have successfully passed pressure testing to positive and negative 10 inches w.g. Reference Ductmate Test Report PEN-113 and PEN-116.
  5. Approved Systems: Ductmate Industries, Inc., DM 25, 35, 45 Connector Systems or W.D.F.C. Flange Connector.

## 2.6 INSULATED FLEXIBLE DUCT

- A. Flexible duct may be used in branch lines for supply and return outlets with a maximum length of 5'-0" from each outlet as shown on the Drawings and shall be Thermaflex Model MK-E consisting of an inner core, insulation R-8 and an outer moisture barrier. The inner core shall be constructed of a chlorinated polyethylene (CPE) bonded to the coated wire helix for maximum strength and durability. An insulating blanket woven of fiberglass shall encase the inner core and shall be sheathed with an outer vapor barrier of metallized polyester film. The vapor barrier shall be .05 perm per ASTM E96, Procedure A. The flexible duct shall be rated for a maximum working velocity of 5500 FPM and shall be listed by the Underwriters Laboratories under their UL 181 standards as Class 1 duct and bear UL stamp.
- B. Flexible ducts shall be supported at 4'-0" o.c. with 3" wide 28-gauge steel hanger collar attached to the structure with an approved duct hanger. Collars shall have

hemmed edges to prevent cutting of flexible duct. Installation shall minimize sharp radius turns or offsets.

- C. Flexible ducts may be used to cross seismic joints without offsets.
- D. All material exposed within ducts or plenums shall have a flame-spread rating of not more than 25 and a smoke-developed rating of not more than 50.
- E. Duct leakage shall not be more than 6% of total air flow and shall be verified.

## 2.7 BALANCING DAMPERS

- A. Balancing dampers shall be furnished and installed at locations indicated on the Drawings.
- B. Dampers shall have locking and indicating quadrant Parker-Kalon Company's, Elgin, or equal. Dampers installed in inaccessible locations shall have damper rods extended and terminated with ceiling, with a Young Company's, Elgin, or equal, adjustable cover concealed damper regulator.
- C. Dampers in square or rectangular ducts not shown as splitter or butterfly dampers shall be of the multi-louver type arranged for opposed blade operation and shall be Controlair, Krueger, or equal to Controlair OPP-MD. Butterfly and splitter type damper blades shall be of U.S. 16 gauge galvanized steel, minimum, and shall have a minimum shaft size of 3/8 inches. Dampers in round ducts shall be single blade type, Controlair or equal, with extended shaft as required.

## 2.8 FLEXIBLE CONNECTIONS

- A. Flexible connections shall be furnished and installed where shown. Duct connections shall also be furnished and installed where shown. Duct connections shall be Vent-Fabrics, Bauer and Black Fiberglass Thermosetting Adhesive Tapes No. 263 and 281. Apply per manufacturer's recommendations. Width of flexible connections shall be sufficient to allow one-inch minimum free space between two metal collars to be connected.

## 2.10 EQUIPMENT

- A. Combination Heating and Cooling Roof Top Air Conditioning Unit (Up to and including 6 tons):
  - 1. The unit shall be package-type gas-fired furnace and air-cooled self-contained air conditioning unit. It shall be Trane or equal, sized as shown on the Drawings.
    - a. The unit casing shall be fully weatherproofed for outdoor curb-mounted installation, bonderized and finished with baked enamel. The cooling section shall be sufficiently insulated to prevent heat losses, sweating, and reduce noise level. The unit shall have sufficient removable panels for servicing of the unit.

- b. The cooling section shall have the required capacity and cfm air delivery as shown on the plan with the return and cfm air delivery as shown on the plan with the return air at a temperature of 80 Degrees db and 67 Degrees wb and outdoor air temperature of 105 Degrees db.
- c. The coils shall be aluminum finned mechanically bonded to copper tubing.
- d. The compressor shall be reciprocating, hermetically sealed type and shall be equipped with vibration isolators. The compressor motor assembly shall be protected by overloads and/or internal thermostat protection. The compressor shall be provided with a total of five (5) years warranty.
- e. The unit shall be equipped with low ambient temperature control down to 45 Degrees F, crankcase heater, head pressure control, and compressor time cycle protector.
- f. Provide a full economizer as detailed on the drawings with an adjustable temperature control setting for "free" cooling with outdoor air while locking out compressor by dry bulb temperature. The economizer shall be a modulating power exhaust type. The power exhaust shall be a MicroMetl series centrifugal blower power exhaust. The power exhaust must have a method to accurately sense the space pressure and adjust the amount of exhaust air accordingly. The pressure shall be sensed with an adjustable range, low-pressure transducer. The different ranges are needed to provide a more accurate and appropriate signal to the variable speed motor controller. The exhaust volume adjustment is accomplished using a variable frequency drive with a built-in PID control to maintain a field adjustable pressure set point. A PID loop is required to prevent the exhaust from hunting to maintain a specific pressure. The power exhaust shall be self-supporting (no external supports), have hinged blower access panel, utilize the HVAC unit filter access door, and have the blower rotated 90 degrees from the supply air intake. The outside/return air damper section shall be gear driven and have a low static pressure drop across the return and outside air dampers.
  - 1) The mechanical contractor and the test and balance agency shall adjust and set up the economizer and power exhaust package. The mechanical contractor shall cycle the economizer to check for proper damper operation, including variable frequency drive, room pressure sensor.
  - 2) Compressor Warranty: Unit manufacturer shall include optional compressor warranty for a total of five (5) years.
  - 3) One-hundred Percent (100%) Power Exhaust Package:



- a) Package is unit mounted on down flow with economizer package only.
  - b) Package shall include integral propeller-type exhaust fan complete with fan drive, field adjustable differential pressure switch and gauge. Field-installed rain hood shall include actuator.
  - c) Power exhaust is microprocessor controlled to operate in conjunction with economizer to maintain a field calibrated interior pressure.
- h. Roof Curb: Units shall be installed on full perimeter support National Roofing Contractors Association approved roof curbs when shown.
- 1) Curbs shall be a welded structurally calculated curb, pre-sloped to match the roof slope, with a minimum height of 14 inches at the high point of the roof.
    - a) Non-insulated full perimeter welded structurally calculated curb, California State Standard, Standard Seismic Criteria, "Structurally" stamped by a professional engineer.
  - 2) Provide without pitch.
  - 3) Provide insulated deck pan with Wood Nailer, seal strip on load bearing surface to facilitate flashing.
  - 4) Provide hold down brackets.
  - 5) Meets seismic requirements for 2019 CBC & 2018 IBC.
  - 6) Wind Design Criteria: 60 Foot Tall Building Maximum, Exposure C, 155 mph, 3 second gust speed, Risk Category III & IV.
  - 7) Mechanical contractor shall coordinate curb height with any rigid insulation on top of sheathing. Roof curb to be installed per manufacturer's written instructions.

B. Cooling Only Air-Conditioning Split System:

- 1. General: Furnish and install a two-piece, air-to-air electric cooling only unit. Unit shall be completely assembled and tested, complete with refrigerant charge and ready to operate. The total unit shall be UL listed and carry a UL label. The unit shall be Mitsubishi PK/PU.
- 2. Cooling capacity: Unit cooling cycle capacity shall be as indicated on the Drawings.
- 3. Unit Compressor shall be fully hermetic with crankcase heater and suitable vibration isolators. The standard unit shall be capable of operating to 45

Degrees F OAT at published cfms on cooling cycle. Compressors shall have a five-year warranty.

4. Coils: Evaporator and condenser coils shall have copper tubing and aluminum fins. A capillary tube shall be the metering device for the refrigeration system.
5. Fans and Motors: Indoor air fan shall be forward-curved, centrifugal, direct driven capable of delivering cfm static pressure as scheduled. Indoor fan shall have permanently lubricated motor. Outdoor air fans shall discharge upward.
6. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked enamel finish. Cabinet interior shall be insulated with one-inch thick neoprene-coated fiberglass. Cabinet panels shall be easily removable for service to all operating components. A condensate drain for the indoor coil shall be provided.
7. Controls and protective devices shall include a crankcase heater, liquid line low pressurestat, suction line accumulator and pressure relief device. Motor compressor shall have both thermal and current sensitive overload devices and internal high-pressure protection. Outdoor unit wiring shall incorporate a positive acting timer to prevent compressor short cycling if power is interrupted. Device shall prevent compressor from restarting for a 5-minute period. An automatic defrost control shall be included to accomplish defrosting every 90 minutes for a period of not more than 10 minutes. A 24-volt transformer shall be factory installed and wired on outdoor units for external control circuit.
8. System accessories shall include the following: remote indoor wall thermostats, head pressure control, filter box with 1" thick throw-away type air filter, electrical resistance heaters, and condensate pump.
9. Electrical Characteristics and capacities shall be as scheduled on the Drawings.

C. Ceiling Mounted and Inline Centrifugal Exhaust Fan.

1. Manufacturer: Lauren Cook or approval equal.
2. Direct Drive Premium Ceiling Mounted Centrifugal Exhaust Fans - Greenheck Model SP-A.
  - a. General Description:
    - 1) Base fan performance at standard conditions (Density 0.075 lb./sq. ft.).
    - 2) Ceiling mounted applications.
    - 3) Performance capabilities up to 1,600 cubic feet per minute (cfm) and static pressure to 0.75 inches of water gauge.

- 4) Fans are available in nineteen sizes (50 - 1550 unit sizes).
  - 5) Maximum operating temperature is 130 Fahrenheit.
  - 6) Sound levels as low as 0.7 AMCA sones Sound levels as low as <0.3 AMCA sones.
  - 7) U.L. listed for above bathtub exhaust.
  - 8) Fans are U.L. listed 507 - Electric Fans.
  - 9) Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number.
- b. Wheel:
- 1) Forward curved centrifugal wheel.
  - 2) Constructed of galvanized steel or calcium carbonate filled polypropylene.
  - 3) Statically and dynamically balanced in accordance to AMCA Standard 204-05.
- c. Motors:
- 1) AC Induction Motor:
    - a) Motor enclosures: Open drip proof (ODP) - opening in the frame body and or end brackets.
    - b) Motors shall be permanently lubricated sleeve bearing type to match with the fan load and furnished at the specific voltage and phase.
    - c) Motor shall be mounted on vibration isolators and be accessible for maintenance.
    - d) Thermal overload Protection.
- d. Housing:
- 1) Constructed of heavy gauge galvanized steel.
  - 2) Interior shall be lined with 0.5 inches of acoustical insulation.
  - 3) Profile as low as 10-1/2 inches.

- e. Spring Loaded Aluminum Backdraft Damper:
  - 1) Prevents air from entering back into the building when fan is off.
  - 2) Eliminates rattling or unwanted backdrafts.
- f. Outlet:
  - 1) Type of outlet: Square.
  - 2) Field rotatable from horizontal to vertical discharge.
  - 3) Shall include an aluminum backdraft damper.
- g. Grille:
  - 1) Type: Designer - Calcium-carbonate, Factory Standard.
  - 2) Constructed of high impact polystyrene, plastic shall be factory standard.
- h. External Electrical Accessories: Eliminates removing the motor pack which saves time on installation.
- i. Mounting Brackets: Fully adjustable for multiple installation conditions.
- j. Options/Accessories:
  - 1) Manual Switches:
    - a) 1 Function: indoor application no water. (Single pole rocker switch assembly).
    - b) U.L. Listed.
    - c) Positive electrical shut-off.
    - d) Access for wiring shall be external.
  - 2) Time Delay Switch:
    - a) Properly evacuate moisture and odor from the space.
    - b) On a delay of 10 to 60 minutes after the fan/light on fan has been turned off.
- 3. Submittals:
  - a. Provide dimensional drawings and product data on each fan.

- b. Provide fan curves for each fan at the specified operation point, with the flow, static pressure and horsepower clearly plotted.
  - c. Provide outlet velocity and fan's inlet sound power readings for the eight octave bands, decibels, and sones.
  - d. Strictly adhere to QUALITY ASSURANCE requirements as stated in the following paragraph (item #4) of this specification.
  - e. Provide manufacturer's certification that exhaust fans are licensed to bear Air Movement and Control Association (AMCA), Certified Rating Seal for sound and air performance.
  - f. Installation, Operation, and Maintenance Manual (IOM): Provide manufacturer's installation, operations, and maintenance manual, including instructions on installation, operations, maintenance, pulley adjustment, receiving, handling, storage, safety information and cleaning. A troubleshooting guide, parts list, warranty and electrical wiring diagrams.
4. Quality Assurance:
- a. Performance ratings: Conform to AMCA standard 211 and 311. Fans must be tested in accordance with ANSI/AMCA Standard 210-99 and AMCA Standard 300-96 in an AMCA accredited laboratory. Fans shall be certified to bear the AMCA label for air and sound performance seal.
  - b. Classification for Spark Resistant Construction, levels A, B, and C conform to AMCA 99.
  - c. Each fan shall be given a balancing analysis which is applied to wheels at the outside radius. The maximum allowable static and dynamic imbalance is 0.05 ounces (Balance grade of G6.3).
  - d. Comply with the National Electrical Manufacturers Association (NEMA), standards for motors and electrical accessories.
  - e. The High Wind models have been analyzed and stamped by a state license P.E. to the ASCE 7-02 Standard which meets the IBC, Florida and Miami-Dade codes.
  - f. Each High Wind model is subject to be certified by a third party to the ASTM E330 Static Pressure Difference Standard.
  - g. All High Wind models have been analyzed using Computational Fluid Dynamics (CFD). The CFD simulates the flow of high speed (150 MPH) winds over the surface of objects.
  - h. The Finite Element Analysis (FEA) is the results from the CFD and it can accurately predict the stress, strain, and deflection resulting from high wind loads.

5. Delivery, Storage, and Handling:
  - a. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer, material, products included, and location of installation.
  - b. Storage: Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer's instructions. For long term storage follow manufacturer's Installation, Operations, and Maintenance Manual.
  - c. Handling: Handle and lift fans in accordance with the manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer.
6. Warranty: Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and is not a limitation of, other rights Owner may have under Contract Documents.
  - a. The warranty of this equipment is to be free from defects in material and workmanship for a period of from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at the Manufacturer's option when returned to Manufacturer, transportation prepaid.
  - b. Motor Warranty is warranted by the motor manufacturer for a period of one year. Should motors furnished by us prove defective during the period, they should be returned to the nearest authorized motor service station.
7. Maintenance: Refer to Manufacturer's Installation, Operation and Maintenance Manual (IOM), to find maintenance procedures.
8. Execution:
  - a. Manufacturer's Instructions: Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog installation instructions.
  - b. Examination: Examine areas to receive fans. Notify the Engineer of conditions that would adversely affect installation or subsequent utilization and maintenance of fans. Do not proceed with installation until unsatisfactory conditions are corrected.
  - c. Preparation:
    - 1) Ensure roof openings are square, accurately aligned, correctly located, and in tolerance.

- 2) Ensure duct is plumb, sized correctly, and to proper elevation above roof deck. Install duct as specified in the construction documents.
- d. Installation:
- 1) Install fan system as indicated in the Installation, Operation, and Maintenance Manual (IOM) and contract drawings.
  - 2) Install fans in accordance with manufacturer's instructions.
- e. System Startup: Refer to Installation, Operation, and Maintenance Manual (IOM).
- f. Cleaning: Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction.
- g. Protection:
- 1) Protect installed product and finished surfaces from damage during construction.
  - 2) Protect installed exhaust fans to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion.

## 2.11 TEMPERATURE CONTROL

- A. General: The wiring and low voltage temperature control equipment in accordance with the wiring diagrams and the functional operation of the temperature control system shall be the responsibility of the Mechanical Contractor. Electrical Contractor shall provide all line voltage wiring, and conduit, disconnects, and connect up all motors complete.
- B. Drawings of temperature control system are diagrammatic only, and any apparatus not shown, such as relays, accessories, etc., but required to make the system operative to the complete satisfaction of the Architect shall be furnished and installed without additional cost.
- C. All electric connections to temperature control equipment shown on the Temperature control diagrams or specified, will be furnished and installed by the Mechanical Contractor performing this work, and, where exposed to weather, shall be run in conduit.
- D. All equipment and controls such as starters, switches, relays, etc., shall be clearly identified and labeled as to function and position with permanently engraved nameplates.

- E. Control interlock wiring shall be provided by Mechanical Contractor and installed per manufacturer's recommendations. All controls and control wiring shall be furnished and installed complete by the Mechanical Contractor.
- F. All thermostats shall have separate heating and cooling settings and shall not allow heating and cooling. At the same time, the thermostats shall be provided with metal covers as shown on the Drawings.
- G. Equipment furnished by this Contractor that is normally wired before installation shall be furnished completely wired. Temperature control wiring normally performed in the field will be furnished and installed by the Mechanical Contractor.
- H. Prior to installation, the Mechanical Contractor shall submit diagrams, component data and description of sequence of operation to Architect for approval.
- I. Entire system shall be guaranteed for one year with emergency service for an additional year without charge to the Owner from the date of Notice of Completion of the completed project. After completion of the installation, the Mechanical Contractor shall regulate and adjust all thermostats, dampers, motors and other temperature control equipment provided under this Contract.
- J. Entire system shall be as shown on the Drawings.

### 3 PART 3 EXECUTION

#### 3.1 INSPECTION

- A. Follow the general arrangement indicated on the Drawings as closely as possible. Coordinate with the Architectural, Plumbing, and Electrical Drawings prior to installation of the materials and equipment to verify adequate space available for installation of work shown. In the event a field condition arises which makes it impossible or impractical to install the work as indicated on the Drawings submit in writing the proposed "departures" to the Architect for approval. Proceed with installation of the "departures", only when notified to do so in writing by the Architect.

#### 3.2 PREPARATION

- A. Because of the small scale of the Drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. Carefully investigate the conditions surrounding the installation of this work, furnishing the necessary fittings which may be required to complete the installation. Verify that adequate space is available for the installation of the equipment and ductwork as indicated, prior to detailing for fabrication.

#### 3.3 INSTALLATION

- A. General: The location of apparatus and equipment indicated on Drawings are approximate. Install ducts, registers, grilles, diffusers, and equipment in such a manner as to avoid all obstructions, preserve head room and keep openings and passages clear. Coordinate the locations of all diffusers, registers, and grilles with the Architectural reflected ceiling drawings.



B. Equipment Installation:

1. Install all equipment provided under this Section in strict accordance with the manufacturer's recommendations.
2. Should the Drawings or Specifications indicate the equipment is to be installed in a manner not in accordance with manufacturer's recommendations, obtain direction from the Architect in writing prior to proceeding with the installation. If installation proceeds without obtaining direction from the Architect, make all required corrections to the installation at no additional cost to the Owner.
3. Position equipment to result in good appearance, with easy access to all components for maintenance. Install the piping and pipe line accessories so that they do not interfere with equipment access.
4. Provide shims, anchors, support straps, angles, grouted bases, etc., as required to install equipment level, secure, and out of moisture.

C. Openings through Walls: Coordinate framed openings in walls, floor, and roof for ductwork in advance of the work. Furnish any additional drawings required showing the correct dimensions and locations of the required openings.

D. Fasteners: Only use galvanized or stainless steel screws, nuts, bolts, rods and washers. After fabrication, hot dip galvanized unfinished ferrous items for outdoor use or other areas subject to moisture.

E. Lubrication Points: When lubrication points on equipment are inaccessible provide a 1/4 inch Schedule 40 black steel extension. Terminate the lubrication extension with the proper type lubrication fitting at an accessible location in front of the equipment or behind an access door.

F. Vibration Isolation:

1. All rotating equipment and equipment capable of transmitting vibration into the space shall be mounted on vibration isolators and bases. The isolator and bases shall be properly sized by the isolator manufacturer, taking into account the piece of equipment and the structure upon which it is setting.
2. The isolators shall be fastened to the structure and to the equipment with properly sized and structurally engineered anchors and bolts.
3. The equipment manufacturer shall furnish the weight of the equipment at each point of support.
4. All isolators shall be properly adjusted so that equipment is level, snubbers, and seismic type mounts are centered, and no short circuiting occurs. They will be readjusted as necessary during the warranty period, at no cost to the Owner, to assure proper operation.

5. All connections to vibrating equipment such as piping, conduits, and ductwork shall be installed so that short circuiting does not occur. Piping shall have flexible pipe connectors before the first hanger to dampen vibration.

G. Seismic Restraints:

1. Provide seismic restraints per applicable code and standards as specified and/or indicated. Design and provide restraints to prevent permanent displacement in any direction caused by lateral motion, overturning or uplift.
2. Design restraints per SMACNA/PPIC "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems", for equipment, ducts, and piping. Seismic Force Criteria: 0.5 G.
3. The equipment itself must be designed to withstand the required seismic force criteria, including its internal design, components and frame; and must have suitable structural elements to which restraining attachments may be fastened.
4. Provide and locate restraints to allow normal operation of system without transmitting vibrations to building structure. Normal operation includes static condition, start up, normal running, and shut-down. Allow maximum of 1/4 inch between restraint and restrained devices.
5. Base Mounted Equipment: Restraints shall be separate from vibration isolator unless otherwise noted. Provide a minimum of four restraints for each piece of equipment.
6. Prepare designs, including arrangements, sizes, locations, and model numbers indicated or referenced in applicable standards. Where designs are neither indicated nor referenced, submit designs and supporting calculations prepared by a Structural Engineer registered in the State of California.

- H. Electrical: Load and line voltage connections to equipment will be made by the Electrical Contractor unless specifically noted otherwise. Coordinate work with the Electrical Contractor. Furnish the Electrical Contractor with shop drawing information for indicating ratings and control circuits required for the actual equipment furnished.

### 3.4 IDENTIFICATION

A. Identification of New Material:

1. Provide pipe with manufacturer's identification and service on each length of pipe as required by ASTM Specifications.
2. Provide all pressure vessels with ASME Stamp of Approval.

B. Piping:

1. Pipe identification shall be tailored to match the legend on the drawings.
2. Color of marker, field and letter size shall conform to ANSI A13.1-1981.

3. Identify piping 2-1/2 inches and smaller every 20 feet where exposed to view, and at valves where concealed.
  4. Identify piping 3 inches and larger every 30 feet where exposed to view, and at valves where concealed.
  5. Markers shall be installed where piping changes direction or passes through walls or floors.
  6. Where piping is provided with insulation, marker size and spacing shall be in accordance with the outside dimensions of insulation.
  7. Provide a minimum of one marker in each room.
- C. Equipment Identification:
1. All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g. AC-1).
  2. Provide 1/2 inch high lettering white on black background. Nameplates shall be permanently secured to the exterior of the unit.

### 3.5 FIELD QUALITY CONTROL

- A. Closing in uninspected work: Do not allow or cause any of this work to be covered up before it has been duly inspected, tested and approved by the Architect or any other authorized inspectors having legal jurisdiction over this work. Should the Contractor fail to observe the above, the work shall be uncovered, and after inspection, testing, and approval, re-covered at no additional expense.

### 3.6 SYSTEM BALANCE AND ADJUSTMENT

- A. General: Heating and Air Conditioning Contractor shall obtain the service of an independent test and balancing agency, or equal, that specializes in, and whose business is limited to, testing and balancing of air conditioning systems.
- B. Contractor shall coordinate work done by testing and balancing agency with work of other trades.
- C. Testing and Balancing agency as part of its contract shall act as authorized inspection agency and shall report any discrepancies or items not installed in accordance with Contract Drawings and/or specifications pertaining to air and water distribution, and exhaust systems.
- D. Contractor shall provide for adjustments, additions, or modifications to fan and motor sheaves, belts, damper linkages and the like to achieve proper air balance at no additional cost.
- E. Testing and balancing shall be performed in complete accord with ABC National Standards for Field Measurement and Instrumentation, Volume four. Testing and balancing shall be performed on all air distribution systems.

- F. Allowance shall be made for air filter resistance at the time of the tests. The main air supplies shall be at design air quantities and at an air resistance across the filter bank midway between the design specifications for clean and dirty filters. The room air supply and exhaust shall be within  $\pm 10\%$  of design air quantities for rooms with an air supply, return or exhaust under 1000 CFM or more in rooms with multiple outlets. In all cases, the total air quantities supplied to any floor or major zone shall be within  $\pm 10\%$  of the design.
- G. Static Pressure Readings shall be taken with an inclined manometer; air velocity readings shall be taken with instruments of recent calibration. The final velocity readings shall be taken with an Alnor Velometer, Anemometer, or a vane type anemeter calibrated prior to the test and recalibrated at the end of the test.
- H. Tests shall be run with supply, return, and exhaust systems operating with all doors, windows, etc., closed or under regular traffic.
- I. Contractor shall adjust deflection of all supply outlets to insure proper and uniform air distribution throughout the areas served by such outlets.
- J. Contractor shall submit two copies of the balancing report to the Architect for evaluation and approval.
- K. This report shall include as a minimum, but not be limited to, the following design and actual information: horsepower, brake horsepower, revolutions per minute, actual amperage and full load rated current of all motors and fans; cubic feet per minute, static pressure and outlet velocity and cubic feet per minute of each outlet of each unit or zone; air temperatures of all rooms serviced by air distribution system, and all other information required to establish completely balanced system.

### 3.7 PRIMING AND PAINTING

- A. Perform all priming and painting on the equipment and materials as specified herein.
  - 1. Priming: Exposed ferrous metals, including piping, which are not galvanized or factory-finished shall be primed. Black steel pipe exposed to the weather shall be painted one coat of Rust-Oleum #769 primer and one coat of #960 primer. Metal surfaces of items to be jacketed or insulated except ductwork and piping shall be given two coats of primer unless furnished with equivalent factory finish. Items to be primed shall be properly cleaned by effective means free of rust, dirt, scale, grease, and other deleterious matter and then primed with the best available grade of rust-inhibitive red lead or chromate primer as approved. After erection or installation, all primed surfaces shall be properly cleaned of any foreign or deleterious matter that might impair proper bonding of subsequent paint coatings. Any abrasion or other damage to the shop or field prime coat shall be properly repaired and touched up with the same material used for the original priming.

### 3.8 TEST AND ADJUSTMENT

- A. Upon completion of the work, all equipment and systems shall be operated and tested for a period of at least three (3) consecutive days to demonstrate their

satisfactory overall operation. On the last day of this period, the Contractor shall arrange for an acceptance test and final inspection to be conducted by the Engineer in the presence of the Contractor or his representative. The Engineer shall be notified of this meeting at least one week in advance of the time proposed by the Contractor and a mutually agreeable time arranged. The Contractor shall make all necessary adjustments and corrections to the systems prior to acceptance test so that the systems are operating smoothly and properly and are absolutely ready for check and acceptance at this time.

- B. Any equipment, system, or work found deficient during the test shall be replaced or revised as required to the entire satisfaction of the Engineer.
- C. During this time, a representative of the Owner shall be instructed in the proper care and operation of the equipment and controls. A set of typewritten instructions giving pertinent operating data shall be framed under glass and mounted in a location as directed by the Engineer. This includes wiring and schematic diagrams of all controls, thermostats, etc.

END OF SECTION

## COMMON WORK RESULTS FOR ELECTRICAL

### SECTION 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL

#### PART 1 – GENERAL

##### 1.01 RELATED DOCUMENTS

All work under Divisions 26, 27, and 28 is subject to the General, Supplementary, Special Conditions and other Division 1 Specification Sections preceding this section. The Contractor will be responsible for and governed by all requirements. Drawings indicate the general arrangement of the electrical layout and work included. The Contractor will follow these drawings to lay out and check the drawings of other trades to verify locations and spaces in which work will be installed.

##### 1.02 SUMMARY OF WORK

- A. This portion of the work includes furnishing of all labor and materials necessary for a complete wiring system to outlets and all equipment shown on the Drawings or covered by this section of the Specifications. In general, the work includes the following:
1. Utility services and facilities as detailed on the plans.
  2. Power service and distribution system as shown, complete with panelboards, transformers, and feeders..
  3. Complete system of branch circuit wiring and equipment including all wiring devices and plates on all outlets.
  4. A new lighting fixture system complete with lighting controls, as shown on Plans, including T24 certified commissioning and acceptance testing.
  5. Fire alarm, Data, PA, Clock, and Telephone systems.
  6. Raceways, wiring, fused disconnect switches, etc., for equipment covered by other sections of these Specifications.
  7. All hangers, anchors, sleeves, chases and supports for fixtures, electrical equipment and materials including earthquake bracing.
  8. All excavating, backfill, concrete pads and bases as required for electrical work.
  9. Include payment of all required insurances, fees and taxes unless specifically shown "BY OTHERS".
- B. The electrical drawings are diagrammatic and do not necessarily show all raceway, wiring, number or types of fittings, offsets, bends or exact locations of items required by the electrical systems. Items not shown or indicated which are clearly necessary for proper operation, payment or installation of systems shown shall be provided at no-increase in contract price.

## COMMON WORK RESULTS FOR ELECTRICAL

- C. The exact routing of systems and location of devices and equipment shall be governed by coordination with other trades, structural and architectural conditions. Contractor shall verify requirements prior to roughing in.
- D. Install electrical work in cooperation with other trades and make proper provisions to avoid interferences and coordinate with structural and architectural features, in a manner approved by the Architect or Electrical Engineer. All changes caused by neglect to make such provisions shall be at Contractor's expense. Provide offsets and special fittings, as required to facilitate installation of the work.
- E. When a particular product or type of product is specified with a manufacturer's designation, the latest published specifications, installation, and construction information of the manufacturer shall constitute the minimum acceptable standard. Any substitutions shall be made in accordance with the SUBSTITUTIONS sections of the Specifications.

### 1.04 RULES AND REGULATIONS

- A. All work and materials shall be in full accordance with the latest rules and regulations of the following:
  - 1. California Electrical Code (CEC), 2019 Edition
  - 2. California Energy Commission, Title 24, 2019 Standards
  - 3. California Fire Code, 2019 Editions
  - 4. National Fire Alarm and Signaling Code NFPA 72, 2019 Edition
  - 5. California Building, Mechanical and Plumbing Codes, 2019 Editions
  - 6. California Code of Regulations
    - a. Title 8, Safety Orders
    - b. Title 19, Fire and Panic Safety Standard
    - c. Title 24, Part 1, Administrative Regulations
  - 7. Occupational Health and Safety Act (OSHA)
  - 8. California State Fire Marshal Rules
- B. Where two or more codes conflict, the most restrictive shall apply.
- C. Nothing in these Plans and Specifications is to be construed to permit work not conforming to these codes.
- D. Before the Final Certificate of Payment will be issued, the Contractor shall deliver to the Owner all Certificates, Permits, Record Drawings and Instructions/Parts Manuals.

## COMMON WORK RESULTS FOR ELECTRICAL

### 1.05 TESTS AND STANDARDS

- A. The tests, standards, or recommended procedures of the following agencies shall relate to all parts of these Specifications and shall be considered a minimum:
1. American National Standards Institute (ANSI).
  2. Underwriters Laboratories, Inc. (UL).
  3. National Electric Manufacturers Association (NEMA).
  4. Electrical Testing Laboratories (ETL).
  5. National Fire Protection Association (NFPA).
  6. Insulated Power Cable Engineers Association (IPCEA).
  7. Institute of Electrical and Electronic Engineers (IEEE).
  8. Illumination Engineering Society (IES).

### 1.06 EXAMINATION OF DOCUMENTS AND SITE

- A. Before submitting a proposal, each bidder shall carefully examine the electrical, mechanical, architectural, and structural drawings and specifications. He shall also visit the site and fully inform himself as to all existing conditions and limitations applying to the work. If, after such examination and study, it appears that any change from the drawings and specifications should be allowed, the bidder shall so state in writing together with any change in cost involved.
- B. By the act of submitting a proposal, each bidder shall be deemed to have made such examinations of the drawings and specifications and premises, and it will be assumed that he is therefore familiar with the entire scope of the project and has based his proposal upon the work described in the Drawings and Specifications and upon all existing conditions and limitations applying to his work.

### 1.07 IMPLEMENTATION

- A. **Workmanship:** The work shall be performed by competent workmen, skilled in the particular phase of the work entailed. The work shall be first class throughout, neat, accurate and in full accordance with the intent of these Specifications and the satisfaction of the Architect or Electrical Engineer.
- B. **Safety:** All standard safety procedures as set forth by OSHA, CCR, and California Division of Industrial Safety shall be strictly adhered to.
- C. **Coordination:** The Contractor shall familiarize himself with the work of other crafts so as to be able to provide electrical service of correct size and voltage and other requirements to any equipment to be installed.



## COMMON WORK RESULTS FOR ELECTRICAL

- D. Scheduling: The installations shall be coordinated as to location and time, and interference causing delays and non-acceptable construction shall be avoided. Order equipment in a timely manner to prevent any delays in the construction schedule and he shall bear any penalty by vendors to meet schedules.
- E. Collaboration: Prior to commencing construction the Electrical Contractor shall arrange a conference with the general and sub-contractors as well as equipment suppliers and shall verify types, sizes, locations, requirements, controls, and diagrams of all equipment furnished by them.
- F. Materials: All equipment and materials shall be new, UL (Underwriters Laboratories) approved, and of the best quality. When specific trade names are used in connection with materials they are mentioned as standards but, this implies no right upon the part of the Contractor to substitute other materials or methods without prior approval.
- G. Excavation: The Contractor shall provide all excavating and backfill required for the proper installation of electrical work, whether or not shown on the Drawings or as specified. This shall be done per the EXCAVATION portion of the Specifications.
- H. Cutting and Repairing: The Electrical Contractor shall do all cutting necessary for the proper installation of his work, repair any damage done by himself or his workmen, and coordinate his work with that of others. Do no cutting or patching without approval of the Architect or Electrical Engineer. Round holes through concrete slabs or walls shall be core drilled with a diamond drill, rectangular openings shall be cut with a diamond saw. In no case shall any concrete beam or column be cut.
- I. Sleeves and Openings: Electrical Contractor shall be responsible for all sleeves and openings through walls and floors required by electrical work. All openings around conduits in sleeves shall be sealed with a material of equal fire rating as the surface penetrated. Openings not utilized shall be temporarily sealed in a similar manner. All required sleeves shall be furnished to and coordinated with the General Contractor.
- J. Cleaning and Painting: All exposed work shall be thoroughly cleaned upon completion of work. Panelboard enclosures, fixtures, and equipment, where finish has been marred in shipment or installation, shall be completely refinished. Minor finish damage shall be rectified as indicated by the Architect or Electrical Engineer. Contractor shall remove all waste and rubbish resulting from his work from the site.
- K. Earthquake Restraint: All electrical equipment shall have a means to prohibit excessive motion during an earthquake. Equipment that vibrates during normal operation shall have isolators with mechanical stops. All transformers are considered to vibrate during operation. All electrical equipment and connections shall be designed to resist lateral seismic forces equal to value shown on Drawings of equipment weight with allowable working code capacity increased by 1/3 or 1.5 times the same value for the weight yield capacity. Connections shall be the same except the 1/3 increase will not be allowed.
- L. Mechanical Equipment and Other Special Equipment:

## COMMON WORK RESULTS FOR ELECTRICAL

1. Prior to commencing construction, the Contractor shall arrange a conference with the Mechanical and Plumbing Contractors, and the Equipment Suppliers, to verify type, sizes, locations, requirements, controls and diagrams of all equipment furnished by them
  2. The Contractor shall furnish all electrical line voltage wiring, fused disconnects and conduits, unless otherwise shown.
  3. The Contractor shall be responsible for electrical hook-up and connection to all electrical equipment furnished by all Contractors of this Project. This includes all mechanical equipment, plumbing equipment, and special equipment furnished by other contractors as shown.
- M. Portable and Detachable Parts: The Contractor shall retain in his possession and shall be responsible for all portable and detachable parts or portions of the installation such as fuses, keys, locks, adapters, locking clips, and inserts until final completion of his work. These parts shall be itemized and delivered to the Owner at Project Closeout.

### 1.08 QUALITY CONTROL

- A. Supervision: The Contractor shall personally, or through a competent representative, constantly supervise the work from beginning to completion and final acceptance. He shall cooperate fully with the inspection authorities in the provision of information and access to the work. He shall, to the best of his ability, maintain the same job foreman throughout the life of the project unless a replacement is requested or authorized by the Architect or Electrical Engineer.
- B. Inspection and Tests: The Contractor shall furnish all labor and test equipment required to fully test and adjust the equipment installed under this specification and demonstrate its proper operation.
1. Arrange for all tests and inspections and provide minimum 48 hours' notice to the Architect or Electrical Engineer.
  2. A test must demonstrate that each piece of equipment, outlet, fixture, device, and appurtenance is in sound operating condition and in proper cooperative relation to associated equipment.
  3. All tests shall be conducted under supervision of the Architect or Electrical Engineer, and any defects of any nature which are apparent as a result of such test shall be made correct to the satisfaction of the Architect or Electrical Engineer before final acceptance is made.
  4. No equipment shall be tested, or operated for any other purpose, such as checking motor rotation, until it has been fully checked in accordance with the manufacturer's instructions.
- C. Warranty: The Contractor agrees to replace or repair, to the satisfaction of the Owner, any part of the installation which may fail due to defective material and/or workmanship or failure to follow Drawings and Specifications, for a period of one year after final

## COMMON WORK RESULTS FOR ELECTRICAL

acceptance. Any damage to other work resulting from such failure or the correction thereof shall be remedied at the Contractor's expense. The Contractor shall, further, secure from the manufacturers of special equipment, such as signal systems, their respective guarantees and deliver same to Owner. Guarantees between Contractor and his suppliers shall not affect warranties between Contractor and Owner.

### 1.09 SUBMITTAL

- A. Make submittal for all material to be used on the project, whether as specified or substitutions, within thirty five (35) days after award of Contract by the Owner, in accordance with Section 01-300, SUBMITTAL, and the following:
1. All submittal shall be neat and bound in a suitable folder or binder.
  2. Identify each item by manufacturer, brand, trade, name, number, size, rating, and whatever other data is necessary to properly identify and check materials and equipment. Words "as specified" are not sufficient identification.
  3. Identify each submittal item by reference to specifications.
  4. All submittal shall be submitted in coherent groups, e.g. all light fixtures at one time. No partial, or incomplete submittal will be accepted.
  5. Organize submittal in same sequence as they appear in specification sections, articles or paragraphs.
- B. Product Data: Submit PDF copies, in groups, as follows:
1. Boxes, pullboxes, conduits, and raceway types required, including fittings
  2. Electric Wire, cable and connectors
  3. Panelboards, Transformers, and disconnects.
  4. Lighting fixtures and Controls
  5. Wiring Devices
  6. Fire alarm system equipment.
  7. PA and Clock System equipment
  8. Data and /Telephone System Structured Cabling System equipment
- C. Shop Drawings: Shop drawings shall show physical arrangement, wiring diagram, construction details, finishes, materials used in fabrication, provisions for conduit entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, weight, power sources, circuit numbers, and shall be compatible with the Contract Drawings and Specifications.

## COMMON WORK RESULTS FOR ELECTRICAL

- D. Show wiring as actually installed, connected, and identified for this specific project. Include identification of cables and cable conductors.
- E. Shop and instruction drawings shall cover the equipment or device to be installed and not merely the general class of such equipment or device.

### 1.10 SUBSTITUTIONS

- A. The Specifications or Drawings are in no way to be construed as being proprietary toward one product. Those products, or types of products, listed are intended to set the standard for quality, design, and installation procedure. However, no right is implied upon the part of the Contractor to substitute other materials, products or systems without the written approval of the Architect or Engineer.
- B. All proposed substitutions shall be standard product of the firm under current manufacture and be a catalog item at time of bid.
- C. Acceptance of substitution shall not relieve the Contractor from responsibility for complying with requirements of the Contract Documents. The Contractor shall be responsible for changes in other parts of the work occasioned by his substitutions and shall bear their expense.
- D. Representative samples may be required for determination of equality. It is understood that the samples may be subjected to destructive testing and will not be returned.

### 1.12 GUARANTEE

This Contractor agrees to replace or repair to the satisfaction of the Owner, any part of the installation that may fail due to defective material and/or workmanship, or failure to follow Plans and Specifications for one year after final acceptance. He shall further obtain from the manufacturers of special equipment (i.e., control systems) their respective guarantees and service manuals and deliver to Owner.

### 1.13 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

The Engineer's decision will be final on interpretation of the Drawings and Specifications. Whenever "AS MAY BE DIRECTED", "SUITABLE", "APPROVED EQUAL", "AS REQUIRED", or other words of similar intent and meaning are used which infer that judgment is to be exercised, it is understood that it is the judgment of the Engineer being referred to.

## PART 2 – PRODUCTS

### 2.01 RACEWAYS:

- A. Except where specifically shown otherwise in this section, the Contractor shall furnish and install a complete conduit system for all wiring.
- B. Galvanized Rigid Steel (GRS)

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1. Joints are to be sealed with conductive pipe compound T&B "Kopr-Shield" before making up.
2. Conduits installed below grade shall be wrapped with 3M "Scotchrap #51" corrosion protection tape using half-laps for double thickness. Conduit surfaces are to be clean and dry before wrapping.

### C. Steel Electrical Metal Tubing (EMT)

1. EMT may be used within the hollow dry spaces of buildings. Trade sizes 4" and smaller may be used within hollow dry spaces of the building.
2. EMT conduit shall be Allied True Color E-Z Pull, or equal.
3. All raceway fittings, locknuts, couplings, elbows, etc. Cast-type fittings shall not be used.

### D. Non-Metallic Polyvinylchloride Conduit (PVC):

1. Rigid nonmetallic PVC, UL labeled and fittings approved for the purpose may be used for electrical systems 0-600V-to-ground under the following conditions:
  - a. All conduits in earth under buildings or protected by permanent paving may be Schedule 40 PVC. All raceways above grade are to be steel.
2. All nonmetallic runs shall have a bond wire for the interconnecting of all conducting portions per Article 250 of the California Electric Code.
3. PVC shall never be used above grade.

### E. Liquid-Tight Flexible Metal Conduit (LFMC):

LFMC may be used in lengths not greater than 36" at motors and other machinery to prevent the transmission of vibration. LFMC shall be supported at both ends.

- F. Surface raceways and fastenings are to be two-piece steel type, complete with all fittings of the same manufacturer and factory finished in gray. Surface plug-in strips shall be two circuit type with NEMA grounded receptacles every 12" with wiring space provided.

- G. The minimum size conduit for lighting, power, and signal wiring shall be 3/4" trade size.

## 2.02 CONDUCTORS:

- A. All conductors shall arrive to the project in their original, unbroken packages plainly marked as follows:

1. Packaging shall indicated underwriter's labels, size, conductor material, insulation of wire, names of the manufacturer and the trade name of the wire.
2. Wire or cable shall have factory markings every 24". Markings shall show its

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maximum allowable voltage, wire size and insulation.

- B. All conductors shall be a minimum of 98% conductivity, soft drawn copper, minimum #12 AWG unless shown otherwise. Conductors sized #8 and larger shall be stranded. Insulation shall be 600 Volt, type "THWN or THHN."
- C. Control circuits for mechanical equipment in locations subject to abnormal temperatures on or under furnaces and heaters shall be Type "RHH" 600 Volt insulation conductors.
- D. Two-bolt type solderless connectors or T&B "ColorKeyed" compression lugs shall be used on #8 and larger conductors.

### 2.03 WIRING DEVICES:

- A. Furnish and install wiring devices and plates as shown on the Drawings and described in these Specifications. Where more than one wiring device is mounted in the same location, such devices shall be mounted in a multi-gang plate. Wiring devices shall be specification grade or better.
- B. Wiring devices shall be of the color selected by the Architect.
- C. Convenience outlets to consist of a specification grade duplex receptacle mounted in an outlet box in the wall, flush with the finished plaster or surface. Outlet rating to be 20 AMPS, 125 Volts, 3-wire, back and side wired.
- D. All outlets shown outdoors or in damp locations shall be GFI type, installed in a weatherproof box and cover equipped with rubber gaskets. Surface outlets shall be weatherproof type FS boxes with hubs as required and equipped with rubber gaskets and weatherproof covers.
- E. Local switches shall be quiet toggle type, totally enclosed, 20 AMPS, 277 Volts AC rated.
- F. Device plates shall be provided for all devices with the number of gangs and openings necessary.

### 2.04 OUTLET BOXES:

- A. Outlet boxes for concealed work shall be one piece pressed steel knock-out type with zinc or cadmium coating. Boxes shall not be smaller than 4" square nominal size unless otherwise indicated. Provide extension rings, extenders, plaster rings and covers necessary for flush finish. No back-to-back or through-boxes shall be used.
- B. Bar hangers shall be used to support outlet boxes in stud or furred partitions and ceilings. Attachment screws, devices, etc., shall be of the proper type to secure boxes to metal studs. Use expansion shields in concrete and masonry. Where used for lighting fixtures, outlet boxes shall be equipped with fixture studs.
- C. Provide approved knock-out seals on all unused open knock-out holes.

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- D. Outlet boxes installed in concrete slabs shall be two-piece concrete boxes, not less than 4" nominal size with a minimum depth of 2 ½".
- E. Surface boxes of cast metal threaded hub-type with suitable gasketed covers shall be used for exposed conduit runs less than 5' above finished floor, or where waterproof boxes are required.

### 2.05 PULL BOXES AND WIREWAYS:

- A. Pull and junction boxes shall be installed as shown to ease the pulling of wire and to comply with CEC requirements.
- B. Wireways shall be constructed in accordance with UL 870 for wireways, auxiliary gutters and associated fittings. Every component, including lengths, connectors, and fittings, shall be UL listed.

### 2.06 TERMINAL CABINETS AND CLOSETS:

- A. Cabinets and fronts shall be in accordance with NEMA Standard Publication No. PB 1-1971 and UL Standard No. 67. Fronts shall include doors and have flush brushed stainless steel, cylinder tumbler-type locks with catches and spring loaded door pulls. The flush lock shall not protrude beyond the front of the door. All locks shall be keyed like the panelboard locks. Fronts are to be adjustable indicating trim clamps that shall be completely concealed when the doors are closed.
- B. Doors shall be mounted by completely concealed steel hinges. Fronts shall not be removable with the door in the locked position. A frame and card with a clear plastic covering shall be provided on the inside of the door. Fronts shall be of code gauge full finish steel with rust inhibiting primer and baked enamel finish.
- C. Install finish grade 3/4" plywood board at the interior rear surface of telephone and signal cabinets.
- D. Provide solderless box lugs, terminal blocks with a white marking strip for conductors sized #16 and larger. Punch-down terminals shall be used for No. 18 and smaller and shall be used for all public address, intercom and other electrical terminations.

### 2.07 FLOOR BOXES:

- A. Provide fully adjustable Type 1, Class 1 watertight floor boxes complete with wiring devices and where shown on Plans.
- B. Fittings for floor box cover finish shall be as selected by Architect.
- C. Verify floor finish prior to purchase. Provide carpet flanges of proper size in carpeted or tiled areas.

### 2.08 NOISE CONTROL:

- A. Outlet boxes at opposite sides of partitions shall not be placed back-to-back or through-

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boxes employed except where specifically permitted on the Drawings by note to reduce transmission of noise between occupied spaces.

- B. Contactors, starters, and similar noise-producing devices shall not be placed on walls that are common to occupied spaces unless specifically called for on the Drawings. Where such devices must be mounted on walls common to occupied spaces, they shall be shock mounted or isolated in such a manner to effectively prevent the transmission of their inherent noise to the occupied space.
- C. Contactors, starters, drivers, and like equipment found noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced at Engineer's request.

### 2.09 MANHOLES AND PULLBOXES:

- A. Precast manholes and pullboxes shall have an ultimate 28-day compressive strength of not less than 3000 psi.
- B. Metal frames and covers shall be made of steel. Covers shall be rated AASHTO H20
- C. Pulling irons shall be bars bent in form and cast in walls and floor.
- D. Cable racks, rack arms, and insulators shall be sufficient to accommodate cable. Wall brackets shall be channel steel. Slots for mounting cable racks shall be at 8 inch intervals. Cable rack arms shall be steel and removable. Insulators shall be dry process glazed porcelain.

### 2.10 WARNING TAPE:

Warning tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep and no more than 1 foot above utility line. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion.

## PART 3 – EXECUTION

### 3.01 INSTALLATION - GENERAL:

- A. The layout and installation of electrical work shall be coordinated with the overall construction schedule to prevent delay in completion of the project. Checking these Drawings before organizing the electrical work schedule or installing material and equipment shall be obligatory.
- B. Dimensions and information regarding accurate locations of equipment and structural limitations and finish shall be verified with other sections.
- C. The Drawings do not show all the offsets, bends, special fittings, junction boxes, or pull



## COMMON WORK RESULTS FOR ELECTRICAL

boxes necessary to meet job conditions and the CEC. They shall be provided as required.

- D. Electrical equipment, outlets, junction and pull boxes shall be installed in accessible locations avoiding obstructions, preserving headroom and keeping openings and passageways clear.
- E. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect function of the equipment. Major adjustments for the location of equipment shall be approved by the Architect and detailed on the Record Drawings.
- F. Structural Fittings: Furnish and install the necessary sleeved, inserts, hangers, anchor bolts and related structural items. Install at the proper time.
- G. Openings have been shown on the Architectural and Structural Drawings. Should any additional openings or holes be required for the work of this section, the cost shall be the obligation of this section.
- H. Contractors shall inspect and account for existing conditions affecting his work.
- I. Sleeves for electrical conduits passing through walls or slabs shall be placed under the work of this section before concrete is poured. Where conduits pass through suspended floor slabs, sleeves shall be standard weight galvanized steel pipe extending 2" above the finished floor level.
- J. Sleeves at other locations shall be either light weight galvanized steel pipe or galvanized sheet steel. Clearance between conduits and sleeves shall not be less than ½".
- K. Sleeves through outside walls and below grade shall be caulked tight with oakum and the ends sealed with an approved semi-plastic coal tar base compound or shall be of the stuffing box type. Other sleeves shall be packed with glass wood ends sealed with Duxseal and covered with chrome plated escutcheon plates.
- L. Conduits entering through floor slabs at grade level will not require sleeves and shall be placed with tops of couplings flush at floor level.
- M. Sleeves for electrical conduit passing outside walls below grade shall be the through-wall and floor seal type.

### 3.02 INSTALLATION OF CONDUITS AND RACEWAYS:

- A. Conduits shall be concealed unless otherwise shown. All conduit runs exposed to view, except those in attic spaces, shall be installed parallel or at right angles to structural members, walls, or lines of the building.
- B. All conduit runs shall be mechanically and electrically continuous from outlet to outlet. Conduit size or type shall not be changed between outlets.
- C. No conduits shall be run on the roof unless specifically shown on the roof. They shall be full weight rigid steel or EMT on PVC sleepers. Install roof jacks at penetrations.

## COMMON WORK RESULTS FOR ELECTRICAL

- D. Conduit for equipment connected permanently to the floor shall be installed with a 6" rigid conduit nipple to a flush coupling to ensure a watertight connection at the floor.
- E. All conduits shall be sloping to drain and shall be sealed with JM Clipper "Duxseal" on the high end.
- F. All conduit bends shall be carefully made so that the conduit is not flattened, kinked or otherwise compromised. The inner radius of any conduit bend shall be not less than eight times the inside diameter. Where conduits are run exposed in groups, bends of all conduits shall have a common center. Use of standard elbows will not be allowed at these locations.
- I. Each run of a conduit shall be finished before concrete, plaster, etc., is installed to ensure against obstruction or omissions. After installation, the ends of all conduits shall be plugged with metal pennies. All conduit systems shall be completed and thoroughly cleaned and dried inside before installation of any conductors.
- J. Conduits shall enter at right angles and be connected to all outlet boxes, pull boxes, and cabinets with locknuts and plastic throated grounding bushings, providing a continuous grounding system in accordance with CEC Article 250.
- K. Use Erikson couplings where a union is necessary. Running threads will not be permitted.
- L. Pull 1/8" stranded nylon pull ropes with 18" coiled at each end in all empty conduits with identification tags indicating source and destination.
- M. Furnish and install seal-offs in all conduit runs through areas of different temperature.
- N. All concealed conduits shall be installed in as direct a line as possible between outlets. No more than four (4) quarter bends or their equivalent will be allowed between outlets. Feeder conduits shall follow arrangement shown on Plans unless a change is authorized. In general, branch circuit conduits shall follow the arrangement as shown insofar as structural conditions permit.
- O. All exposed runs shall parallel buildings, walls, or partitions, and shall be supported on Kindorf Hangers to meet Title 24 Part 6, California Code of Regulations.
- P. All telephone, data, and other signal conduits shall be installed with long radius sweeps. No factory ells will be permitted.
- Q. Expansion joints shall be provided at building structural expansions or as required due to length of run or difference in temperatures.
- R. All fittings exposed or in damp areas shall have sealing glands and proper gaskets. Fittings in hazardous areas shall be of the type approved for the particular hazard.
- J. Fire Penetration Seals:
  - 1. Seal all penetrations for work of this section through fire rated floors, walls and

## COMMON WORK RESULTS FOR ELECTRICAL

ceilings to prevent the spread of smoke, fire, toxic gas or water through the penetration before, during or after a fire. The fire rating of the penetration seal shall be at least that of which it is installed so that the original fire rating is maintained as required by CEC Article 300.21.

2. Where applicable, provide OZ Type CFSF/1 and CAFSF/1 fire seal fittings for conduit and cable penetrations through concrete and masonry walls, floors, slabs and similar structures. Apply an approved firestopping system, including wall wrap, partitions, caps and other accessories as required. All manufacturers' instructions and recommendations for installation of sealing fittings and barrier sealing systems.

### 3.03 CONDUCTORS AND CONNECTIONS:

#### A. General Requirements:

1. All branch circuit and fixture wiring joints, splices and taps for conductors #10 and smaller shall be made with UL approved connectors listed for 600 Volts. Connector bodies shall consist of a cone shape rotating expandable coil spring inserts insulated with phenolic or plastic shell.
3. Do not install wire in conduits until all work of any nature that may cause injury (including pouring of concrete) is completed. Use care in pulling in wires to prevent damage to wire or insulation. Do not use blocks, tackle or other mechanical means to pull #8 AWG or smaller conductors.
4. Splices are not permitted except in outlet boxes, pull boxes, junction boxes, panelboard gutters and auxiliary gutters.
5. Use only wire pulling compounds listed by the UL as a lubricant for pulling conductors through raceways. The use of cleaning agents that have deleterious effect on conductor coverings are not permitted.
6. Unless otherwise shown on Plans or specified elsewhere, leave at least 12" of free conductors at each connected outlet (outlets connected to equipment or device) and 9" of free conductors and coil neatly in outlet box for future connection.

#### B. Terminations:

1. Circuit and signal terminations to single screw or push on terminals shall be done with insulated "Sta-Kons" or approved equal terminals.
2. Bolt type solderless connectors shall be torqued with a torque wrench according to the manufacturer's recommendations and then retightened after 24-48 hours before taping. Owners' inspector shall be informed of this procedure during the waiting period and shall witness the act of retightening.

#### C. Feeders and Branch Circuits:

## COMMON WORK RESULTS FOR ELECTRICAL

1. Connectors and lugs for terminating stranded conductors sized #8 and larger shall be machine crimp compression type.
2. All splices shall be taped with Scotch "Super 88" vinyl electrical tape, and "Scotch Fill" tape putty where necessary for a smooth joint. For other than normal temperatures or conditions, Scotch #27 or #2520 shall be used.
3. No splices shall be made below grade in a manhole or pull holes without the Engineer's written approval. When approved, these shall be encapsulated with 3M potting kits per 3M Specifications.
4. Wires in panels, cabinets, pullboxes and wiring gutters shall be squared, labeled, and neatly grouped with Ty-raps and fanned out to the terminals.
5. Support all conductors in hand holes/manholes and label with plastic rope. Tag all conductors with plastic waterproof tags.

### 3.04 WIRING DEVICES:

- A. Wiring devices shall be securely fastened to the outlet box. Where the outlet box covers are back from the finished walls, the device shall be built-out with washers so that it is rigidly held in place to the box. Provide metal extenders in flammable construction per CEC.
- B. All device screw slots shall be left in a vertical orientation.

### 3.05 OUTLET BOXES:

- A. Boxes shall be securely fastened in position to the ceiling or walls with screws or bolts. Nails are not acceptable. The Contractor shall set and align all equipment, level, bolt down, or otherwise secure in place. No back-to-back or through-boxes shall be used.
- B. Boxes shall be accurately located and set square and true with exposed edges of a box or plaster ring flush with finished surface of walls or ceiling. All unused boxes shall be equipped with blank covers that shall match existing covers.
- C. Boxes shall have no unused openings.
- D. Boxes shall be cleaned of all direct plaster, etc., before conductors are installed. Rust spots shall be scraped to bare metal and painted with Rust-Oleum "Cold Galvanizing Compound".
- E. Make any change in outlet location necessary to all job conditions and rearrange fixtures and equipment as directed.
- F. Study all Plans as to relation of spaces surrounding outlets so that this work may be installed at the proper time with others. Fixtures and equipment shall be symmetrically located. Conflicts and discrepancies shall be referred to the Architect immediately and prior to box installation.

## COMMON WORK RESULTS FOR ELECTRICAL

### 3.06 JUNCTION AND PULL BOXES AND WIREWAYS:

- A. Boxes shall be installed square and plumb
- B. Pullboxes and wireways shall be concealed or installed flush in finished areas. They shall be surface mounted in machine rooms or unfinished areas.

### 3.07 TERMINAL CABINETS AND CLOSETS:

- A. Install, level and identify per schedule.

### 3.08 FLOOR BOXES AND PEDESTALS:

- A. Floor boxes are to be installed level and plumb. Fill with paper prior to pouring concrete. Re-level after concrete has set, then raise to accommodate the floor finish.
- B. The installation of pedestals shall be coordinated with cabinet work.

### 3.09 IDENTIFICATION

#### A. Conductors:

1. All power and low voltage systems conductors and cabling shall be identified in accordance with the following schedule:
  - a. 120/208 Volts, 3-phase, 4-wire Wye: Red-Black-Blue, Neutral White
  - b. 120/240 Volts, 3-phase, 4-wire Delta: Black-Blue for single-phase, Orange for 3-phase stinger, Neutral White
  - c. 480/277 Volts, 3-phase, 4-wire Wye: Yellow-Brown-Purple-, Neutral Grey
  - d. Bond or grounding conductor (GWG): Green
  - e. Special system conductors shall be color coded and labeled
2. Brady Labels shall be used to identify terminals and destination of feeders, branch circuits, signal and control circuits, etc., at all terminations and junction boxes and shall be coordinated with the nameplates in all boxes and equipment.
3. All terminals in the switchboards, panels, relays, switches, devices, starter terminals, etc., shall have Brady Labels for identification to identify both ends of all wiring. Wires #8 and smaller to be terminated on terminal strips squared-type 9080K with white marking strip and screw lugs for wire size.

- B. Nameplates: The Contractor shall furnish and install 1" x 3" x 3/32" thick laminated black Nylon nameplates with a white core, unless specifically shown as red with a white core, engraved to produce white letters on black background for all items of electrical

## COMMON WORK RESULTS FOR ELECTRICAL

equipment including 2-pole and 3-pole circuit breakers, panelboards, starters, relays, time switches and disconnect switches. The plates shall be screwed in place with stainless steel screws. Adhesive backed plates are not acceptable.

- C. Panels: Panels having single-pole circuit breakers shall be provided with typed schedules mounted in welded metal holders behind plastic.
- D. Devices: All devices shall have their branch circuit identified on the back side of device plate with a permanent type black marker, i.e., CKT A-21.

### 3.10 CONCRETE PADS, PULL HOLES AND MANHOLES:

- A. Contractor shall provide a minimum of 3'-6" of sand or base material suitable to receive the manhole. The base material shall be compacted, graded level, and at proper elevation to receive the manhole in relation to the conduit grade or ground cover requirements as designated in the Plans.

### 3.11 SUPPORTS AND ANCHORS:

- A. Provide inserts, anchors, supports, rods, brackets and miscellaneous items to adequately support and secure the electrical systems and equipment.
- B. Secure hangers, brackets, conduit straps, supports and electrical equipment to surfaces by means of toggle bolts on hollow masonry. Utilize expansion shields and machine screws or standard preset inserts on concrete or solid masonry. Utilize machine screws or bolts on metal surfaces. Utilize wood screws on wood construction. Wood, fiber plugs, or concrete nails are not acceptable.
- C. Power or velocity driven inserts may not be used for any anchorage unless specifically approved by the Engineer and where the use does not affect the finished appearance of work. Under no circumstance shall these be used in pre-stressed slabs, beams, purlins, or precast members in tension.
- D. Seismic Requirements: Provide vertical and lateral supporting equipment to resist the application of seismic forces per California Code of Regulations, Title 24 Chapter 23.

### 3.12 FIELD TESTING

As an exception to requirements that may be stated elsewhere in the contract, notify the Engineer [5] working days prior to each test.

- A. Distribution Conductors 600 Volt Class

Perform 600 volt cable tests to verify that no short circuits or accidental grounds exist. Make tests using an instrument which applies a voltage of approximately 500 volts to provide a direct reading in resistance; minimum resistance shall be 250,000 ohms.

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### 3.13 CONNECTIONS TO NEW MANHOLES & PULLBOXES

Construct concrete-encased duct lines connecting to underground structures to have a flared section adjacent to the manhole to provide shear strength. Construct underground structures to provide for keying the concrete encasement of the duct line into the wall of the structure. Use vibrators when this portion of the encasement is poured to ensure a seal between the encasement and the wall of the structure.

### 3.14 CONNECTIONS TO EXISTING MANHOLES & PULLBOXES

For duct line connections to existing structures, break the structure wall out to the dimensions required and preserve steel in the structure wall. Cut steel and bend out to tie into the reinforcing of the duct line encasement. Chip out the structure wall to form a key for the duct line encasement.

END OF SECTION

## LOW VOLTAGE ELECTRICAL TRANSMISSION

### SECTION 26 20 00 – LOW VOLTAGE ELECTRICAL TRANSMISSION

#### PART 1 – GENERAL

##### 1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 - Specification sections, apply to work of this section.
- B. Section 26 05 00 - Basic Materials and Methods section and other Division 26 sections apply to work specified in this section.

##### 1.02 SCOPE:

- A. Work included: Furnishing and installation of a complete electrical service, distribution, and grounding system. Conditions of this section apply to all other 26 40 00 series sections included.
- B. Related Work: Refer to other sections, particularly those listed below, so as to properly coordinate work specified herein with that specified elsewhere to produce a finished, workmanlike, fully functioning installation.
- C. All other Electrical Sections: Division 26

##### 1.03 QUALITY ASSURANCE:

See Section 26 05 00.

##### 1.04 SUBMITTAL:

- A. Product Data: Submit manufacturer's data on service entrance equipment, switchboards, motor control centers and/or individual starters, transformers, panelboards, disconnect switches and grounding components.
- B. Trip Curves: When requested, submit trip timing curves for all circuit interrupting devices.
- C. Nameplate Schedule: Submit nameplate schedule for approval.

##### 1.05 COMPONENT COORDINATION:

In order to maintain close control and coordinate the various components of the distribution systems, the number of manufacturers shall be kept to a minimum. Equipment manufacturer shall be General Electric or Square D. It shall be the manufacturer's responsibility though the Electrical Contractor to coordinate all components of the system in order to ensure systems that will provide maximum protection of equipment and reliable safe operation.

##### 1.06 NAMEPLATES:



## LOW VOLTAGE ELECTRICAL TRANSMISSION

Laminated phenolic plastic, color coded black for 120/208 volt equipment, with white letters. Provide for identification of each transformer, panelboard and motor control center, secure to face with two (2) chrome plated screws each. A schedule of nameplates shall be included with the shop drawings for approval.

### 1.07 FEEDER CONNECTIONS:

Provide cast, saddle type bolted lugs or hydraulically set compression lugs for all bus connections. Manufacturer shall be Thomas and Betts, Burndy, O.Z. or approved equal. Lugs in which the set of screw embeds directly into feeder conductor shall not be used.

### 1.08 MISCELLANEOUS:

- A. Equipment Bases: Provide appropriately sized concrete housekeeping bases for all floor-mounted equipment.
- B. Hoisting Lifting Lugs: Provide on all heavy equipment as required to ensure safe hoisting.
- C. Space for Future Protective Device: Provide as indicated on drawings; shall be completely equipped for the future addition of a circuit breaker or fused switch, including all connections.

## PART 2 – PRODUCTS

### 2.01 PANELBOARDS:

- A. Panelboards shall be Bolt-down Circuit Breaker type, with voltage, phase, and breakers as specified in panelboard schedules. Panelboards shall be installed flush or surface or specified, at locations as indicated on plans. Panelboards shall be installed in code gauge rust proof steel cabinets with flush door having flush locks all keyed alike and with trim cut square and true.
  - 1. Panelboards: General Electric A-Series and Spectra Series; Square D, type NQ, NQOB, and NF; or approved equal.
- B. All panelboards and breakers shall meet the requirements of the indicated available symmetrical short circuit current or have a minimum bus bracing to meet figure shown.
- C. All interiors shall be completely factory assembled. They shall be so designed that switching and protective devices can be replaced without disturbing adjacent units and without removing the main bus connectors, so that circuits may be changed without machining, drilling or tapping.
- D. Branch circuits shall be arranged using double row construction except when narrow column panels are indicated. A nameplate shall be provided listing panel type and ratings.
- E. Unless otherwise noted, full size insulated neutral bars shall be included. Bus bar taps for

## LOW VOLTAGE ELECTRICAL TRANSMISSION

panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices. Neutral bussing shall have a suitable lug or each outgoing feeder requiring a neutral connection. A ground bus will be included in all panels.

- F. Boxes shall be at least 20 inches wide made from galvanized steel. Provided minimum gutter space in accordance with California Electric Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.
- G. Door hinges shall be concealed. All locks shall be flush, stainless steel, cylinder tumbler type locks with catches and spring loaded door pulls, keyed alike and directory frame and card having a transparent cover shall be furnished with each door.
- H. All exterior and interior steel surfaces of the trim shall be properly cleaned, primed with a rust inhibiting phosphatized coating and finish with a gray ANSI 61 paint. Trims for flush panels shall overlap the box for at least 3/4 inch all around. Surface trims shall have the same width and height as the box. Trims shall be mountable by a screwdriver without the need for special tools. After installation, trim clamps shall not be accessible when the panel door is closed and locked.
- I. All main bus bars shall be cooper or tin plated aluminum sized in accordance with UL standards to limit the temperature rise on any current carrying part to a maximum of 50 degrees C above an ambient of 40 degrees C maximum.
- J. Circuit breakers shall be quick-make, quick-break, thermal-magnetic, trip indicating, and have common trip on all multipole breakers. (Trip indication shall be clearly shown by the breaker handle taking position between ON and OFF when the breaker is tripped). Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker to prevent repeated arcing shorts resulting from frayed appliance cords. Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" and carry the SWD marking. UL Class A (5 milliampere sensitivity) ground fault circuit protection shall be provided on 120V ac branch circuits as specified on the plans or panel board schedule. This protection shall be an integral part of the branch circuit breaker which also provided overload and short circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole circuit breaker with integral ground fault circuit interruption shall require no more panelboard branch circuit space than a conventional slide pole circuit breaker. Connections to the bus shall be bolt on.

### 2.04 DISCONNECTS:

- A. Motor and circuit disconnects shall have an Underwriters' Laboratory label.
- B. Disconnect switches shall be suitable for area where they are installed, i.e., weatherproof, and shall be rated heavy duty. Use only 600 volt class with proper number of poles. Switches shall be fused unless indicated on plans. Fuses shall be of type specified on

## LOW VOLTAGE ELECTRICAL TRANSMISSION

plans.

- C. When a disconnect switch is not clearly visible from the control location, provide an operating handle which is lockable in the open position.

### 2.05 GROUNDING:

- A. Clamps, bonds, etc. suitable and as necessary to provide continuous ground system.
- B. Ground Rods: "Copperweld" 3/4" diameter 8' long.
- C. All grounding conductors shall be copper, sizes not less than that required under CEC Table 250.122.
- D. All grounding electrode conductors shall be copper, sizes not less than that required under CEC Table 260.66.

### 2.06 SWITCHBOARDS:

- A. Manufacturer's: Subject to compliance with requirements, provide switchboards of one of the following:
  - General Electric Company
  - Square D Company
- B. General: Except as otherwise indicated, provide switchboards of types, sizes, characteristics, and ratings indicated, which comply with manufacturer's standard design, materials, components, and construction in accordance with published product information, and as required for complete installation. Service entrance switchboards shall comply with serving utility requirements.
- C. AC Dead-Front Distribution Switchboards: Provide factory assembled, dead-front, metal enclosed, self-supporting secondary power switchboards, of types, sizes and electrical ratings and characteristics indicated; consisting of panel (vertical) units, and containing circuit breakers of quantities, ratings and types indicated. Provide copper or tin plated aluminum main bus and connections to switching devices of sufficient capacity to limit rated continuous operating temperature rise to 54 degrees F, and 90 degrees F for circuit breaker branches; with main bus and tap connections silver-surfaced and tightly bolted for maximum conductivity. Brace bus for short circuit stresses up to maximum interrupting capacity. Prime and paint switchboard with manufacturer's finish and color. Construct units for outdoor, NEMA Type 3R.
- D. Enclosures: Construct dead-front switchboards, suitable for floor mounting, with front cable/wire and conduit accessibility as indicated. Provide welded steel channel framework, hinge wireway front covers to permit ready access to branch circuit breaker load slide terminals. Coat enclosures with manufacturer's standard corrosive resistant finish.
- E. Bussing: Provide switchboard with sufficient cross-sectional area to fulfill U.L. Standard 891 pertaining to temperature rise.

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### 2.06 MOTOR STARTERS:

- A. Manual motor starters to be quick-make, quick break, with overload protection. General Electric cr 101 for 120/240 volt 1 hp or less.
- B. Magnetic motor starters shall be across the line unless indicated with control power transformer (120 volt coil) and with overload relay protection. Combination type shall have integral fused switch or circuit breaker as indicated.

### 2.07 TRANSFORMERS:

- A. Transformers, Dry Type: Distribution transformers shall be constructed and tested in accordance with ASA and NEMA Standards, TP-1 minimum, and shall be wound with copper or aluminum conductors. Performance of transformers shall be equal to or exceed ASA and NEMA published criteria.
- B. Transformers shall be self-cooled type with Class H, NEMA, Group 111 insulation and a temperature rise of 150°C under continuous full load conditions with an ambient of 400°C.
- C. Transformers supplying voltage to wave altering devices (computers, electronic ballasts, etc.) shall be K3 rated minimum, or as noted otherwise on plans.
- D. Transformers shall be equipped with four 2 1/2% taps (2 taps above and 2 taps below normal voltage). Windings shall be of the fire-resistant type, designed for natural convection cooling through normal air circulation.
- E. Core mounting frames and enclosures shall be of welded and bolted construction with sufficient mechanical strength and rigidity to withstand shipping, erection and short circuit stresses.
- F. Enclosure cover plates shall be Code gauge sheet steel, captive bolted to the enclosure framework. Enclosure shall have suitable ventilating openings with rodent-proof screens. Enclosure shall be provided with lifting lugs and jacking plates as required.
- G. Transformers shall be furnished complete with mounting channels and mounting bolts. Metal parts, except cores and core mounting frames, shall be cleaned, rust-proofed and given a heavy coating of an inert primer.
- H. Transformers used indoors shall be "low noise." They shall be provided with vibration dampers. Size and number of shock mounts shall be in accordance with manufacturer's recommendations.
- I. Transformers shall be manufactured by General Electric, Square D, or approved equal.

### 2.08 POWER PANEL / TRANSFORMER PEDESTALS

Power pedestals shall be configured as indicated on drawings. Construction shall be weatherproof, pad mounted, with main circuit breaker, transformer, 480 volt main circuit breaker,

## LOW VOLTAGE ELECTRICAL TRANSMISSION

and branch circuit breakers. Sizing, ratings, and configurations shall be as indicated on Drawings. Power pedestals shall be Tesco 23,000 series, IEM equal, or approved equal.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION OF SWITCHGEAR AND SWITCHBOARDS:

- A. Install switchgear and switchboards as indicated, in accordance with manufacturer's written instruction, and with recognized industry practices to ensure that switchboards comply with requirements of NEMA and CEC standards, and applicable portions of NECA's "Standard of Installation".
- B. Prior to energization of circuitry, check all accessible connections to manufacturer's torque specifications. Subsequent to wire and cable hook-ups, energize switchboards and demonstrate functioning in accordance with requirements.

#### 3.02 INSTALLATION OF PANELBOARDS:

- A. Provide mounting brackets, busbar drilling, and filler pieces for unused spaces.
- B. Branch circuits shall be connected as shown in line diagrams and/or panelboard schedules, with wires neatly tie wrapped in panel.
- C. All distribution panelboards shall have all sub feeders and main breakers marked with 1" x 3" plastic name tags secured with two self tapping screws.
- D. All panelboards shall be provided with a 2" x 3-1/2" plastic name tag on the front of the panel door or on the trim, indicating panel designation and distribution panel and circuit feeding above panel, secured with two self tapping screws.
- E. Branch circuit panelboards shall have a plastic covered circuit directory card on the inside of each door with all circuit destinations neatly typed.
- F. Contractor shall check and tighten all factory made wire or lug connections. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standard 486A.
- G. Install four (4) spare 3/4" conduits from all panelboards to accessible ceiling space.

#### 3.03 INSTALLATION OF DISCONNECTS:

Install disconnects for all equipment and motors of the size required and as recommended by manufacturer.

#### 3.04 INSTALLATION OF GROUNDING:

- A. Scope: Provide grounding system complying with the codes and ordinances specified.

## LOW VOLTAGE ELECTRICAL TRANSMISSION

Grounding system shall provide continuity through the entire electrical system.

1. Panelboard ground buses.
  2. PVC conduit or other raceways.
  3. All motors.
  4. All lighting fixtures.
  5. Grounding terminals of all receptacles.
  6. Miscellaneous grounds required by code.
- B. Equipment and raceway bonding procedures shall be rigidly maintained and meet all jurisdictional requirements of codes and regulations.
- C. Good, electrically continuous, metal to metal contacts shall be made wherever possible at all panel boxes, pull boxes, etc. Where it is not possible to obtain good contacts, the conduit shall be bonded round the boxes with a 6 BS gauge, rubber covered, double braided wire with ground clamps.
- D. A separate grounding conductor shall be run in all conduit runs from distribution, lighting, and power, etc. panelboards, motor control outlets, etc., back to their respective service or distribution panelboards.
- E. Flexible Conduit Grounding: Provide a separate grounding conductor in all flexible conduit runs to include watertight flexible conduit with integral grounding straps. Install ground conductors inside conduit with ungrounded conductors. Extend from nearest panel to device being connected.
- F. Receptacle Circuits: Provide a separate grounding conductor in all receptacle circuit conduit runs, back to serving panelboard.

### 3.05 INSTALLATION OF MOTOR STARTERS:

- A. In finished areas, mount motor protection switches flush and install suitable cover plates.
- B. Install heaters correlated with full load current of motors provided.
- C. Set overload devices to suit motor provided.

### 3.06 INSTALLATION OF TRANSFORMERS

- A. Transformer core frame shall be installed level on shock absorbing pads within the enclosure.
- B. Mounting bolts on floor-mounted transformers shall be extended into pads only and shall not be in direct contact with building structural members.

## LOW VOLTAGE ELECTRICAL TRANSMISSION

- C. Flexible jumpers shall be installed for grounding continuity from enclosure to conduits.
- D. Voltage Check:
  - 1. The Contractor shall set the taps on all transformers (which are a part of this contract) as necessary to provide satisfactory operating voltages with all present loads energized. A check shall be made in the presence of the District Inspector at a panel fed from each transformer and which is the farthest from the transformer. Voltages at the transformers ranging from 118 to 122 volts inclusive, for 120-volt systems and proportionately equivalent for higher voltage systems, are acceptable.
  - 2. The Contractor shall provide all instruments and accessories required to perform the checks. Volt meters shall be accurate within 1% and shall have scales permitting the voltage readings to be made on the upper half of the scale.

END OF SECTION

# LIGHTING FIXTURES

## SECTION 26 50 00 – LIGHTING FIXTURES

### PART 1 – GENERAL

#### 1.01 DESCRIPTION

- A. Work Included: Furnish and install lighting fixtures including lamps; connect fixtures to circuits, occupancy sensors, relays, room controllers, contactors, control panels, and gateways, where applicable.
- B. Related Work:
  - 1. Common Work Results for Electrical: Section 26 05 00.
  - 2. Low Voltage Electrical Transmission: Section 26 20 00.

#### 1.02 SUBMITTALS

- A. All submittals shall be made in accordance with Division 1 Submittal Procedures.
- B. List of Materials: Submit a complete list of material proposed for this Section.
- C. Shop Drawings for Lighting Fixtures: Provide detailed and dimensioned working drawings showing kind, weight and thickness of materials, method of fitting and fastening parts together, location and number of sockets, size and color of lamps, and complete details of the method of fitting, suspension and securing the fixtures in place. Drawings shall contain sufficient information to enable a workman to construct and install the fixtures without further instructions.
- D. Shop Drawings for Lighting Controls: Provide detailed and complete wiring diagrams and plans for lighting controls. Provide cut sheets for lighting control devices and cabling.

#### 1.03 MOUNTING REQUIREMENTS

Comply with State of California earthquake requirements and CEC requirements for lighting fixture installations and support.

#### 1.04 GUARANTEE

- A. Guarantee lighting components against service failure for five years

### PART 2 – PRODUCTS

#### 2.01 MATERIAL AND FABRICATION

- A. Each lighting fixture shall be the type indicated on the drawings and as specified herein. Fixtures of the same type shall be of identical make, design and appearance. The size of each lighting fixture shall be as specified herein for the lamp or fixture wattage indicated on the drawings.



## LIGHTING FIXTURES

- B. The design of all lighting fixtures, accessories and supports, as well as the method of hanging fixtures, shall comply with all requirements for earthquake resistant construction of the State of California.

### 2.02 LIGHT FIXTURES

- A. LED Drivers: Drivers shall be electronic type specifically designed to save energy while maintaining full light output. Drivers shall have "A" sound rating, thermal protectors and guaranteed against service failure for three years. Drivers shall comply with FCC and NEMA limits governing electromagnetic and Radio Frequency Interference and meet all applicable ANSI, State and Federal standards. Drivers shall be noiseless, high power factor type and shall be ETL certified under CBM Standards and Underwriters' Laboratory listed.
- B. LED Diodes shall have the following minimum characteristics:
  - 1. Efficacy – 100 lumens per watt or greater
  - 2. Color rendition index – 80 or greater
  - 3. Standard deviation color matching for diodes shall fall within 1 MacAdam ellipse.

### 2.03 LIGHTING CONTROLS

- A. Lighting controls and control systems shall meet all requirements of the State of California Title 24 energy code.
- B. Lighting control systems shall be commissioned by a Title 24 Certified Commissioning Agent.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. Install lighting fixtures where shown on plans.
- B. Fixture voltage shall be as shown on drawings and in the fixture schedule.
- C. Install recessed and surface-mounted fixtures with mounts or plaster frames compatible with the ceiling and wall systems employed and secure fixtures mechanically to frames.
- D. Align rows of surface-mounted fluorescent fixtures to form straight lines at uniform elevations. Provide factory joiner bands for contiguous fixtures, and end caps on ends.
- E. Recessed fixtures shall fit snugly against ceilings to prevent light leakage.
- F. Support suspended recessed fixtures in a T-bar ceiling as follows: All fixtures shall be attached to the ceiling grid to resist a horizontal force equal to the weight of the fixtures. For heavy duty grid systems, fixtures weighing less than 56 pounds must also have two 12

## LIGHTING FIXTURES

gauge slack safety wires from diagonal corners to the structure above; fixtures weighing more than 56 pounds shall be independently supported by not less than 4 taut No. 12 gauge wires capable of supporting four times the load. For intermediate duty grid systems, fixtures shall be independently supported by not less than four taut No. 12 gauge wires capable of supporting four times the load. All fixture hanger wire ends shall be twisted three tight turns within a 2" distance. Fixture installation shall be coordinated with the acoustical ceiling installation.

### G. Light Pole Installation:

1. Set in concrete footings; set poles plumb and straight. Grout and drypack after leveling poles. Concrete, grout and drypack are specified under Section 03 30 00, Cast-in-Place Concrete.
2. Electrically ground the fixtures and poles.
3. Solder and tape splices as required for the floodlight fixture installations.
4. Each standard shall be tapered galvanized steel, with handhole, anchor bolts, fixture mounting brackets and all accessories.
5. Poles shall be designed to withstand a minimum wind velocity of 80 mph sustained, 104 mph gusts.

H. Provide factory commissioning for lighting controls and devices. The completed installation shall comply in every way with the requirements of Title 24.

### 3.02 CLEANING

- A. Clean surfaces of all dirt, cement, plaster and other debris. Use cleansers compatible with material surfaces being cleaned.
- B. Clean lenses, reflectors, and the like of dust, fingerprints, and grime.

### 3.03 TESTING

- A. Check and adjust fixtures for even illumination.
- B. Replace defective fixtures and fixture components with new.
- C. The lighting control system shall be acceptance tested by a Title 24 Certified Commissioning Agent. The contractor is responsible for passing the acceptance tests.

END OF SECTION

## SECTION 267260

### SECURITY SYSTEM

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK:

- A. All applicable portions of Section 260500 shall apply to this section as though written herein completely.
- B. The work under this section includes all labor, materials, equipment, and accessories required to furnish and install a new Integrated Security System as indicated on the drawings and as specified herein and connect to the existing system on the site.
- C. Work includes the coordination with the building contractor for the locations of devices and the rough in requirements for the devices. The Installing Communications Contractor shall coordinate locations, outlet boxes, back boxes and junction boxes and conduit sizes with the building contractor.

##### 1.02 RELATED WORK:

Document affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 26 of these specifications.

- A. The work described by this part includes the furnishing of all materials, equipment, supplies, labor and the performing of all operations necessary for the installation of complete and operating systems.
- B. All conduits, outlet boxes, back boxes, junction boxes are by electrical contractor. See section 260500. Conduit and junction box sizes shall be determined by the Installing Communications Contractor for the particular wire and cable fills required for the systems installed and shall communicate this information to the building contractor. (Conduit sizes shall comply with the California Electrical Code). The entire responsibility of the system, including the installation, operation, function, testing and maintenance for one (1) year after final acceptance under this section shall be the responsibility of the communications contractor.
- C. All terminal cabinets, backboards, wiring, cables, equipment, devices, etc., will be furnished and installed complete by the Installing Communications Contractor.
- D. The Installing Communications Contractor shall furnish and install all equipment, cables, devices, and other materials even though not specifically mentioned herein, which are necessary for the proper integration of the system so that the system shall perform the functions listed herein in compliance with all specified requirements.

##### 1.03 GENERAL REQUIREMENTS

- A. The Installing Communications Contractor shall hold a valid State of California C-10 License, shall have completed at least 20 projects of equal scope, shall have been in business of furnishing and installing communication systems of this type for at least five years, and capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.
- B. The Installing Communications Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work. Such as Alarm Company

and Agent licenses.

- C. The Installing Communications Contractor shall be a factory authorized distributor and warrantee station for the brand of equipment specified and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Installing Communication Contractor shall maintain a spare set of all major parts for the system at all times. All circuit boards, amplifiers and control sub systems shall be 100% backed up with stock at contractor's shop.

#### 1.04 QUALITY ASSURANCE:

- A. The new equipment is to match the existing Security system components on this site. The existing system is a General Electric (GE). The new components shall match the quality and standards of performance the current system. All electrical and general information set forth on the respective data sheets for each specified item shall be considered to be part of these specifications and binding herein. The decision of the Architect regarding equality of proposed equal items will be final.
- B. All of the Electronic Systems Equipment shall be furnished and installed by the Authorized Factory Distributor of the equipment. The Contractor shall furnish a letter from the manufacturer of all major equipment, which certifies that the Installing Communication Contractor is the Authorized Distributor and that the equipment has been installed according to factory intended practices. The Contractor shall also furnish a written guarantee from the manufacturer that they will have a service representative assigned to this area for the life of the equipment.
- C. All communication systems supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.

#### 1.05 SUBMITTAL AND MANUALS

- A. Comply with all requirements of the General Conditions, Supplementary Conditions and applicable sections of Divisions 1 and 26 of these specifications.
- B. Additional requirements of this section are:
  - 1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit to the Architect for review, eight copies of a complete submission.
  - 2. The submission shall consist of five major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.
  - 3. The first section shall be the "Index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.
  - 4. The second section shall include a copy of the Installing Communication Contractors valid C-10 California State Contractors License, letters of factory authorization and guaranteed service, list of 20 projects of equal scope and list of proposed instrumentation to be used by the Contractor.
  - 5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets.
  - 6. The fourth section shall contain an original factory data sheet for every piece of equipment in the specifications.
  - 7. The fifth section shall contain a wiring designation schedule for each circuit leaving each piece of equipment and drawings showing system wiring plans.

- C. The Contractor shall provide two copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components with all transistor and IC complements and replacement number.

## **PART 2 - SYSTEM EQUIPMENT SPECIFICATION**

### **2.01 ACCEPTABLE MANUFACTURERS**

- A. The current equipment on this site is manufactured by General Electric. (GE).
- B. The equipment model numbers updated as required to meet current manufacturer's part identifiers are to be provided in the quantity indicated on the plans and required to expand the current system to include the new and relocated buildings. Quantities as shown on drawings. Minimum one control panel and one key pad per building or group of relocatable classrooms.
  - 1) NX-8E-FP-7-RF Control Panel
  - 2) SMP5CTX 4 amp power supply with enclosure.
  - 3) NX-216E Zone Expander modules
  - 4) NX-148E-RF LCD key pads
  - 5) ISC-BDL2-WP126 Tri Tech Motion Detectors
  - 6) Door contacts
- C. The intent is to establish a standard of quality, function and features. It is the responsibility of the bidder to ensure that the proposed product meets or exceeds every standard set forth in these specifications.
- D. The functions and features specified are vital to the operation of this facility, therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

### **2.02 INTRUSION ALARM SYSTEM**

- A. DESCRIPTION:
  - 1. Description of system:

The system shall consist of door switches and motion detection/speaker devices connected to detect intrusion into the covered areas. The system shall be zoned as indicated on the drawings and have a control panel capable of providing alarm and trouble signals, by zone, for connection to the district equipment or transmitted as per district requirements. System on-off and access control from remote equipment furnished by the district or by a remote push button key-pads.
  - 2. The building shall be a separate compartment and can have a keypad mounted as shown at each exterior door on the north wall, two locations. The keypads shall be mounted within the building adjacent to an exterior door.
  - 3. Contractor shall install all required expansion module within the main control panel to support the new building being added to this campus.
- B. PRODUCTS:
  - 1. The new control panel shall provide annunciation of each room separately. Provide alpha remote controls as shown on plans.
  - 2. Passive infrared motion/speaker detectors each with a popit.
  - 3. Door switches: mounting as necessary to adapt to doors furnished.
  - 4. Cable shall be WestPenn 355 or equal .

5. Power supply for motion detectors shall be TECO Model PS-12R, 12vdc located in terminal cabinets.
  6. Protect the roof hatches ( if there are any )in each building with magnetic contacts and annunciate separately with a day zone to indicate opening and closing of all hatches during the day and alarm at night.
  7. Provide all necessary hardware and software for a complete and working system.
- C. TESTING:
1. System shall detect the entry through a door switched door and/or the motion of a body taking not more than four steps in an area secured with motion detection equipment where entry doors or windows are possible access. System shall be complete and properly operating prior to calling for the test. The inspector, contractor and engineer shall walk test system at district's option and contractor shall make minor satisfactory adjustments to the system in the presence of the inspector. Contractor shall coordinate the time of test with the district inspector. This test shall be performed during a time when there is no other persons on the site.
  2. Test equipment:  
Provide two portable radio transceivers to be used when walk testing the security detection system. The transceivers shall be capable of communication throughout the site.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory authorized distributor of the specified equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- B. Furnish all conductors, equipment plugs, terminal strips, etc., And labor to install a complete and operable system.
- C. The cables within the rack or cabinets shall be carefully cabled and laced with no. 12 Cord waxed linen lacing twine or ty-wraps. All cables shall be numbered for identification.
- D. Splices of conductors in underground pull boxes is not permitted.
- E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.
- F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.
- G. The contractor shall provide not less than eight (8) hours for instruction of personnel in the operation and maintenance of the systems. This instruction time shall be divided as directed by the Owner.

### 3.02 WARRANTY

- A. The entire system shall be warranted free of mechanical or electrical defects for a period of one (1) year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the purchaser.
- B. The contractor shall maintain a competent service organization and shall, if requested, submit a service maintenance agreement to the owner after the end of the guarantee period.
- C. A typewritten notice shall be posted at the equipment rack which shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

### 3.03 TESTING

- A. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds. Perform all tests stated in each separate system specification.
- B. The owner reserves the right to make independent tests of all equipment furnished to determine whether or not the equipment complies with the requirements specified herein and to accept or reject any or all of the equipment on the basis of the results thereby obtained.

**END OF SECTION**

## PA / CLOCK SYSTEM

### SECTION 274000 – PA / CLOCK SYSTEM

#### PART 1 - GENERAL

##### 1.01 GENERAL

- A. The intent of this specification is to provide a complete and properly operating digital telephonic communications system extension with call processing, amplification, distribution and reproduction of voice and/or other audio program material and time keeping / Telemedia retrieval functions. The system shall be of modular design to facilitate both expansion and service and shall be completely solid state. All necessary hook-up and testing shall be by a factory approved representative.
- B. The system shall be supplied by the manufacturer's authorized representative. Certification shall be submitted verifying that the contractor is the manufacturer's authorized representative. Included shall be certificates for attendance of manufacturer's installation / maintenance training by the contractor's directly employed personnel.
- C. The system assemblies shall be completely factory built and tested by manufacturers of established reputation, who have and can refer to similar systems which are currently installed and functioning properly. The factory pre-assembled cabinets, consoles, and power supplies shall be approved and listed by a National Recognized Testing Laboratory (NRTL) such as ETL or UL.
- D. The system shall be guaranteed for a period of two years from the date of acceptance or first beneficial use, whichever is first, against defects in materials, workmanship, design and improper adjustment. Any defects in the system shall be corrected at no expense to the Owner, provided the system does not show signs of abuse. During the guarantee period any work found not to be in conformance with the plans, specifications and addenda shall be brought into conformity with same at no additional cost to the owner.
- E. The equipment described herein, and furnished per these specifications shall be supplied by one communications contractor. The contractor shall hold the necessary valid C-7 State Electrical Contractors License for this type of work. All reference to model numbers and other detailed descriptive data is intended to establish standards of design, performance, and quality as required. The system shall be a Quantum IP Communications System, manufactured by Bogen Communications Inc.
- F. Approval request for installation of equipment not as specified herein must be received by the architect not less than ten days prior to bid opening. Proposals must be accompanied by complete technical data as well as a list of at least 10 references for successful Telephone interface / Intercom / Master Clock / PA/Paging/ Telemedia Retrieval system installations. All potential bidders submitting proposals for substitute system approval must provide a working demonstration system, for the owner's inspection prior to final acceptance, to ensure that the submitted components are equal to the specified in all functional aspects. Demonstrations shall be provided at the owner's chosen location at no cost or inconvenience to the owner's personnel.
- G. Alternative proposals which are approved, for bidding purposes only, will be published by addenda. Bidder shall provide all pertinent information including: manufacturer



## PA / CLOCK SYSTEM

specification sheets, working drawings, shop drawings and a demonstration of the system.

- H. Final approval of the alternate systems shall be determined at the time of job completion. Failure to provide a precise functional equivalent shall result in the removal of the alternate system at the installer's expense. Proposals not complying with the prior approval requirements and conditions set forth will not be considered.
- I. The communications contractor shall furnish all equipment, accessories and material required for the installation of a comprehensive Intercom / Telephone / Call Processing / Clock / Telemedia retrieval Communications System in strict compliance with these specifications and applicable contract drawings. Any material and/or equipment not specified or described herein necessary for the proper operation of the system shall be deemed part of this specification.
- J. The contractor shall instruct personnel designated by the owner in the proper use, basic care, and maintenance of the equipment. Such training shall be provided as an integral component of the system. These training sessions will be on both the general operation and basic programming of these systems. The contractor will also provide the owner with limited programming access to the system. This programming will be executed utilizing plain English menus, from any authorized administrative phone, to assist the owner with all necessary changes. The main programming for the system shall be PC/Windows based for ease of operation. Systems that do not use plain English menus and Windows based PC programming and are only programmable from a laptop PC will not be accepted as equal.
- K. All systems herein specified shall be provided and installed by a Factory Authorized Dealer for the equipment. All systems shall be supplied and installed by one Systems Contractor, who shall be the sole source, responsible party with complete authority over all aspects of the project. Certificates of authorization showing that the submitting contractor is qualified to install and maintain all the types of equipment shall be part of the submission process.

### 1.02 SUBMITTALS

- A. Provide submittals as follows:
  - 1. Shop drawings: Provide wiring diagrams clearly indicating proposed equipment and interconnection of all internal and external components. Include dimensional details of all mounting including rack elevations and ergonomic layouts. Submit to architect for approval prior to fabrication.
  - 2. Provide complete catalog data sheets of all major components including but not limited to:
    - a. Integrated speaker control & digital telephone communication/ Clock Equipment Racks and equipment.
    - b. Administrative and Staff Telephone Stations, Station Controls and Displays.

## PA / CLOCK SYSTEM

- c. Classroom and Station Equipment, Jacks, and terminations.
  - d. Classroom and Hallway "Amplified Voice" Speakers, Outside Paging Speakers.
  - e. Backboxes and Specialty Rough-Ins.
  - f. Wire, Cable, Jacks and Termination fields.
3. Provide an AUTOCAD engineering floor plan diagram, in D size format, of the system installation details indicating wiring lay-out, proposed wire routing, rough-in and installation information.

### 1.03 OPERATIONS AND MAINTENANCE MANUALS

- A. Provide 3 complete bound O&M manuals describing maintenance and operation of the system. Include descriptions and service data on all component parts. Manual shall also include the following:
  1. Warranty Statement indicating effective dates.
  2. Complete engineering data on all systems furnished including schematics of all equipment, shop drawings on all specially fabricated items, wiring diagrams of the system in its "as built" condition.
  3. Instructions on operational procedures, including master and substation operation, standard and special codes and alarm or maintenance indications and procedures.
  4. A listing of all stations connected to the system, the power drawn by each speaker circuit, and the total load in watts connected to the amplifiers.
  5. All system programming information and forms.

### 1.04 SCOPE

- A. Provide a complete and comprehensive Computer based School Communications / Telemedia / Clock system extension. The system shall incorporate integrated Speaker Intercom and a fully non-blocking Digital Telecommunication system, capable of integrated LAN based call processing and connection to outside telephone lines as specified. All system functions shall be enabled by DTMF/microprocessor control. The communications system shall be provided by one supplier to assure smooth coordination of all communications needs. The system shall have the capabilities of processing voice/data transmission at the standard ISDN basic rate interface (BRI), to and from any administrative telephone station. The system shall accept direct DS-1 level interfaces. The system shall have a Computer Telephony Interface (CTI) conforming to Novell TSAPI standards for custom software applications. The contractor will also provide an intelligent control to run the Centralynx portion of the MC-DCS system. This is an

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integral part of the network, for all systems to operate properly.

### 1.05 SYSTEM CONTRACTOR QUALIFICATIONS

- A. A Systems Contractor who has been regularly engaged in the furnishing and installation of commercial and industrial sound, communications and telephone systems and related visual communications systems for a period of at least two years. The systems contractor, not its employees, shall meet these qualifications.
- B. Systems Contractor shall:
  - 1. Provide written certification indicating said contractor be a FACTORY AUTHORIZED DEALER for the supplied systems.
  - 2. Supply DOCUMENTS CERTIFYING SUCCESSFUL COMPLETION BY CURRENT EMPLOYEES of the manufacturer's technical training program(s).

### 1.06 MANUFACTURER

- A. The manufacturer shall be a United States manufacturer, who has been regularly engaged in the manufacture of communication systems for at least thirty (30) years.
  - 1. The equipment described herein, and furnished per these specifications shall be provided by one manufacturer. All reference to model numbers and other detailed descriptive data is intended to establish standards of design, performance and quality, as required. Equipment manufactured and supplied by Bogen Communications, Inc., or approved equal, shall be acceptable.

### 1.07 FUNCTION - INTERCOM/TELEPHONE

- A. The communications system shall provide a comprehensive microprocessor controlled, multiple talkback network between telephone stations and intercom speakers. There shall be one 12 watt talkback amplifier and one 20 watt paging amplifier for every 24 speaker stations in the system. Provide booster amplifiers, as specified, for high power draw speakers.
- B. The speaker control central processor and switching unit shall be of the modular plug-in printed circuit board type, using HMOS microprocessor and TTL logic with HCMOS memory and sensing. CMOS circuitry shall be protected with transient suppression devices on all inputs and outputs. Non volatile EPROM shall store field programmable memory. The system shall provide no less than the following features and functions:
  - 1. Unlimited communication links, (digital non-blocking) complete with DTMF signaling, dial tone, ring back and busy signals to the telephone control microprocessor. The intercom shall be connected to the telephone control cabinet for complete system interface via DTMF control. Intercom systems which do not offer complete system control via DTMF will not be acceptable. The DCS system shall utilize a separate intelligent control unit so that all systems can communicate all features and functions that are being executed.

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2. Amplified-voice communication with loudspeakers from any system telephone with automatic VOX switching. The system shall provide up to 8 simultaneous amplified-voice intercom communications over staff loudspeakers.
3. The system shall be expandable up to 720 stations.
4. There shall be a system-wide emergency all-call feature. The emergency all-call shall be accessed at designated staff or administrative phones or by Emergency handset or by the activation of contact closure (which shall also give program input #3 emergency status). The emergency call-call shall capture complete system priority, shall be transmitted over all speakers, and shall activate an external relay for control of external functions.
5. There shall be four (4) built-in alarm tones, each accessed by dialing a three-digit number from designated administrative telephones.
6. There shall be four (4) external driver outputs, for activation of television system switching and other external control functions as specified, accessible by dialing a pre-determined number from designated administrative telephones or automatically programmed in software, to be determined by the owner.
7. There shall be an integral program material interface which shall accept up to 3 program / control modules. This shall contain input modules for program sources and digital announcement messages as specified herein and shall allow for input latching and level control of program into the system speakers. Program distribution control shall be made available to authorized system telephones as allowed by programming.
8. The system shall provide for field-programmable three or four-digit architectural speaker station numbers, to match the building architectural numbers.
9. An architectural-number/station-number cross-reference shall be field-accessible to facilitate service.
10. There shall be an automatic level control for return speech during amplified-voice communications.
11. Each station loudspeaker shall be assigned to any of eight paging zones, plus all call.
12. Each station loudspeaker shall be assigned to any of eight time-signaling zones. These zones shall be independent of paging zones.
13. There shall be 8 time-signaling schedules with a total of 1024 user-programmable events. Each event shall sound one of 8 user-selectable tones. It shall be possible to assign each schedule to a day of the week, or manually change schedules from a designated administrative telephone.
14. An internal program clock (with battery back-up) shall be included in the system. It shall be possible to synchronize the program clock with an external master

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clock.

15. There shall be a pre-announce tone signal at any loud-speaker selected for amplified-voice communication. The pre-announced tone shall be disabled by programming.
16. There shall be a periodic privacy tone signal at any loud-speaker selected for amplified-voice communication. The privacy tone shall be disabled by programming.
17. There shall be an automatic disconnect of the MCDCS system to prevent tying up communications channels. When a telephone is lifted from it's cradle and does not initiate a call within ten (10) seconds, the station shall receive a busy signal and shall automatically disconnect after 45 seconds.
18. The entire system shall include diagnostic / programming software for system testing and for full remote maintenance.
19. The system will also provide for the disconnect of the speaker when it's associated telephone is lifted from the cradle.
20. The telephone will be capable of generating an emergency call by pressing the \* (star) button three times. Emergency calls can be programmed to ring a single administrative phone or a group of administrative phones.
21. Any classroom telephone will also be allowed to access any one of the three program sources, and turn on and off the program sources to that related speaker.
22. It shall be possible to configure the MCDCS system with a "sub-system" of non dial handsets, call switches, administrative display phones and speakers. It shall be possible to program each sub-system station location as a staff station (handset or speaker and call-in switch), or administrative station (keypad-dialing DTMFtelephone and alphanumeric display panel). All station locations shall also have the option of being used with loudspeakers. Systems which do not allow for this "sub-system" configuration or limit the capabilities of each station location by not allowing loudspeakers in addition to handsets sets shall not be acceptable.
23. The "sub-system" staff stations may be programmed to ring one sub-system administrative telephone during day hours and one "sub-system" administrative telephone during night hours. Day and night hours shall be user-programmable.
24. Each "sub-system" staff station may be programmed for 3 different levels of call into a select sub-system master station, as follows:  
  
Level 1 - Normal/Emergency  
Level 2 - Urgent/Emergency  
Level 3 - Emergency
25. The speaker intercom system shall have provisions to connect a Digital An-

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nouncement System (DAS). The DAS shall be connected for automatic distribution of emergency or other user programmable voice or program information, when activated by the system wide emergency all-call feature specified herein. The DAS shall be capable of storing up to 12 minutes of audio information in one variable length message. The message shall be available for playback as a continuous loop or in single play mode.

### 1.08 FEATURES - TELEPHONE/INTERCOM

- A. A fully integrated Digital Communications System (DCS) / LAN Call Processing System shall be provided. The system shall provide for non-blocking internal and external communications from any telephone in the system by simple familiar touch pad dialing or accessed from the LAN computer terminals. Types and quantities of station instruments shall be as specified and as shown on the plans.
- B. The system shall be equipped with digital DSS/BLF Modules as shown on the plans. The DSS/BLF stations shall be able to monitor the status of any telephone in the system, and be able to call any station by simply depressing the associated key button. The DSS / BLF stations shall be labeled with the classroom number, staff station location, administrative location or desired architectural coding as indicated by the owner. Incoming calls to the Central Answering Position (CAP) from any telephone, call switch and handset in the system shall light the appropriate indicator on the BLF/DSS module and sound a tone to alert the operator of an incoming intercom call. The intercom call tone shall be distinctly different from outside line ringing tones.(provide one)
- C. The system shall have, at a minimum, the following features:
  - 1. The system shall be completely solid state utilizing time division digital technology with stored digital program control and digital transmission. The system shall contain main operators console(s) with DSS/BLF locations as shown on the plans (CAP). Single line type telephones, call switches and handsets shall be utilized in classroom and staff locations as indicated on the plans. Multi-line telephones shall be used at the administrative locations as specified herein and shown on the plans. Systems that can not utilize all different types of devices will not be considered. The system shall be of American manufacture and registered under Part 15 (class A) of the FCC regulations for connection to outside telephone lines. The system shall be capable of either "squared" or "non-squared" operation as desired.
  - 2. The Telephone System shall have unrestricted speech paths, with a non blocking digital architecture and shall be fully integrated.
  - 3. The system shall have the following wired capacity. Wired capacity is defined as the maximum configuration allowable on the system. This capacity may be obtained through the use of manufacturers' standard hardware and software expansion as allowed by system architecture. Wired capacity shall be a standard configuration of the manufacturer Wired capacity: 16 lines by 80 stations

The system shall contain; All cabinets, wired circuitry, circuit cards, power

## PA / CLOCK SYSTEM

supplies, and programming firmware for the below installed capacities. Systems which require expansion cards or add on modules to reach the specified capacities must include these items under this specification. Installed capacity: 16 lines by 300 stations

4. Provide direct-dial private two-way telephone communications with other administrative stations and staff stations.
  5. Provide two-way amplified-voice communications with any station loudspeaker.
  6. DCS system programming shall be from a standard MS-DOS Computer Terminal (local or remote), and allowed administrative telephone(s). Class of Service Programming (COS) for system shall be on a per line / per station basis allowing for flexible assignment of functions. Further, toll restriction administration class of service for enable and deny tables shall be class of service programmable by time of day.
  7. System initialization shall be accomplished from DCS-PCI. This is a Windows based program that allows for all the programming of the Virtual stations. All system initialization data shall be stored in non volatile memory.
  8. All telephones may turn program material on or off at their associated loud-speaker by dialing a pre-set code.
- D. The system shall offer at least the following standard operations:
- Alpha-Numeric Calling Party and Line Display
  - Automatic Number I.D. (Caller I.D.)
  - Automatic Route Selection
  - Access Denied
  - Call Forwarding
  - Call Conferencing (5 way unsupervised)
  - Call Parking
  - Call Pickup
  - Class of Service (Each Station & Line)
  - Class of Service Program Storage to Disk
  - Computer Telephony Interface (CTI)
  - DID Trunk Support
  - DISA Trunk Support
  - Night Transfer of Ringing Assignments (3 schedules)
  - ISDN BRI Data transmission
  - Off Premise Extensions
  - Open Applications Interface (OAI)
  - Music on Hold
  - Power Failure Transfer
  - Station Message Detail Reporting (SMDR)
  - Toll restriction (allow and deny tables)
  - Do Not Disturb
  - RS 232 Serial Ports
  - SMDR and programming Via Serial Port
  - Station locking button

## PA / CLOCK SYSTEM

Station Speed dials (10 per Station)  
System Speed dials (200 minimum capacity)  
TAP - Hookswitch Flash for PBX functions  
TSAPI / TAPI compliance and compatibility  
Intercom System (telephone)  
Intercom Speaker System/Programmable Access  
Intercom Line Lock-out  
Mute of Handset and Microphone Transmitters  
Multiple Attendant Positions  
Message Waiting Lamps  
T-1 Direct interface  
Voice Mail Interface  
Toll Restriction Override with access code  
Least Cost Routing  
Digit Translation  
Three Color LED's

- E. Provide a Station Message Detail Report (SMDR) System. Included shall be all terminal equipment, wire, installation and programming to allow for local traffic analysis of the telephone system from any RS-232 compatible serial device (e.g. data printer). This feature shall allow for a record of calls to be kept for each telephone station in the system. Incoming and outgoing calls greater than 20 seconds in length shall be recorded. The outside telephone line used and digits dialed (up to 32) shall be recorded. On incoming calls, the answer time (in tenths of a minute) shall be kept.
- F. The system shall be connected to the public telephone network. The communications system contractor shall develop a comprehensive cut-over plan with the owner's representative to ensure an orderly transition of service to the new telephone system. Provide owner with all pertinent FCC registration numbers and RE numbers to allow for the connection of the system to the public telephone network as customer premise equipment.
- G. The system will allow for the addition of third party developed equipment. One example is the Tracker. This is an internal paging system that interfaces with the DCS system to get a call to any person wherever they are within the operating radius of the system.
- H. The system shall have the capability of using wireless digital telephones for assignments to the staff to allow mobile communications throughout the building complex. This telephone shall operate the same as any administrative telephone in the system. The phone will be able to do programming and system functions within the operating range. This phone will be a four line LCD instrument. Systems not complying with this function will not be considered. (Provide one)
- I. All classrooms will have a built in PA system. This shall be accomplished by picking up the classroom phone and dialing its related speaker. Systems that do not comply with this feature will not be considered.
- J. The DCS will automatically adjust to daylight savings time when these changes occur. This will be pre-programmed into the software for automatic update as a program function.



## PA / CLOCK SYSTEM

- K. The DCS will allow for certain speakers or horns to be excluded from all-call, but will allow them to be included in a zone or in an emergency call. A list of speakers and horns will be provided by the owner during set-up.
- L. The system shall have the capability to designate a Student Phone. This phone shall include the following programmable features:
  - 1. Restrict phone numbers
  - 2. Restrict area code
  - 3. Timed conversation
  - 4. Allow a number to be dialed only once a day
  - 5. Phone will only work during programmed hours
- M. Virtual Station technology shall be utilized. A Virtual station is programmed via (DSC-PCI), a Windows based software. This feature will allow for complete flexibility in grouping staff communication devices through programming as software defined stations.
- N. The DCS will have both day and night COS assignments. This will allow for the same phone to maintain two COS services.
- O. The DCS will allow for group listening for programmed administrators. This is used for the additional monitoring of conversations without the third parties knowledge.
- P. The system will have provisions for supporting computer terminals on the digital ports. These computers will have the same features as administrative phones. These stations will also follow the same COS as any other station.
- Q. Interactive LCD's will allow the user access to a level of programming. This feature will allow the end user to create a more flexible station which will meet their needs.
- R. The LCD's will log all calls. This creates a printout that can be retrieved at a later date on the SMDR report. These calls can be answered in the order that they were placed or in any order that the user chooses.
- S. The system will be capable of supporting a call processing system that will be compatible with the DCS. This will also turn on and off message waiting lights. The call processing system will have 10,000 mail boxes with 18 hours of recording time.
- T. Subdued Off-hook Voice Announce: a subdued announcement can be made from one station to another station that is off-hook and busy on a call. With this feature the announcement is delivered and responded to in a subdued manner that prevents the distant party from hearing either the announcement or the response. Users can respond to the announcement in a verbal or non-verbal manor. They affect a response by pressing a Mute button or soft key response and speaking into the handset. They affect non-verbal response by pressing a pre-programmed button to send a message to be shown on the display of the announcing station (if it is an LCD speakerphone).
- U. All digital phones that are moved within the system shall maintain the same programming (COS, architectural number and features) when they are relocated.

## PA / CLOCK SYSTEM

- V. The administrative phones shall have tri-color LED's, for easier identification of system traffic. Incoming calls will appear in green, calls placed on station hold will appear in orange, and all other calls and busy lines will appear in red.

### 1.09 FUNCTION - REMOTE MAINTENANCE

- A. Remote maintenance shall be provided for the entire system. It shall be possible to perform all programming and software maintenance functions on the system from a remote computer located at the installing contractor's site and/or from a central owner maintenance location to be determined by the owner. Automatic line sharing devices shall be included at remote sites so that an existing outside line resource may be used for remote maintenance when not being used for its primary function.
- B. Provide, install and configure a complete and functioning remote maintenance system. System shall include, but not be limited to, all on site hardware and software, modems, transfer devices, installation, programming, testing, etc. and off site modems, software, installation, programming, testing, etc. (Owner will provide an MS-DOS based computer for owner remote end location).
- C. Connect and test the remote maintenance functions for all of the systems under remote control. Perform actual remote maintenance operations from the owner's remote site and demonstrate proper system operation in front of owner's designated maintenance personnel.
- D. Provide 4 hours minimum instruction time in the operations of the remote maintenance features.

## PART 2 PRODUCTS

### 2.01 EQUIPMENT

- A. **EQUIPMENT ENCLOSURES:** The Program Source Equipment shall be mounted in an upright equipment rack having 61" panel space and measuring 65-3/8"H x 22-3/8"W x 18-1/2"D. Color shall be black. System equipment shall mount on the telephone back board or be rack mounted as required. All communication system/program equipment shall be provided as required to fully implement a functioning system.
- B. **ADMINISTRATIVE TELEPHONES:** Shall be for desk top or wall mounting as indicated on plans. All administrative telephones shall be American made digital DTMF touch dial type speaker phones, with 24 line capability, and monitor speaker. All administrative telephones shall have full programmable access to internal intercom system, speaker intercom system and PBX/CO telephone functions. Administrative telephones shall have built in Liquid Crystal Display to give elapsed time of calls and 10 programmable messages. Any of the 24 dynamic "soft key" buttons shall be programmable for line access, DSS/BLF or speed dial functions as required. System wide DSS/BLF Module shall be supplied for Administrative telephones in the Main office Central Answering Positions and in Administrators office(s), as shown on the plans.

## PA / CLOCK SYSTEM

1. The MAIN ATTENDANT CONSOLE (Central Answering Position) shall be an American made digital 24 line multi-button electronic DTMF dialing LCD display speaker phones with access to outside lines and Intercom Control Console as enabled by programming. Telephones shall have built in Liquid Crystal Display to give elapsed time of calls and 10 programmable messages. Any of the 12/24 dynamic "soft key" buttons shall be programmable for line access, DSS/BLF or speed dial functions as required. The console shall have dedicated DSS/BLF positions for each telephone in the system. A monitor button and speaker phone shall be standard. The Console shall be programmed to provide message waiting indication at selected stations.
- C. STAFF STATION TELEPHONES: Shall be wall mounted or desk mounted as indicated on the plans. They shall be American manufactured digital DTMF touch dial 12 line speaker telephones with message waiting / incoming call light, Timed Hook Flash Button (TAP) and hold button. Access to outside telephone lines and the Intercom Central Control Console shall be available by programming.
- D. CLASSROOM TELEPHONES: Shall be wall mounted or desk mounted as indicated on the plans. They shall be American manufactured digital DTMF touch dial Single Line Telephones with message waiting / incoming call light, Timed Hook Flash Button (TAP) and hold button. Access to outside telephone lines and the Intercom Central Control Console shall be available by programming. Multiple line sets for Classroom Stations shall not be acceptable.
- E. TELEPHONE CONTROL CABINET: Shall be a standard American made solid state device designed to operate at 117 VAC (+/- 10%) single phase. Switching principle shall be solid state, time division digital switching with stored program control. The Telephone Control Cabinet shall meet the regulatory standards of FCC Part 15 (Class A), EIA RS478, Bell 48002 guidance and be UL Listed. Loop limits shall be 1000' max. RS-232 serial ports (2), data storage interface, and PC control support shall be standard. Memory shall be fully protected by internal battery like device and shall keep program resident in memory for a minimum of 30 hours if power fails. Customer programming shall be downloaded onto floppy disk as a permanent record and delivered with operations manuals to owner. Connection and terminations of lines and stations shall be via standard 50 pin female connectors. Capacity and features shall be as specified elsewhere herein.
- F. PRINTER: Shall be dot matrix type capable of accepting serial interface input. Printer shall be programmable for required data format of SMDR output of communications system to enable hard copy reports of SMDR studies. Printer shall use standard form feed paper. (Optional)
- G. SPEAKERS: Shall be 8" full range loudspeaker / baffle combination. 6oz. nominal magnet weight, 7 watt continuous power, with matching dual 25/70 volt transformer. Transformer shall be capable of delivering at least 6 separate wattage taps from 1/8 watt to 4 watts. Flush mounted onto steel back box. Paint to match ceiling. Quantity as shown on plans.
- I. OUTDOOR PAGING / PROGRAM SPEAKERS: Shall be UL listed, surface mounted moisture resistant type paging speakers for voice and tones with matching transformer.

## PA / CLOCK SYSTEM

Quantity as shown on plans.

- J. AM - FM ANTENNA: Provide a complete AM/FM antenna system, as required for proper radio reception. Provide a weather headed conduit run from roof to intercom junction box if required. Provide all mounting and connection hardware to receive available off air channels. Feed from building cable system, provided under separate section is an acceptable signal source. Installation shall be in accordance with latest safety standards. All masting and outdoor mountings shall be capable of withstanding winds of up to 100 MPH. Provide lightning protection and grounding as per National Electrical Codes.
- K. SURGE PROTECTOR: Provide over voltage and transient spike surge protector to condition AC voltages into all microprocessor control systems.
- M. REMOTE MAINTENANCE EQUIPMENT: As required to meet performance specifications.
- N. SPEAKER ASSEMBLIES
  - 1. Wall Speakers shall be Bogen Model S86T725 8" speaker with multi-tap 25volt transformer mounted in a flush back box and baffle or surface backbox in portables.
  - 2. Ceiling-mount flush speakers shall be Bogen Model S86T725PG8W 8" speaker with multi-tap 25volt transformer and steel baffle assembly with RE84 enclosure and TB8 T-bar bridge.
  - 3. Outdoor loudspeakers shall be Bogen Model FMH15T or Atlas AFT-15T, weatherproof, all-metal construction with enamel finish, 15 watt multi-tap transformer mounted in model BBFM6 flush-mount enclosure for new construction, BBSM6 surface-mount enclosure for existing construction, and SGHD8 vandal-resistant baffle with tamper proof screws.
- O. WIRELESS CLOCKS
  - 1. Clocks shall be Primex to match existing and to operate over the existing site wireless transmitter system. The clocks shall receive signal from the site main system antenna in Building 'C'.
    - 1. The clock is powered by two D-cell batteries and shall have a 5-year battery life.
    - 2. Provide 16" diameter clocks where noted on drawings. Except for the diameter the clocks are the same as the above 12" diameter clocks.
- P. MASTER CLOCK
  - 1. Existing Primex Wireless and Bogen PA

## PART 3 EXECUTION

## PA / CLOCK SYSTEM

### 3.01 MATERIALS

- A. **WIRE:** Wire shall be #22 gauge at a minimum. Wire for communications system shall consist of 4 twisted pairs #22 solid copper under jacket and 1 twisted pair #22 under shield solid copper with overall PVC jacket. Clock wiring as required for proper operation. No splices are permitted except in approved junction boxes. All terminations (except clock) shall be made on telephone type punch blocks or at specified devices. Display, speaker, and specialty cables shall be as required for best operation under manufacturer recommendations.
- B. **JACKS:** All station device terminations (except speakers) shall be terminated on USOC standard modular jacks. Jacks for wall mounted telephones shall have lugs for securely attaching the instrument to the wall.
- C. **BACKBOARDS:** Provide 4' x 8' plywood backboards for mounting of system cross connect field. Mount as shown on the plans. Provide Modular Termination backboards with 110 type terminal blocks as required to terminate all cables. Provide Distribution and cross connect backboards equal to AT&T 110 Series for all cross connect wiring.
- D. **TERMINAL CABINETS:** A terminal cabinet with a sufficient number of bushed openings shall be installed in the wall behind the Intercom Control Console equipment rack. Cabling between the equipment rack and the main junction box shall be provided with telephone type 50 pin connectors to allow ease in console connections, disconnection's and service. Satellite terminal junction boxes shall be provided as needed to allow for station terminations in each building.

### 3.02 EXECUTION

- A. All work under this section shall be performed by persons having specific familiarity with telephone, data and sound system installation. Upon request the contractor shall submit resumes, references or other corroborating documentation, to the engineer to confirm the contractor's capabilities and experience.
- B. **GROUNDING:** Except were specifically indicated otherwise, all exposed non-current carrying metallic parts of the communications system shall be grounded. This may be accomplished via a driven ground rod, cold water pipe or building power ground. If the building power ground is used, a separate ground conductor shall be used from the equipment to the grounding grid. All grounding shall be done with #6 solid copper wire or larger. The contractor shall use every effort to insure system stability and safety.
- C. **WIRING:** A comprehensive, documented communications wiring system is to be installed. Wiring is to be identified by room number, segregated, neatly laced, and terminated on telephone type punch blocks. Back boards and cross connect fields shall be neatly organized as to function. (i.e.: intercom, telephone stations, data network etc.) All termination points are to be labeled with function. Data cables shall be certified as usable and checked using the cable certification sheet. Data cables shall be labeled as per the data identification scheme.

### 3.03 TESTING AND TRAINING:

## PA / CLOCK SYSTEM

- A. Prior to connection of any terminal equipment all cables shall be tested as per REA spec. PC-4. Cables shall be tested for Opens, Splits, Crossed Pairs, Shorts to Ground and Shield Continuity. All defective cabling is to be replaced prior to device hook-up.
- B. Upon completion of the installation the contractor shall test each room station speaker, handset or call switch for proper operation. All telephones, programming and functions are to be tested for proper operation. All emergency and program functions are to be tested. Any malfunction shall be corrected prior to final acceptance.
- C. A minimum of eight hours time shall be included in the bid for instruction of the owner's personnel in proper operation and routine maintenance of the system. Instruction shall cover all materials indicated in the owners and operations manual.
- D. Operational guidelines shall be given in written form in sufficient numbers so that all key personnel have operational instructions for programming, station use and special features. Copies of these instructions shall be provided for permanent record in the operations and maintenance manuals specified in part 1.04 above.

END OF SECTION

# STRUCTURE CABLING

## SECTION 276000 – STRUCTURED CABLING

### PART 1 GENERAL

#### 1.01 GENERAL

All work and materials shall conform to the latest codes and ordinances and the Turlock Unified School District High School Standards. It is the intention of these plans and specifications to cover all things required to provide complete and operative systems. The contractor is to furnish labor, materials, transportation, equipment, miscellaneous services, etc., required to accomplish this result. Anything which may be reasonably construed as a necessary part of the installation is to be included, whether specially shown or mentioned.

#### 1.02 QUALITY ASSURANCE

- A. Contractor must possess a valid C-7 or C-10 California State Contractor's License. Contractor must have successfully performed at least three projects of similar scope, within the past two years.
- B. For purposes of determining equality, technical and general information set forth on the respective data sheets by manufacturers for each specified item shall be considered as part of these specifications and binding herein. Any proposed equal item offered shall be substantiated fully to prove equality. The Owner reserves the right to require a complete sample of any proposed item and may, if necessary, request a sample tested by and a copy of the test results by an independent testing laboratory to prove equality. The decision of the Owner regarding equality and proposed equal items will be final.
- C. The work performed under this specification shall be of good quality and performed in a workmanlike manner. In this context "good quality" means the work shall meet industry technical standards and quality of appearance. Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.
- D. Installation, materials, and workmanship to conform to applicable EIT/TIA and IEEE standards.

#### 1.03 SUBMITTALS

Submit all required specification listings, including a complete listing of the characteristics of the equipment in the specifications. Include a complete, detailed bill of materials. The Contractor shall submit to the Engineer specification sheets and/or catalog pages which provide detailed information regarding the products and equipment proposed for installation. These submittals shall be provided to the Engineer within ten days of the time the Contractor executes the contract for services. Such submittals shall be provided for the following products:

- o Copper cables
- o Fiber cables
- o Copper terminations, terminal blocks, patch panels, and patch cords
- o Fiber terminations and patch cords
- o Jacks and faceplates
- o Enclosures

## STRUCTURE CABLING

- o Cable supports
- o Testing results

### 1.04 FUNCTION

- A. Contractor shall provide materials and install a complete, functional local area network (LAN) system in accordance with this specification and the drawings. Contractor shall be responsible for providing a complete, functional system including all necessary components, whether included in this specification or not.
- B. The installation shall include cable (fiber optic and category 5 twisted-pair copper) innerduct (where shown), fiber interconnect equipment, connectors (copper and fiber), concentrators, jumpers (fiber and copper), patch panels, wiring blocks, DATA outlets, testing, start-up, training, and warranty. Additionally, Contractor shall provide labor and any incidental material required for installation. All fiber strands shall be terminated on and landed on the fiber interconnect equipment. All copper conductors shall be terminated on wiring block (distribution end) and on DATA outlets (station end). Components for connection of active equipment (network) shall be provided. Upon completion of installation, Contractor shall test all fiber and copper pathways and record the test results, as specified in the following.

### 1.05 REFERENCES AND GUIDELINES

The specifications and guidelines referred to in various portions of this specification can be obtained from the following sources:

ANSI	American National Standards Institute (ANSI) 430 Broadway New York, NY 10018 (212) 642-4900
ASTM (ASTM)	American Society for Testing and Materials  1916 Race Street Philadelphia, PA 19103 (215) 299-5400
Bellcore	Bellcore Customer Service 60 New England Avenue, Room 1B252 Piscataway, NJ 08854-4196 (201) 699-5800
BICSI	Building Industry Consulting Services International (BICSI) 10500 University Center Drive, Suite 100 Tampa, FL 33612-6415 (813) 979-1991
EIA/TIA	Electronic Industry Association (EIA) 2001 Pennsylvania Avenue NW Washington, DC 20006



## STRUCTURE CABLING

	(202) 457-4900 Telecommunications Industries Association (TIA) 2001 Pennsylvania Avenue NW Washington, DC 20006 (202) 457-4934
FCC	Federal Communications Commission (FCC) Washington, DC 20554 (301) 725-1585
IEEE	The Institute of Electrical and Electronic Engineers, Inc. (IEEE) IEEE Service Center 445 Hoes Ln. PO Box 1331 Piscataway, NJ 08855-1331 (201) 981-0060
NEMA	National Electrical Manufacturers Association (NEMA) 2101 L Street Washington, DC 20037 (202) 457-8400
NFPA	National Fire Protection Association (NFPA) Batterymarch Park Quincy, MA 02269
REA	Rural Electrification Association (REA) Room 2835, South Building US Department of Agriculture Washington, DC 20250-1500 (202) 382-8663
UL	Underwriters Laboratories, Inc. (UL) 333 Pfingsten Road Northbrook, IL 60062 (312) 272-8800

## PART 2 MATERIALS

### 2.01 GENERAL

- A. DATA OUTLETS: with stainless steel coverplate, in 4- 11/16" box with one gang ring.

Data cabinets and IDF's

Panduit - Mini-Com Module, Category 6, UTP, 8-Position 8-Wire, Universal Wiring, TG Style

CJ688TGBU – Blue for computers

CJ688TGGR – Green for wireless

CJ688TGYL – Yellow for surveillance cameras

CJ688TGVV – Violet for video

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CJ688TGOR – Orange for audio

### Classrooms/Offices outlets

PANDUIT - NetKey Category 6 punch down Jack module, Blue

NK688MBU – Blue for computers

NK688MGR – Green for wireless

NK688MYL – Yellow for surveillance cameras

NK688MVL – Violet for video

NK688MOR – Orange for audio

### Faceplates

PANDUIT – Single Gang, Flush Mount Vertical Faceplate, Ivory

NK1FNEI – 1 port

NK2FNEI – 2 port

NK3FNEI – 3 port

NK4FNEI – 4 port

## B. OUTLET CABLING:

### External applications

PANDUIT - Copper Cable, Category 6, 4-pair, 23AWG, U/UTP, Outside Plant, Black  
PUO6C04BL-U

### Internal applications

PANDUIT - Copper Cable, Enhanced Category 6, 4-Pair, 23 AWG, U/UTP, Riser CMR,  
REELEX

PUR6004BU-W – Blue for computers

PUR6004GR-W – Green for wireless

PUR6004YL-W – Yellow for surveillance cameras

PUR6004VL-UY – Violet for video

PUR6004OR-UY – Orange for audio

## C. PATCH PANELS:

PANDUIT – 48-Port Patch Panel

CPP48WBLY

## D. ACTIVE HUBS AND SWITCHES: By District.

## D. FIBER CABLE:

SUPERIOR ESSEX - Interlock Armored Cable, 12 Fiber, SM (BI), Riser,  
Indoor/Outdoor

F108-012U13-E991

## F. FIBER TERMINATIONS:

PANDUIT - LC Simplex Single-mode Fiber Optic Connector

FLCSSBUY

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PANDUIT - FAP with 6 LC Duplex OS1/OS2 Single-mode Adapters (Blue) Zirconia Ceramic Split Sleeves  
FAP6WBUDLCZ

PANDUIT – 1U adapter panel  
FCE1U

### G. DATA RACKS:

#### Floor mounted

19" floor mounted racks, Chatsworth 19" by 7", "clear" finish.. Provide cable management and plugmold power provisions.

#### Wall mounted

DAMAC – WALMOUNT 24"X22"X30" HD DUAL SWING, 24"X30"D PLEX DOOR WITH LOCK, BLACK  
WSR24ABP1VVV3

### H. SURFACE WIREWAY (where notes or shown)

PANDUIT – Surface mount box  
CBX2EI-AY

Wire mold – Nonmetallic raceway Ivory  
5400  
2900

### I. CABLE RUNNERS: Chatsworth 10500 series, "clear", attach to top of rack and brace to walls in two directions.

### J. TELEPHONE CABLING: Category 6 with termination to 66 block by IDF, and connection to site telephone cabling to telephone system. Provide adequate service loop allowing for re-connection to data patch panels in future for VoIP conversion.

## 2.02 BUILDING WIRING

Provide data outlets with dedicated cable home runs in raceway to IDF for each building. Number of outlets and locations as indicated on drawings.

## 2.03 INTERMEDIATE DISTRIBUTION FACILITY

Provide patch panel, and fiber termination unit and backboard in each building. Sizes, numbers, and mounting enclosures as required and locations as indicated on drawings.

## 2.04 BACK BONE EQUIPMENT

Provide outside plant fiber optics cables with innerduct in raceway system and pullboxes throughout site as indicated on drawings.

## STRUCTURE CABLING

### 2.05 MAIN DISTRIBUTION FACILITY

Provide patch panel and fiber termination unit(s) and equipment rack in main building. Sizes, numbers, as required and locations as indicated on drawings.

## PART 3 EXECUTION

### 3.01 SERVICES

All installation work must be performed according to District Standards, published industry guidelines, rules, and regulations. If disputes occur, local, state, and national codes have precedence; then District policies and procedures; then standards such as EIA/TIA; then guidelines from firms such as Building Industry Consulting Services International (BICSI), AT&T, GTE, and Northern Telecom; then finally, manufacturer recommendations for category 6

### 3.02 INTERBUILDING CABLE

- A. All cables shall be clearly labeled with pair identification numbers. All pairs on the Building IDF shall be clearly identified with cable pair and sheath.
- B. Install fiber cable in accordance with Manufactures Standards of Installation and not more than (2) 90 bends. Cable radius turns shall not be exceeded and pulling tension on cable shall not exceed cable manufacturer's tension rating. Fiber optic cable shall not be spliced in pull boxes. Fiber cable shall be installed in innerduct, innerduct may be spliced in pull boxes.
- C. Open copper cable in buildings shall be independently supported to the roof structure with "J" hooks 5 feet on center maximum.

### 3.03 TERMINATING

- A. All work must be neat and orderly, per District standards, and no more than 1% of the pairs in any cable will be accepted as defective. Leave 36 inches excess cable before terminating.
- B. Fiber optic cable to be terminated in fiber patch panel bulkhead with 'ST' connectors and looped with proper radius. Leave 72 inches excess of cable before terminating.

### 3.04 GENERAL INSTALLATION MANAGEMENT ROVISIONS ARE AS FOLLOWS:

- A. **Equipment Racks:** Equipment racks shall be assembled in accordance with the manufacturer's instructions and recommendations. Each rack shall be mounted such that the side rails are plumb. Each rack shall be affixed to the backboard at each of the mounting holes provided. Attachment shall be by 1/2" X 1-1/4" lag bolts. A 3/8" pilot hole shall be drilled for each lag bolt. Each bolt shall be tightened to the extent that it holds the mounting hardware firmly to the backboard, but not so tight as to distort the hardware or strip the threads.
- B. **Wiring Blocks and Wiring Management Components:** Wire management components shall be mounted to the plywood backboard. Each device shall be mounted such that its

## STRUCTURE CABLING

horizontal dimension is level. In cases where more than one device is mounted, they shall be aligned vertically. Each device shall be affixed to the plywood backboard by means of screws suitable for fastening to plywood. A minimum of four (4) of the mounting holes provided shall be utilized for fastening. Screws shall be tightened to the extent that they hold the device snug to the backboard, but not so tight as to distort or damage the device. Wiring blocks shall be terminated in accordance with the manufacturer's instructions and recommendations. Installation of accessories shall also be conducted in accordance with the manufacturer's instructions and recommendations.

- C. **Fiber and Copper Cable:** Where fiber or copper cable enters an MDF or IDF it shall be affixed to the backboard or via "D" Rings and cable ties or to racks with wire management full length cable ring assembly, "clear" finish. Cable runner assembly shall be provided for all racks. All cable shall be neatly bundled, combed, and tied. All cable runs, within the MDF or IDF shall be horizontal or vertical within the constraints of minimum cable bending radii.
- D. **Labeling:** With the exception of work station cables, hand written labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or type written onto adhesive labels. The font shall be at least one-eighth inch (1/8") in height, block characters, and legible. The text shall be of a color contrasting with the label such that it may be easily read. If labeling tape is utilized, the font color shall contrast with the background.

### 3.05 DEFINITIONS

- A. **MAIN DISTRIBUTION FACILITY (MDF):** The MDF is the location, within the main building, where the entire data system originates. Including: the physical location, enclosure, wire and cable management hardware, termination hardware, distribution hardware, and equipment racks.
- B. **INTERMEDIATE DISTRIBUTION FACILITY (IDF):** The IDF is the location in a building where a transition between the fiber backbone and the copper category 5 distribution system occurs. Including: the physical location, enclosure, wire and cable management hardware, termination hardware, and equipment racks.
- C. **BACKBONE PATHWAY:** The backbone pathway consists of a series of conduits or chases which connect the MDF to the IDF's.
- D. **BACKBOARD:** Backboard generally refers to the 3/4" plywood sheeting lining the walls of the data facilities. Backboard may also refer to the entire wall mounted assembly, including wire management, wiring blocks, and equipment racks.
- E. **DESIGNATION STRIPS:** Paper or plastic strips, usually contained in a clear or color tinted plastic carrier, designed for insertion into a termination frame, constitute Designation Strips. Designation strips are usually imprinted with the adjacent terminal number and are used to aid in locating a specific pair or group of pairs inserted into the termination frame, or for the purpose of delineating a termination field.
- F. **WIRE MANAGEMENT:** Hardware designed and manufactured for the purpose of keeping cross-connect wire and patch cables neat and orderly. Most termination frame

## STRUCTURE CABLING

manufacturers provide wire management components designed to work in conjunction with their termination frames. Wire management may also refer to other types of hardware for the purpose of securing wire and cable to the building.

- G. DATA OUTLETS: In order to support all of the possibilities, each workstation shall be provided with a data outlet. Each data outlet shall contain the required modular jacks.
- H. MAIN DISTRIBUTION: The MDF serves as the origin for all data signals. It shall contain termination fields, wire management, and equipment racks.
- I. WIRE MANAGEMENT: Wire management shall be provided between the backboard and the free-standing equipment racks (if required).

### 3.06 MANUFACTURER

Throughout this specification, Leviton , Berktek, and other manufacturers are cited, along with specific part numbers. These citations are for the purpose of establishing quality, function and performance criteria. Contractor may provide approved alternates.

### 3.07 TESTING

Contractor shall test each pair of twisted-pair copper cable. The Owner reserves the right to have a representative present during all or a portion of the testing process. If the Owner elects to be present during testing, test results will only be acceptable when conducted in the presence of the Owner.

- A. WORKSTATION CABLE: Each workstation cable shall be tested from the wiring block to the data outlet.
  - 1. TEST EQUIPMENT: Microtest 8050-00 NEXTSCANNER or equivalent.
  - 2. TESTS: Signal Attenuation, Noise, Near End Cross-talk, Cable Length, DC loop back resistance and pair-by-pair continuity.
  - 3. TEST CRITERIA: Per EIA/TIA standards for Cat 6.
- B. FIBER OPTIC CABLE
  - 1. Interbuilding fiber cable test shall be conducted from patch panel to patch panel. All testing shall be documented on a district approved form.
    - a. Insertion loss: The Contractor shall conduct insertion loss testing in both directions on the installed interbuilding cable at 850 nm and 1300 nm for the multimode fiber and 1310nm and 1550 nm for single mode.
    - b. Power meter: The Contractor shall conduct power meter insertion loss testing on fiber cable at 1310nm and 1550 nm.
    - c. Optical time domain reflectometer: The Contractor shall conduct an OTDR test of each of the interbuilding fibers.

## STRUCTURE CABLING

### 3.08 DOCUMENTATION:

Contractor shall provide documentation to include test results and as-built drawings.

- A. Work Station Cable: The results of the work station cable tests shall be provided in the form of print-outs from the test equipment.
- B. As-Built Drawings: Contractor will be provided with clean copies of the space planning drawings. These drawings shall be modified to indicate actual cable routing and work station numbers.

### 3.09 ACCEPTANCE

Acceptance of the data communications system, by owner, shall be based on the results of testing, functionality, and the receipt of documentation. With regard to testing, all fiber segments and all workstation data cables must meet the required criteria. With regard to functionality, Contractor must demonstrate to Owner that 10base-T data signals can be successfully transmitted, bi-directionally, from the MDF to and from some number of individual data outlets. The number of outlet locations to be tested shall be determined by Owner. With regard to documentation, all required documentation shall be submitted to Owner.

### 3.10 SERVICE AND MAINTENANCE

- A. The Contractor shall provide a one year warranty of the installed system against defects in material and workmanship.
- B. All labor and materials shall be provided at no expense to the owner during normal working hours. The warranty period shall begin on the date of acceptance by the owner/engineer.

### 3.11 LABELING

- A. With exception to work station cables, hand written labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or type written onto adhesive labels. The font shall be at least one-eighth inch (1/8 inch) in height, block characters, and legible. The text shall be of a color contrasting with the label such that it may be easily read. If labeling tape is utilized, the width of the tape shall not exceed 3/8 inch, and the font color shall contrast with the background. Patch panels shall exhibit workstation numbers, in sequential order, for all workstations served by the MC or HC.
- B. Each optical fiber cable segment shall be labeled at each end with its respective HC identifier. Each fiber interconnect device shall be labeled with its respective HC identifier. Each telecommunications outlet shall be labeled with its respective work station number (machine labels only). Workstation numbers shall be comprised of The Building Designator-The Room Number-The Station Number (for example A-205-2) Each workstation cable shall be neatly hand labeled, using permanent ink or other permanent labeling medium, at each end with its respective workstation number. Each

## STRUCTURE CABLING

copper backbone cable shall be machine labeled at each end with its respective HC number. Each binder group shall be tied off with its respective identifying ribbon at each break-out point.

- C. Warning Tags: At each location where the fiber cable is exposed to human intrusion, it shall be marked with warning tags. These tags shall be yellow or orange in color, and shall contain the warning: "CAUTION FIBER OPTIC CABLE." The text shall be permanent, black, block characters, and at least 3/16" high. A warning tag shall be permanently affixed to each exposed cable or bundle of cables, at intervals of not more than five (5) feet. Any section of exposed cable which is less than five (5) feet in length shall have at least one warning tag affixed to it.

END OF SECTION



# FIRE ALARM AND DETECTION

## SECTION 283100 - FIRE ALARM AND DETECTION

### PART 1 - GENERAL

#### 1.01 GENERAL REQUIREMENTS

- A. The Simplex Automatic Voice Evacuation Fire Alarm System shall be complete and operating. All equipment shall be new and unused. All field peripherals shall be designed for continuous duty without interruption or degradation of function or performance. This system shall be designed to provide (24) twenty-four hours of stand-by in the event of loss of primary power, and shall be able to provide (15) fifteen minutes of voice alarm.
- B. The equipment and the installation shall comply with the current applicable provisions of the following standards and the general conditions and the supplemental conditions as if fully repeated herein.  
Upon completion of the installation of the Fire Alarm system, a satisfactory test of the entire system shall be made in the presence of the Fire Marshall.

#### 1.02 RELATED DOCUMENTS:

- A. 2019 California Electrical Code
- B. National Fire Protection Standards; NFPA 72 with CSFM amendments.
- C. California Fire Code
- D. All requirements of the local authorizing agency.
- E. Underwriters Laboratories, Inc.
- F. The system and all components shall be listed by underwriters laboratories, inc. and by the California state fire marshal for use in fire protective signaling systems.

#### 1.03 COORDINATION:

- A. Confirm compatibility and interface of other materials. Report discrepancies to the Architect or Electrical Engineer, and defer ordering until clarified.
- B. Supply mounting hardware, and back boxes to other trades.
- C. Coordinate with Division Mechanical to avoid conflicts between fire alarm equipment & mechanical equipment.
- D. All apparatus mounting shall be coordinated with the architectural reflected ceiling plan. If any discrepancies occur, the Architect or Electrical Engineer must be notified in writing before installation is started.

#### 1.04 SUBMITTALS

- A. The Fire Alarm System design is complete. The contractor shall submit complete

## **FIRE ALARM AND DETECTION**

submittals for the fire alarm system equipment components. At least 8 copies of this information shall be submitted to the architect within (30) thirty days after award of this work and shall be subject to the approval of the architect.

- B. All substitute equipment proposed as equal to the specified shall be submitted for pre-approval at least (14) fourteen days prior to the bid date. Provide (3) three copies for review showing a riser diagram, installation drawings, C.S.F.M. Numbers, manufacturers data sheets and any differences between the specified equipment and the proposed alternate equipment. Any and all cost increases due to approval by the architect for the use of the alternate equipment shall be borne by the installing contractor.
- C. The system shall be installed in conduit and will be provided and installed by the electrical contractor.

### 1.05 OPERATION

The fire alarm system shall be a complete and operating Simplex Automatic Voice Evacuation System complete with new 4100ES control panel to replace or add to the existing 4100U network addressable, Class B, power limited, fire alarm system.

## PART 2 PRODUCTS

### 2.01 EQUIPMENT

Refer to the contract drawings for fire alarm equipment items.

## PART 3 EXECUTION

### 3.01 FIRE ALARM INSTALLATION

- A. Installation of the fire alarm system shall be in strict compliance with the manufacturers' recommendations, U.L. And C.S.F.M. Requirements.
- B. All equipment shall be attached as indicated on the contract drawings, and shall be held firmly in place. Fastening and support shall provide a safety factor of five.
- C. As indicated on the contract drawings, each system alarm point or zone of the system shall be uniquely labeled within the fire alarm control panel. Each zone of initiation shall be permanently labeled on the fire alarm control panel.
- D. Provide a complete system of wiring and conduit between all equipment. Unless otherwise specified, all field wiring shall be no. 12 AWG (Quantity as indicated on Drawings) for alarm and 16 AWG TSP For initiation circuits. A maximum of 40% fill, and shall be approved for use in fire alarm systems. Unless otherwise specified, 3/4 inch conduit shall be the smallest conduit used. All back boxes shall be U.L. Listed. All back boxes shall be U.L. Listed. All splices shall be made in U.L. Listed junction boxes and shall be identified by a unique method as to identify them as related to the use for fire alarm circuit cabling or devices.
- F. All field wiring shall be completely supervised. In the event of primary power failure,

## **FIRE ALARM AND DETECTION**

disconnected stand-by batteries, removal of any internal modules, or any open circuits in the field wiring, an audible and visual trouble signal will be activated until the system and its associated field wiring are restored to a normal condition.

- G. Cable shall be the type listed for fire alarm use and shall be installed per CEC article 760.
- H. Cable must be separated from any open conductors of power, or class 1 circuits, and shall not be placed in any conduit, junction box, or raceway containing these conductors, as per CEC article 760-29.

### **3.02 FINAL CONNECTION**

- A. The system shall be accepted only after a satisfactory test of the entire system has been accomplished by the factory trained distributor in the presence of the authorizing agency, the architect or his representative, and the owner, or the owner's representative. Upon completion of the installation of the Fire Alarm system, a satisfactory test of the entire system shall be witnessed in the presence of the Fire Marshall
- B. The installing contractor shall make available to the owner a contract for periodic service, testing, maintenance, and calibration. This contract shall not become effective until the (1) one year installation warranty has expired. The one year installation warranty shall commence upon acceptance of the system by the architect.

### **3.03 ON-SITE SERVICE**

The installing contractor shall provide comprehensive training on the operation of the system operation, proper use, and testing of the fire alarm system to the owner and the local authorizing agency. General operating instructions shall be posted adjacent to the fire alarm control panel.

**END OF SECTION**

# APPENDIX “A”

## GEOLOGIC/ SEISMIC HAZARD REPORTS



4230 Kiernan Ave., Ste. 150 | Modesto, CA 95356 | Ph: (209) 543 - 1799 | Fax: (209) 543-1775

January 7, 2020

CTE Job No. 25-0908G

Turlock Unified School District  
Attention: Mr. Barney Gordon  
P.O. Box 819013  
Turlock, California 95381-9013

C/o FF & J Architects  
Attention: Gary Mallory Architect  
2101 Geer Road Suite 308  
Turlock California 95382

Subject: Geotechnical Engineering Investigation  
Proposed Classroom Buildings  
Osborn Academy School (Project No. TU17.02.14)  
201 N. Soderquist Road  
Turlock, California

Gentlemen:

As requested, we have completed a preliminary geotechnical investigation at the subject site. The attached report includes preliminary recommendations for the proposed classroom building addition. Based on field observations and testing, project development is considered feasible from a geotechnical standpoint provided the recommendations contained in the attached report are followed during site grading, structure and improvement construction.

If you have any questions regarding our findings or recommendations, please do not hesitate to contact this office. The opportunity to be of service is appreciated.

Respectfully submitted,

CTE CAL Inc.

Rodney D. Ballard, GE 2173  
Principal Geotechnical Engineer



Jim Fitzgerald, CEG 2436  
Engineering Geologist



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GEOTECHNICAL ENGINEERING INVESTIGATION  
PROPOSED CLASSROOM BUILDINGS  
OSBORN ACADEMY SCHOOL (PROJECT NO. TU17.02.14)  
201 N. SODERQUIST ROAD  
TURLOCK, CALIFORNIA

Prepared for:

TURLOCK UNIFIED SCHOOL DISTRICT  
ATTENTION: MR. BARNEY GORDON  
P.O. BOX 819013  
TURLOCK, CALIFORNIA 95381-9013

Prepared by:

CTE CAL, INC.  
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CTE JOB NO.: 25-0908G

JANUARY 7, 2020

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## 1.0 INTRODUCTION AND SCOPE OF SERVICES

### 1.1 Introduction

This report presents the results of our geotechnical engineering investigation and provides conclusions and design criteria for the proposed improvements. It is our understanding that this project will include construction of six new classroom buildings, a French drain storm water collection system, new paved parking, and associated improvements. Figure 1 shows the general location of the site. Figure 2 shows a plan view of the site with exploratory boring locations.

Our investigation included field exploration, laboratory testing, geologic hazard evaluation, and engineering analysis. Specific recommendations for excavations, fill placement, and foundation design for the proposed improvements are presented in this report. Cited references are presented in Appendix A.

### 1.2 Scope of Services

The scope of services provided for this preliminary investigation included:

- Review of readily available geologic reports and documents pertinent to the site area.
- Explorations to determine subsurface conditions to the depths influenced by the proposed construction.
- Perform storm water disposal soil suitability via percolation testing
- Laboratory testing of representative soil samples to provide data to evaluate the geotechnical design characteristics of the site foundation soils.
- Determination of the general geology and evaluation of potential geologic seismic hazards at the site.
- Preparation of this report describing the investigations performed and providing opinions/conclusions and geotechnical engineering recommendations for design and construction.

## 2.0 SITE LOCATION AND PROJECT DESCRIPTION

The project site is located at the Osborn Academy Elementary School. The K-12 school property consists of an approximately 750 ft by 690 ft parcel located at 201 Soderquist Road in Turlock, California as shown on the Site Index Map (Figure 1, attached). The Osborn Academy school property is bounded by N. Soderquist Road on the east, West Main Street on the south and Turlock Memorial Park property on the north and west.

The existing campus is understood to have been constructed in the 1950's and 1960's and prior to the school's construction was likely used for agricultural production or farmland. Existing buildings associated with the school are present on the eastern half of the property with sports play fields located on the western half.

It is our understanding the proposed project consists of designing and constructing four new classroom buildings totaling approximately 27,480 square feet (sf) as follows: Building F, G, H, and J are proposed to be 5760 sf; 10,800 sf; 8,040 sf; and 2,880 sf. respectively. The building locations are shown on the attached Exploration Map (Figure 2). If soil conditions allow, the new buildings are proposed to be single-story wood framed structures constructed on standard spread footing foundations with concrete slab on grade construction.

A new asphalt paved parking lot is proposed in the northeastern corner of the site. Two storm drainage collection and disposal French drain systems are proposed, one in the new northern parking lot area and the other in the central grass covered turf area. In addition, associated flatwork, utilities, landscaping, and other improvements are expected to be constructed as part of the project.

Percolation testing was performed by our office which provided design information for the proposed storm water drainage disposal system. A summary of the percolation testing conducted as well as the recommended infiltration rates are contained in Section 3.2.

The lot, proposed for new improvements, is relatively level, therefore, only nominal grading is expected to be required to prepare the site. Disturbed soils, if present at subgrade, will require over-excavation and replacement with engineered fill as recommended herein. Recommendations for site grading and design of structure foundations and improvement have been provided below.

### 3.0 FIELD AND LABORATORY INVESTIGATION

#### 3.1 Field Investigations

Field investigation, conducted on October 26, 2019, included site reconnaissance, mapping of surficial site deposits, and the excavation of six soil borings to assess the subsurface soil and groundwater conditions at the site. The borings were drilled using a truck-mounted CME-75 drill rig utilizing 4-inch diameter solid flight auger and HQ (3 7/8-inch) mud rotary, casing advance system and 6-inch casing. The maximum explored depth of these borings was 51.5± feet below existing ground surface (beg).

The field subsurface exploration program included performing Standard Penetration Tests (SPT) using a standard split barrel (1.4-inch inside diameter, 2-inch outside diameter) sampler which was operated in accordance with ASTM D-1586. The sampler was utilized to obtain samples of the subsurface soils at depth intervals of 5-ft or less by driving the sampler into the bottom of the borehole with successive blows of an automatically tripped 140-pound hammer free-falling 30 inches.

The number of blows required to drive the sampler each six-inch interval (three intervals for 18 inches in total) of sampler penetration was recorded and are shown on the test boring logs (attached as Appendix B). The results of the drive sampler testing are shown on the boring logs in the column labeled "Blows/ 6 Inches". The standard penetration blow counts (N) were corrected and used during the geotechnical engineering evaluation and analysis to correlate soil strength and structure bearing characteristics.

Soils were logged in the field by a CTE Field Geologist and were classified according to the Unified Soil Classification System (ASTM D2487), sampler drive resistance, field testing, and visual



observations. Exploration logs prepared for each of the borings provides soil descriptions, field in-situ test results, and blow count (N) data. The boring logs are included in Appendix B which contains the Boring Log Legend and Definition of Soil Terminology as shown on Plates BL1 and BL2, respectively. The location of the test borings are shown on Figure 2.

Relatively undisturbed soil samples were obtained in stainless steel sample tubes from the sampler and a bulk soil sample was recovered directly from drill cuttings. Soil samples were then transported to CTE's laboratory for further testing. Field descriptions within the boring logs have been modified, where appropriate, to reflect laboratory test results. Upon completion of drilling, the borings were grout backfilled from final boring depth up to original ground surface.

### 3.2 Percolation Testing General

Our subsurface geotechnical investigation included conducting a site storm water disposal soil suitability evaluation via percolation testing. The evaluation included the drilling and testing of two percolation test holes drilled at the locations shown on Figure-2. The percolation test holes were drilled from existing lot grade to a maximum depth of 7.0 feet. In addition, as stated previously, three subsurface borings were drilled, logged, and sampled to a maximum depth of 51.5 ft below grade to access the subsurface soil and groundwater profile below the site.

Field investigation and subsurface exploration oversight was performed by an experienced geological engineer from this office. Soils were logged and field classified using the Unified Soil Classification (USC) System as to consistency, color, texture, and gradation, on the bases of drill action, drive sampler penetration, and examination of soil samples and drill cuttings.

Soil materials encountered during our geotechnical subsurface drilling program generally consisted of loose to medium dense silty sand (SM) to an approximate depth of 5 feet bgs which are underlain by very stiff silt (ML) to an approximate depth of 10 feet bgs. The stiff silt deposits are underlain by loose well graded sand (SW) to an approximate depth of 15 feet bgs which are in turn underlain by very dense silty sand (SM) to an approximate depth of 30 feet bgs. The silty sand is underlain by

hard low plastic clay (CL) to an approximate depth of 43 feet bgs which are underlain by very dense silty sand (SM) to the maximum depth explored of 51.5 feet beg.

Soil materials encountered within the percolation test holes were generally consistent with silts and silty sand materials encountered within the upper portions of the geotechnical borings. The material type presented on the percolation test data sheets represents the material type in which the percolation testing was conducted. Percolation data sheets are contained in Appendix-B.

Groundwater was encountered at 22.2 feet beg in Boring-6 drilled for our geotechnical investigation. These observations represent groundwater conditions at time of the field exploration and may not be indicative of other times, or at other locations. Groundwater conditions can vary with seasonal changes, local weather conditions, and, other factors. Groundwater depth in the vicinity of the site is indicated to be on the order of  $40\pm$  feet below existing grade (<https://gis.water.ca.gov/app/gicima/>). Based on a groundwater depth of 22.2 feet and a maximum proposed depth of the drainage element of 12 feet, groundwater is located at least 10 feet below the base of the proposed drainage element.

As stated previously logs of subsurface borings, percolation data, and, test results are included in Appendix-B. Locations of the geotechnical test borings and percolation tests are shown on the attached “Exploration Location Map” (Figure-2). All test borings were backfilled to ground surface and surface restored to original condition upon completion of testing.

### 3.2.1 Percolation Testing Procedure

Upon completion of the percolation hole drilling, loose material was removed and a 3-inch diameter open-ended slotted drain pipe was installed to control potential sidewall caving of the test-hole. Pre-saturation of the soils to be tested was accomplished by filling each test hole with water to a level 12 inches above the bottom. During the testing a six inch (minimum) column of water “dissipated” from each of the percolation test holes within 30 minutes or less. Percolation testing was then performed immediately by adding water to a level of approximately  $6\pm$  inches above the top of the 2 inches of gravel placed at the base of each test hole. Recordings were made of the change (drop) in water level

at regular time intervals and water level was refilled after each interval. Specific details are included on the attached percolation test data sheets located in Appendix-B.

### 3.2.2 Percolation and Infiltration Rates

The soil percolation rate is defined by the average time in minutes for a 1-inch column of water to “seep” into the soil. Percolation rate was calculated (in minutes per inch) by dividing the time (in minutes) by the change (drop) in water level (in inches). No correction factor was used in the calculation for boring diameter.

As shown below in Table 3.2.2 percolation test “P-1” achieved a steady percolation rate of 4.0 minutes/inch, and, “P-2” achieved a steady percolation rate of 6.7 minutes/inch. In general, the percolation rates are not considered inconsistent with those typical of the soil types encountered at the site and the site location. Owing to variations in material type and depth, percolation rates would typically be expected to fluctuate somewhat across a site and are also dependent upon actual construction, depth, size, location, and workmanship of the drainage element.

Based on percolation test results, as described above, the soil conditions at the site are considered suitable for a storm water disposal system in the vicinity of P-1 and P-2. It is CTE’s opinion that the percolation results obtained are representative of the silty fine sand deposits encountered at the site. The percolation test measures the length of time required for a quantity of water to infiltrate into the soil and is commonly referred to as the “percolation rate”. It should be noted that the percolation rate is related to, but not equal to, the infiltration rate. While an infiltration rate is a measure of the speed at which water progresses downward into the soil, the percolation rate measures not only the downward progression but the lateral progression through the soil as well. This reflects the fact that the surface area for infiltration testing would include only the horizontal surface while the percolation test includes both the bottom surface area and the sidewalls of the test hole.

The calculated conversion from percolation rate to infiltration rate is located in Appendix B. The resulting percolation rate in min/inch and Infiltration rates in gal/sf/day are listed in Table 3.2.2



below. The observed infiltration rates listed below do not include a safety factor. It is commonly accepted practice that a minimum factor of safety of 2 be utilized in storm water infiltration design. Therefore based on the average infiltration rate observed in P-1 and P-2 and utilizing a factor of safety of 2, a design infiltration of 15.0 gal/sf/day is recommended as indicated in Table 3.2.2 below.

TABLE 3.2.2				
TEST NUMBER	DEPTH, ft	MATERIAL TYPE	PERCOLATION RATE (Min/In)	OBSERVED INFILTRATION RATE (Gal / ft <sup>2</sup> /day)
P-1	7	SM (SILTY SAND)	4.0	53.9
P-2	6.5	SM (SILTY SAND)	6.7	29.9
RECOMMENDED DESIGN INFILTRATION RATE				21.0

### 3.3 Laboratory Investigations

Laboratory tests were conducted on representative soil samples for classification purposes and to evaluate physical properties and engineering characteristics. Laboratory tests were conducted to determine Moisture Content, Dry Density, Atterberg Limits, Grain-Size Analysis, Chloride and Sulfate Content, pH, Minimum Resistivity, and, R-value. Laboratory results and test methodologies are included in Appendix C.

## 4.0 GEOLOGY

### 4.1 General Geologic Setting

The site lies along the in the central part of the San Joaquin Valley, a structural and topographic basin making up the southern half of the Great Valley Geomorphic province of California. The San Joaquin Valley is characterized by an extensive system of coalescing alluvial fan deposits from the Sierra Nevada and Coast Ranges, which border the valley to the east and west, respectively. The gently sloping, eastern alluvial fans are principally composed of deposits from granitic rock sources in the Sierra Nevada. The smaller, more steeply sloping fans on the west have originated from sedimentary and metamorphic rocks of the Coast Range (Davis et al., 1959).

The San Joaquin Valley has been filled with hundreds of feet of erosional sediments, ranging in age from Pleistocene to Holocene. Recent alluvial deposits generally consist of poorly sorted silts and fine sands with less extensive lenses of medium to coarse grained sands and gravel. Lacustrine deposits occur along the axis of the valley, and consist of clays, silts, and fine sands. These alluvial units overlie Pliocene-Pleistocene continental clastic deposits, which in turn lie over older continental and marine deposits. A pre-Tertiary basement complex of granitic and metamorphic rocks unconformably underlies the entire area.

Based on the USGS Geologic Map of the San Francisco-San Jose quadrangle, California (CDMG Regional Geologic Map 5A, Scale 1:250,000, 1991) geologic units at the site/vicinity consist of Quaternary Alluvial Fan Complex deposits (Holocene and Upper Pleistocene) of the Modesto Formation. These deposits are described as undeformed, generally unweathered, unconsolidated, poorly to moderately sorted and bedded coarse sandy gravel and gravelly coarse sand as stream terraces and valley fills and at fan heads, grading downstream to sorted and bedded silt, clay, and fine sand on lower fans.

#### 4.2 Generalized Soil Conditions

Soil materials encountered in our site explorations are considered consistent with alluvial fan deposits as described on published geologic mapping (discussed above). Soil materials encountered during our geotechnical subsurface drilling program generally consisted of loose to medium dense silty sand (SM) to an approximate depth of 5 feet bgs, underlain by very stiff silt (ML) to an approximate depth of 10 feet bgs. The silt is underlain by loose well graded sand (SW) to an approximate depth of 15 feet bgs, underlain by very dense silty sand (SM) to an approximate depth of 30 feet bgs. The silty sand is underlain by hard low plastic clay (CL) to an approximate depth of 43 feet bgs, underlain by very dense silty sand (SM) to the maximum depth explored.

#### 4.3 Groundwater Conditions

Groundwater conditions within the test borings were evaluated at the time of field exploration and groundwater was determined to be present at least 22.2 feet bgs after bailing the drill fluid from Boring-6 excavated on October 26, 2019. These observations represent groundwater conditions at





the time of the field exploration and may not be indicative of other times, or at other locations; groundwater conditions can change with varying seasonal and weather conditions, and other factors. Based on the Groundwater Information Center Interactive Map Application (<https://gis.water.ca.gov/app/gicima/>), groundwater is indicated to be on the order of 40± feet beg.

Based on information from the Water Data Library, CTE reviewed data from wells surrounding the site, all less than 1 mile from the site. The historically highest groundwater recorded in 1958 was 3.3 feet below ground surface. Based on above, groundwater is not expected to affect construction of the proposed structure or other improvements.

Wet weather construction methods should be anticipated if construction is scheduled to occur during the rainy season. During periods of appreciable precipitation, localized higher groundwater and/or perched water situations should be expected which could produce locally or widespread saturated surface soils. In addition, if construction is undertaken during wet-season/heavy-rains, saturated soils are not expected to be acceptable for grading or compaction and could hamper progress due to limited equipment mobility and/or inability to achieve appropriate moisture content and required soil compaction.

Saturated soils, if present, may need to be dried by extensive aeration or chemically modified through the addition of lime, cement, or kiln dust added to stabilize the working surface. Appropriate erosion control and permanent site surface drainage elements per the latest California Building Code should be designed and implemented as per the project civil engineer.

#### 4.4 Geologic Hazards

Based on our explorations and research, the most significant geotechnical condition which could affect the proposed structures is the potential for strong shaking from a potential earthquake, the California Building Code and recommendations below should be conformed to and confirmed during grading and construction. Engineered fill materials constructed as described below are considered adequate for support of moderately loaded structures using conventional shallow

foundations. Design and construction recommendations presented herein have been developed based on the noted site conditions.

#### 4.5 General Geologic Hazards Observation

Based on our site reconnaissance, evidence from our explorations, and a review of appropriate geologic literature, it is our opinion that the site is not located on any known fault traces (<http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps>).

The site does not lie within a State of California- “Fault-Rupture Hazard Zone” (DMG, 2000) and State of California- “Seismic Hazard Zone” mapping is currently not planned for the site/vicinity ([http://gmw.consrv.ca.gov/shmp/html/pdf\\_maps\\_no.html](http://gmw.consrv.ca.gov/shmp/html/pdf_maps_no.html)).

The potential for fault rupture or damage from fault displacement or fault movement directly below the site or near to the site is considered to be low. However, the site is located within an area where shaking from earthquake generated ground motion waves should be considered likely.

#### 4.6 Local and Regional Faulting

Based on the “USGS Earthquake Hazards Program, National Seismic Hazard Maps – Source Parameters, ([https://earthquake.usgs.gov/cfusion/hazfaults\\_2008\\_search/query\\_main.cfm](https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm)), the Great Valley 8 Fault, located 16.2 miles to the west, is the closest known active fault and is indicated to be capable of generating an earthquake moment magnitude on the order of  $M=6.8$ .

The site does not lie within an Alquist-Priolo special studies zone. Fifteen (15) significant faults capable of generating earthquake induced ground motion at the site are located within 65 miles (104.6 kilometers) of the subject site. A list of these faults is presented in Table 4.6. These and other faults located throughout California are studied as part of an on-going effort to create a probabilistic model to estimate earthquake-induced ground motion for the State of California (USGS, 2008).

**TABLE 4.6**  
**SIGNIFICANT FAULTS LOCATED WITHIN 65 MILES OF OSBORN ACADEMY SCHOOL,**  
**CALIFORNIA**  
**(USGS, 2008)**

Significant Earthquake Fault	Geometry	Slip Rate (mm/yr)	Mmax	Dist (Mi)
GREAT VALLEY 8	r	1.5	6.8	16.62
GREAT VALLEY 7	r	1.5	6.9	16.65
ORTIGALITA	ss	1.0	7.1	27.68
GREAT VALLEY 9	r	1.5	6.8	27.80
GREENVILLE Connected	rl-ss	2.0	7.0	37.27
CALAVERAS	rl-ss	15.0	7.03	45.99
QUIEN SABE	ss	1.0	6.6	47.97
GREAT VALLEY 10	r	1.5	6.5	48.22
HAYWARD-RODGERS CREEK	rl-ss	9.0	7.33	54.29
MOUNT DIABLO THRUST	r	2.0	6.6	55.16
MOUNT VISTA-SHANNON	r	0.4	6.5	57.13
N. SAN ANDRES	rl-ss	17	7.94	57.88
ZAYANTE-VERGELES	ss	0.1	7.0	58.64
GREAT VALLEY 11	r	1.5	6.6	59.94
GREAT VALLEY 5	r	1.0	6.7	64.74

Geometry- (ss) strike slip, (r) reverse, (n) normal, (rl) right lateral, (ll), left lateral

#### 4.6.1 San Francisco Bay Area Faults

The San Andreas Fault Zone is located about 57.9 miles to the west of the site. Two (2) of the biggest earthquakes in California occurred along the San Andreas Fault, the 1857 Fort Tejon earthquake of Mw 7.92 and the 1906 San Francisco earthquake of Mw 7.68. The San Andreas Fault Zone is considered the active boundary between the North American tectonic plate to the east, the Pacific plate to the west, and the Juan de Fuca plate to the north. The San Andreas Fault is also regarded as the primary expression of movement along this boundary. Other parallel and related faults in the California Coast Ranges are considered lesser expressions of tectonic stresses that occur along the plate boundary. These faults make up the majority of the active faults in the Central California area. The closest active fault with a maximum moment magnitude of 6.8 and a slip rate of 1.5 millimeters per year is the Great Valley 8 Fault Zone located a distance of approximately 16.2



miles from the site. A significantly more active fault with a maximum moment magnitude of 7.03 and a slip rate of 15 millimeters per year is the Calaveras Fault located at a distance of approximately 46.0 miles.

#### 4.6.2 Foothills Fault System

The edge of the Foothills Fault System lies about 39.0 miles east of the subject site. This fault system roughly defines the Central Valley and the Sierra Nevada margin. The Foothills Fault System is based on poorly constrained Quaternary slip rates across the Bear Mountain and Melones Fault Zones (CDMG, 1996; Woodward-Clyde Consultants, 1978). It is regarded as an aerial earthquake source. Wakabayashi and Smith (1994) describe the Foothills Fault Zone as lacking evidence of active crustal shorting and note that deformation along the eastside of the Central Valley is extensional or transtensional. This fault system has much less activity relative to the Central Coast area strike-slip faults and the CRCV boundary located along the west side of the Sacramento and San Joaquin Valley.

#### 4.6.3 CRCV Boundary

The Coast Range-Central Valley (CRCV) geomorphic boundary (margin) is located approximately 16.0 miles west of the site. The CRCV boundary is underlain by a 310 mi (500 km) long seismically active fold and thrust belt (Wakabayashi and Smith, 1994). Wakabayashi and Smith (1994) point out that, for communities located along the western margin of the Central Valley, the CRCV, because of its proximity and the comparatively long distance to major strike-slip faults, may represent the most significant seismic hazard for the area. Numerous earthquakes have occurred along the CRCV fold and thrust zone including the 1866 Patterson earthquake of magnitude (Mw) 5.9. The most recent large earthquake occurring along the CRCV fold and thrust zone was the 1983 Coalinga earthquake, magnitude (Mw) 6.5, which caused considerable damage in the Coalinga area. Below we present a summary of large damaging earthquakes which are thought to be associated with the CRCV fold and thrust zone (Table 4.6.3).

<b>TABLE 4.6.3</b> <b>HISTORIC LARGE EARTHQUAKES ASSOCIATED</b> <b>WITH THE CRCV BOUNDARY</b> <b>(Wakabayashi and Smith, 1994)</b>		
<b>Year</b>	<b>Location and Comments</b>	<b>Mw (Moment Magnitude)</b>
1892	Vacaville-Winters mainshock	6.8
1892	Vacaville-Winters aftershock	6.4
1892	Vacaville-Winters aftershock	5.8
1889	Antioch	6.3
1866	Near Patterson	5.9
1881	Near San Luis Reservoir	6.4
1905	Near Firebaugh	6.1
1885	Near Mendota	6.5
1983	Coalinga mainshock	6.5
1983	Coalinga aftershock	6.0
1985	Kettleman Hills (north dome)	6.1

The Osborn School site will have potential for ground shaking because of its proximal location to the CRCV seismically active fold and thrust belt and the nearby San Francisco Bay area faults. Wakabayashi and Smith (1994) point out that although eleven (11) magnitudes greater than or equal to six (6) have taken place on the CRCV boundary (Great Valley Fault), approximately 65% of the fault system has not yielded earthquakes of this size in historic time.

Since Wakabayashi and Smith (1994) described the CRCV fold and thrust belt, it has since been sectioned into distinct fault segments by the California Geological Survey (CGS) and the United States Geological Survey (USGS). The general name of the fault is Great Valley (GV) followed by the segment number (CDMG, 1996). The moment magnitude of earthquakes occurring on the closest segments to the site have an intensity of 6.8 (Great Valley 8).

#### 4.7 Earthquake Epicenters

The ANSS (Advanced National Seismic System, <http://www.ncedc.org/cnss>) earthquake catalog was searched for earthquakes of local magnitude greater than 3.0 occurring since 1901 for a radius of 50



km surrounding the site with the coordinates 37.4937 degrees latitude and -120.8635 degrees longitude. The table located in Appendix D presents a tabular listing of earthquake epicenters close to the site. The earthquake epicenters are sorted by distance from the site. The search of the earthquake catalog indicated that forty (40) earthquakes have occurred within approximately 50 km of the site with a magnitude greater than or equal to 3.0. The closest earthquake epicenter to the site occurred about 9.9 miles from the site in 1974 with a local magnitude of 3.13. This is probably related to activity along the Great Valley (GV8) fault at depth.

#### 4.8 Site-Specific Seismic Ground Motion Evaluation

CTE has conducted a site-specific ground motion analysis for the proposed Osborn Academy classroom additions in accordance with Chapter 21 of ASCE/SEI 7-16, Section 1613 of the 2019 California Building Code (CBC), and the 2008 USGS Ground Acceleration Maps.

The open source software package OpenSHA (version 1.4.0) was used to facilitate the seismic response analysis. This software enabled the use of all seismic sources within 200 kilometers of the site, as cataloged by the United States Geological Survey (USGS) 2014 National Seismic Hazard Map source model. Each seismic source is characterized by its location, fault mechanism, geometry, and probability of activity, magnitude recurrence distribution, and deterministic magnitude. The maximum rotated component of ground motion was used in the site-specific probabilistic and deterministic analyses that incorporate the selected Next Generation Attenuation (NGA) relationships.

Equally weighted NGA relationships by Abrahamson and Silva (2014), Boore and Atkinson (2014), and Campbell and Bozorgnia (2014) were used for analysis of crustal and subduction sources. The resulting site-specific spectral accelerations calculated from these NGA relationships were averaged for both the probabilistic and deterministic analyses. As required, the 84<sup>th</sup>-percentile spectral acceleration values were averaged to conservatively calculate the deterministic spectral accelerations (in lieu of 150 percent of the median spectral accelerations). Deterministic maximum considered earthquake (MCE) lower limit spectral response acceleration values have been determined from

ASCE 7-16 Figure 21.2-1. The probabilistic analysis data represent a two-percent probability of exceedance in fifty years.

NGA relationships used for the response analysis account for site-specific soil affects using  $V_{S30}$ , the shear wave velocity averaged over the upper 30 meters. The site shear wave velocity value was estimated from blow count data and regional geological characteristics. For the Campbell and Bozorgnia NGA, the depth to rock having a shear wave velocity of at least 2.5 kilometers per second ( $Z_{2.5}$ ) was estimated. Using regional geologic map relationships,  $Z_{2.5}$  appears to be on the order of 1.0 kilometers. The Abrahamson and Silva, along with the Chiou and Youngs NGA relationships require a similar parameter,  $Z_{1.0}$ , which is anticipated to be on the order of 0.5 kilometers. Based on soil conditions, shear wave velocity, and the understanding that the proposed facility will have a fundamental period of less than 0.5 seconds, Site Class D is considered to be appropriate.

The site-specific MCE spectral response acceleration at any period is taken as the lesser of the spectral response accelerations from the probabilistic MCE and the deterministic MCE. The design spectral response acceleration at any period is calculated as  $2/3$  of the corresponding ordinate from the site-specific MCE, which should not be less than 80 percent of the spectral response acceleration from the design response spectrum determined in accordance with ASCE 7 Section 11.4.5.

The probabilistic MCE, risk coefficient, and adjusted probabilistic spectral acceleration ordinates are shown on Figure E1, Appendix E. The site specific risk-based probabilistic  $MCE_R$  representing 1% probability of collapse in 50 years was calculated using ASCE 7-16 Section 21.2.1.1 Method 1: ( $C_R$ ) ( $S_a$  2% PE in 50 years). The deterministic MCE, and the deterministic lower limit on MCE response spectra are shown on Figure E2, Appendix E. The site-specific MCE response spectrum,  $2/3$  of site-specific MCE response spectrum and 80 percent of NEHRP/ASCE design response spectrum are shown on Figure E3, Appendix E. The site-specific design response spectrum is presented on Figure E4 and a summary of spectral acceleration data is shown on Figure E5, Appendix E.

In Accordance with section 11.4.8 of ASCE/SEI 7-16, the resulting site-specific acceleration parameters are shown below. ASCE Section 11.4.8 requires site specific parameters if structures on Site Class D or E for values of  $S_1$  greater or equal to 0.2g. In this case, the value of  $S_1$  is 0.270g. Site-specific parameters are provided below.

<b>SITE SPECIFIC AND CODE BASED GROUND MOTION VALUES</b>	
<b>Site-Specific Ground Motion Values</b>	<b>Code-Based Seismic Values (CBC 2019)</b>
$S_{DS} = 0.458g$	$S_{DS} = 0.572g$
$S_{D1} = 0.373g$	$S_{D1} = \text{null}$
$S_{MS} = 0.687g$	$S_{MS} = 0.859g$
$S_{M1} = 0.560g$	$S_{M1} = \text{null}$

#### 4.9 Liquefaction and Seismic Settlement Evaluation

Liquefaction occurs when saturated fine-grained sands and/or silts lose their physical strength temporarily during earthquake induced shaking and behave as a liquid. This is due to loss of point-to-point grain contact and transfer of normal stress to the pore water. Liquefaction potential varies with water level, soil type, material gradation, relative density, and probable intensity and duration of ground shaking.

The California Geological Survey (CGS) has designated certain areas within California as potential liquefaction hazard zones. These are areas considered at risk of liquefaction-related ground failure during a seismic event. The project site is not currently mapped for potential liquefaction hazard by the CGS (refer to CGS website: ([http://gmw.consrv.ca.gov/shmp/html/pdf\\_maps\\_no.html](http://gmw.consrv.ca.gov/shmp/html/pdf_maps_no.html))). Based on readily available published geologic information, there is no historical record of liquefaction occurring at the site.



Based on our explorations the subsurface soils at the site consist of loose to medium dense silty sand (SM) to an approximate depth of 5 feet bgs, underlain by very stiff silt (ML) to an approximate depth of 10 feet bgs. The silt is underlain by loose well graded sand (SW) to an approximate depth of 15 feet bgs, underlain by very dense silty sand (SM) to an approximate depth of 30 feet bgs. The silty sand is underlain by hard, low plastic clay (CL) to an approximate depth of 43 feet bgs, underlain by very dense silty sand (SM) to the maximum depth explored. Furthermore, our investigations indicate that groundwater is located at approximately 22 feet bgs, with the historically highest groundwater recorded in 1958 at 3.3 feet bgs, and therefore the potential for liquefaction occurring at the site cannot be totally discounted. However, based on the site location and relatively low intensity of ground shaking the possibility of large differential settlements due to seismic dry sand settlement or liquefaction is considered low and therefore the potential for catastrophic building collapse due to a seismic liquefaction event are not likely in an area of relatively dense soil deposits and low seismic frequency and ground acceleration.

To evaluate earthquake induced settlement at the site, the total vertical settlement due to earthquake shaking was performed in accordance with the updated code based and site-specific ground motions. Seismic settlement evaluation performed as part of this investigation was estimated using the program LiquefyPro (2012) by CivilTech Software utilizing a Factor of Safety of 1.3. Total seismic settlement was negligible for both code based and site-specific accelerations.

As was conducted herein, seismic settlement analyses is typically limited to a maximum depth of 50 feet due to the lack of surface settlement that will manifest itself upon seismic densification of deposits located below 50 feet. Furthermore, only a portion of the seismic settlement of deposits located above 50 feet will manifest itself at the surface with near surface deposit densification contributing to the surface settlement the most. Based on our analysis CTE finds that negligible settlement of the site will occur during a seismic event. A graphic representation of the liquefaction performed is contained in Appendix F.

#### 4.10 Earthquake Induced Landsliding

Based on information available on the California Geological Survey (CGS) website, the site is not currently within a State of California Seismic Hazard Zone for seismically induced landsliding. In addition, the site and at least one mile of surrounding terrain within the valley is relatively flat-lying; therefore, seismically induced landsliding and/or other (gravity) landslides are not considered a significant hazard at the site.

#### 4.11 Tsunamis and Seiche Evaluation

The site is not located within an inundation area as defined by the State of California Office of Emergency Services (<http://myhazards.caloes.ca.gov/>). In addition, the site is located inland within the Central Valley over 65 miles from the Pacific Ocean and over 100± feet above MSL. Based on this geometric relationship, the potential for tsunami damage at the site is considered negligible. Damage caused by oscillatory waves (Seiche) is not considered likely as the site is not near any significant bodies of water.

#### 4.12 Compressible and Expansive Soils

Near surface soil deposits encountered during our subsurface investigation consisted of loose to medium dense silty sands (SM) and sandy silts (ML). These soils are considered to have non uniform compression characterizes and therefore structures constructed on these unimproved soils will have non uniform settlements. Based on this assessment CTE recommends that the near surface soil deposits be remediated through removal and replacement with engineered fill as recommended in section 5.2.

The near surface soil deposits at the site, within the depth of structural influence consisted of loose to medium dense silty sands (SM) and sandy silts (ML), such soil materials are considered to have a low expansive potential and therefore the potential for post construction shrinkage and swelling is not considered a risk at the project site.

#### 4.13 Soil Corrosion Potential

Chemical testing was performed to evaluate the potential effects that site soils may have on concrete foundations and various types of buried metallic utilities. The test results indicate the soils have Non-Detectable soluble sulfate and chloride concentrations a pH= 8.5 and a resistivity of  $2 \times 10^{-8}$  ohm-cm. Soil environments detrimental to concrete generally have elevated levels of soluble sulfates and/or pH levels less than 5.5. According to American Concrete Institute (ACI) Table 318 4.3.1, specific guidelines have been provided for concrete where concentrations of soluble sulfate ( $\text{SO}_4$ ) in soil exceed 0.1 percent by weight. These guidelines include low water: cement ratios, increased compressive strength, and specific cement type requirements. Based on the results of the Sulfate and pH testing performed, onsite soils are anticipated to generally have a low corrosion potential to Portland cement concrete improvements.

A minimum resistivity value less than approximately 5,000 ohm-cm, and/or soluble chloride levels in excess of 200 ppm generally indicate a corrosive environment to buried metallic utilities and untreated conduits. Based on the obtained resistivity value onsite soils are anticipated to have a moderate to severe corrosion potential for buried uncoated/unprotected metallic conduits. Based on these results, at a minimum, the wrapping of buried metallic piping and or the use of buried plastic piping or conduits would appear logical, where feasible.

The results of the chemical tests performed are presented in the attached Appendix C. CTE does not practice corrosion engineering. Therefore, a corrosion engineer or other qualified consultant could be contacted if site specific corrosivity issues are of concern.

#### 4.14 Flooding and Dam Inundation Hazzard Potential

Based on FEMA flood zone maps for Stanislaus County, California and Incorporated Areas, Map No. 06099C0825E, (2008) to assess the potential for flooding of the site. Based on a review of the noted map, the site is located in the designated zone “Other Areas- Zone X”, which is outside the 0.2 percent chance of flood, meaning it does not reside within a 500-year flood plain.

CTE reviewed the “Stanislaus County Dam Inundation Hazards” map, (2010) to evaluate the potential for flooding in the event of a dam failure. Although Stanislaus County has seven potential dams that could affect the county in the case of a failure, none of the inundation zones are near the site. Please see Figure 5 for more details.

#### 4.15 Volcanic Hazards

Based on the USGS, Potential Hazards from Future Volcanic Eruptions in California, the Mono Lake – Long Valley Volcanic Area is the closest potential volcanic hazard to the site, located approximately 100 miles east of the site. The site is outside the range of any potential lava flows, pyroclastic/debris flows, or tephra hazard (explosive eruptions) zones.

#### 4.16 Radon Hazards

The Environmental Protection Agency (EPA) has devolved state-specific radon maps. The maps categorized each county into one of three zones. Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCi/L. Zone 2 has counties with predicted average indoor radon screening levels from 2 to 4 pCi/L. Zone 3 identifies counties with a predicted indoor radon screening level less than 2 pCi/L. Based on the EPA Radon Zone Map, Stanislaus County is within Zone 3.

#### 4.17 Asbestos Hazards

Asbestos is a term for a naturally occurring group of silicate minerals, which develop as asbestiform fibers. These fibers have high tensile strength, flexibility, and heat and chemical resistance. Serpentine and tremolite are common asbestos minerals and are commonly found with ultra-mafic rock geologic settings. According to the USGS map, “Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California” by Van Gosen and Clinkenbeard dated 2011, the site does not appear to be near any known asbestos sites, see Figure 6.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

We conclude that the proposed construction is feasible from a geotechnical standpoint, provided the recommendations in this report are incorporated into the design of the project. Recommendations for the design and construction of the proposed structures and associated improvements are included below.

### 5.1 Site Preparation

Project site stripping should include the demolition, removal and disposal of all asphalt and concrete debris, vegetation, other organic material in all proposed building pad and improvement areas. Loose, wet or otherwise unstable soils should be excavated and evaluated by CTE for possible re-use as engineered fill or disposed of offsite. Utilities that extend into the construction area and are scheduled to be abandoned should be properly capped at the perimeter of the construction zone or moved as directed in the plans. CTE personnel shall observe and confirm that all asphalt and concrete debris, vegetation, other organic material has been adequately removed in all proposed improvement areas.

### 5.2 Grading and Earthwork

Based on the current proposed development and the subsurface soils encountered during our excavations CTE recommends that the proposed building pad should be overexcavated to a depth of at least 2 feet below current grade in all proposed structure areas. The building pad overexcavation should extend to a minimum distance of at least 5 feet outside of all proposed structure areas. The exposed overexcavated surface should then be scarified to a depth of approximately 12 inches and recompacted to 90 percent relative compaction per ASTM D1557 at a moisture content of at least optimum moisture content. Additional engineered fill, if required, shall then be placed in approximately 8 inch loose lifts, moisture conditioned to at least optimum moisture content and recompacted to at least optimum moisture content.

Soils generated from the site are considered acceptable for engineered fill provided all debris and organic materials are removed from the soils. Based on our laboratory and field soil testing



overexcavated onsite soil deposits used for engineered fill should be expected to shrink approximately 10-15% from their insitu to recompacted state. Import soils proposed for engineered fill should consist of soil deposits having an Expansion Index  $EI < 20$  or a liquid limit less than 30 ( $LL < 30$ ) and a plasticity index less than 12 ( $PI < 12$ ), with no particles greater than 3 inches and 20 to 80% of the soil particles passing the #200 sieve. A CTE representative should approve all imported soils prior to delivery to the site.

After stripping in the proposed parking and driveway pavement improvement areas is conducted, the stripped areas should be excavated to one foot below the proposed pavement subgrade surface. The pavement subgrade surface should then be scarified to a minimum depth of 12 inches, moisture conditioned to above optimum moisture condition and recompacted to 95 percent relative compaction per ASTM D1557.

If unanticipated, unsuitable materials are encountered at surface improvement subgrade or structure over-excavation such that proper compaction cannot be obtained, over-excavations to remove such material may be required.

CTE shall inspect and approve all structure over-excavations and pavement and surface improvement subgrade areas to confirm that adequate soil conditions have been reached. CTE shall also observe and approve the scarification, moisture conditioning and recompaction of the excavated surfaces and the placement of engineered fill.

### 5.3 Structure Foundation Recommendations

CTE anticipates it will be feasible to utilize continuous and isolated spread foundations for use at this site. It is recommended that these structure foundations consist of spread footings constructed upon properly compacted engineered fill comprised of low to non-expansive soils per previous sections. Reinforced continuous and isolated spread footings are considered suitable for use at this site to support the relatively light weight, 1-2 story structures.

All spread footings should be founded in properly prepared and compacted engineered fill as recommended herein. Foundation dimensions and reinforcement should be based on allowable soil bearing values of 2,000 pounds per square foot (psf) for spread footings of at least 12-inches in width penetrating into and embedded below rough pad soil grade at least 12 inches for one story structures and 18 inches for 2 story structures. The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include short duration wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations. The weight of the footing should be neglected in the above downward capacity calculations.

We recommend that all footings be reinforced as required by the structural engineer to provide structural continuity, to permit strong spanning of local irregularities and to be rigid enough to accommodate potential differential static movements estimated at about one-half inch over 20 linear feet. Based on the conditions observed at the site, the total structure settlement is expected to be on the order of one inch for static compression. Dynamic settlement due to an earthquake event is estimated to be on the order of 0.5 inch with differential seismic settlement of about 0.25 inches. The dynamic settlement is in addition to the static settlement.

The foundation excavations should be clean (i.e., free of all loose slough) and dry prior to placing steel and concrete. Foundation excavations should be moisture conditioned to at least two (2%) percent over optimum moisture content prior to foundation and slab concrete placement. The concrete for the foundation should not be placed against a dry excavation surface. Concrete should be pumped or placed by means of a tremie or elephant's trunk to avoid aggregate segregation and earth contamination.

Rebar reinforcement should be properly supported with proper clearances maintained during concrete placement. The concrete should be properly vibrated to mitigate formation of voids and to promote bonding of the concrete to steel reinforcing. These recommendations are predicated upon CTE's representative observing the bearing materials as well as the manner of concrete placement.

CTE’s geotechnical engineer or his representative should observe soil conditions exposed in foundation excavations. If the soil conditions encountered differ significantly from those presented in this report, then supplemental recommendations will be required.

5.4 Lateral Load Resistance

Shallow footings may be designed to resist lateral loads using a coefficient of friction of 0.30 (total frictional resistance equals the coefficient of friction times the dead load). A design passive resistance value of 250 pounds per square foot per foot of depth (with a maximum value of 1250 pounds per square foot) may be used. The allowable lateral resistance can be taken as the sum of the frictional resistance and the passive resistance, provided the passive resistance does not exceed two-thirds of the total allowable resistance.

5.5 Retaining Walls

Free draining retaining walls backfilled using generally onsite undocumented fill soils per the preceding section of this report, may be designed using the equivalent fluid weights given in the table below. These values are also considered suitable for permanent shoring, if proposed.

<b>TABLE 5.5</b>		
<b>EQUIVALENT FLUID UNIT WEIGHTS (pounds per cubic foot)</b>		
<b>WALL TYPE</b>	<b>LEVEL BACKFILL</b>	<b>SLOPE BACKFILL 2:1 (HORIZONTAL: VERTICAL)</b>
CANTILEVERED WALL	35	50
RESTRAINED WALL	50	65

Traffic surcharges on retaining walls should generally be equal to 1/3 of the vertical load of the traffic located within ten lateral feet of wall. Lateral pressures on cantilever retaining walls (yielding walls) due to earthquake motions may be calculated based on work by Seed and Whitman (1970).





The total lateral thrust against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$$P_{AE} = P_A + \Delta P_{AE}$$

For non-yielding (or “restrained”) walls, the total lateral thrust may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where  $P_A$  = Static Active Thrust (given previously Table 5.8)

$P_K$  = Static Restrained Wall Thrust (given previously Table 5.8)

$\Delta P_{AE}$  = Dynamic Active Thrust Increment =  $(3/8) k_h \gamma H^2$

$\Delta P_{KE}$  = Dynamic Restrained Thrust Increment =  $k_h \gamma H^2$

$k_h$  =  $1/2$  Peak Ground Acceleration =  $1/2 (S_{DS}/2.5)$

$H$  = Total Height of the Wall

$\gamma$  = Total Unit Weight of Soil  $\approx$  125 pounds per cubic foot

The increment of dynamic thrust in both cases should be based on a trapezoidal distribution (essentially an inverted triangle), with a line of action located at  $0.6H$  above the bottom of the wall. The values above assume non-expansive backfill and free-draining conditions.

Measures should be taken to prevent moisture buildup behind all retaining walls. Drainage measures should include free-draining backfill materials and sloped, perforated drains. These drains should discharge to an appropriate off-site location. Waterproofing should be as specified by the project architect.

### 5.6 Foundation Setback

The bottoms of all utility trenches placed along the perimeter of the canopy foundations should be above an imaginary plane that projects at a 45-degree angle down from the lowest outermost edge of

the foundation. Deepening of affected foundation is considered an effective means of attaining the prescribed setbacks.

### 5.7 Concrete Slabs-On-Grade

Lightly loaded concrete slabs-on-ground placed beneath the structures should be designed for the anticipated loadings, but measure at least 4 inches in thickness. Concrete slabs exposed to vehicular traffic should measure at least 5 inches in thickness. Slab-on-grade reinforcement should consist of #4 reinforcing bars placed on 24-inch centers, each way, at or above mid-slab height, but with proper cover. Control joints at appropriate spacing i.e. 12 feet each way should be saw-cut into the slab after concrete placement in accordance with ACI Design Manual, Section 302.1R-37 8.3.12 (tooled control joints are not recommended). All interior slab on grade areas shall be underlain by a capillary moisture break consisting of a 4" layer of  $\frac{3}{4}$ " minus crushed rock or Class 2 base.

All interior slab on grade located in moisture sensitive areas should be directly underlain by a minimum 10-mil thickness vapor retarder with all laps or penetrations sealed or taped. The vapor retarder should be installed above the capillary moisture break which in turn overlies the compacted building pad. The use of sand above the vapor retarder is not recommended. The concrete to be placed into the post tensioned or conventional slab on grade shall have a water to cement ratio  $w/c \leq 0.45$  and be placed at a maximum slump of 4" +/-.

### 5.8 Seismic Design Criteria

This report is written based on the 2019 CBC, which becomes effective January 1, 2020. In general accordance with the 2019 CBC, Section 1613.2.2, CBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile. The 2019 CBC requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. Borings for this study extended to a maximum depth of 51.0± feet, and therefore the seismic site class definition considers soils below 51.0 feet in depth to be consistent with the stiff soils encountered at shallower depths. Therefore soils that underlie the site are considered to be consistent with Site Class D materials. Site ground motion with 10% probability of exceedance in 50 years is presented in Table 5.8. The table is based on United States Geological Survey's (USGS) Probabilistic Seismic Design



Maps web (online <https://earthquake.usgs.gov/hazards/designmaps/>) for the site coordinates 37.4937° latitude and -120.8635° longitude and “Risk Category III”.

<b>TABLE 5.8</b>			
<b>SEISMIC GROUND MOTION VALUES</b>			
<b>PARAMETER</b>	<b>CODE BASED</b>	<b>SITE SPECIFIC</b>	<b>CBC REFERENCE (2019)</b>
Site Class <sup>1</sup>	D <sup>2</sup>	D	ASCE 7, Chapter 20
Mapped Spectral Response Acceleration Parameter, $S_s$	0.686g		Figure 1613.2.1 (1)
Mapped Spectral Response Acceleration Parameter, $S_1$	0.270g		Figure 1613.2.1 (2)
Seismic Coefficient, $F_a$	1.251		Table 1613.2.3 (1)
Seismic Coefficient, $F_v$	Null		Table 1613.2.3 (2) ASCE 7 Section 11.4.8
MCE Spectral Response Acceleration Parameter, $S_{MS}$	0.859g	0.687g	Section 1613.2.3
MCE Spectral Response Acceleration Parameter, $S_{M1}$	Null	0.560g	Section 1613.2.3
Design Spectral Response Acceleration Parameter, $S_{DS}$	0.572g	0.458g	Section 1613.2.5 (1)
Design Spectral Response Acceleration Parameter, $S_{D1}$	Null	0.373g	Section 1613.2.5 (2) ASCE 7 Section 11.4.8
Mapped MCE Geometric Peak Ground Acceleration, PGA	0.286g		ASCE 7, Chapter 21
Mapped MCE Geometric Peak Ground Acceleration Adjusted for Site Class Effects, $PGA_m$	0.376g	0.331g	ASCE 7, Chapter 11
Seismic Design Category	Null		ASCE 7, Chapter 11

<sup>1</sup> In general accordance with the 2019 CBC, Section 1613.2.2. CBC Site Class is based on the average characteristics of the upper 100 feet of the subsurface profile.

<sup>2</sup> The 2019 CBC requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. Borings for this study extended to a maximum depth of 51± feet, and this seismic site class definition considers soils below 51 feet in depth to be consistent with the dense soils encountered at shallower depths.

5.9 Pavement Section Alternatives

It is understood asphaltic or concrete pavement is proposed for the site. The upper 12 inches of subgrade beneath all pavements should be compacted to at least 95 percent (%) of laboratory determined maximum dry density, as per ASTM D1557, at moisture contents of at least optimum moisture content. Pavements should be designed and constructed according to CALTRANS standards.

Laboratory testing to determine the R-value of the subgrade materials was conducted by CTE and resulted in an R-value of 78 obtained by exudation. Preliminary pavement sections presented below are based on a Resistance ("R") Value of 50 (CALTRANS recommended maximum) and assumed Traffic Indices presented below. Based on our previous experience on similar sites we have assumed traffic indices (TI's) of 5.0 for parking areas and 7.0 for Truck / Bus drive traffic areas. The pavement design is based on California Department of Transportation (CALTRANS) Highway Design Manual and on anticipated traffic indices as indicated below. If these assumptions are incorrect, then this office should be contacted to obtain further pavement recommendations.

<b>TABLE 5.9</b>				
<b>RECOMMENDED PAVEMENT SECTIONS</b>				
Traffic Area	Assumed Traffic Index	Preliminary Subgrade "R"-Value	Asphalt Pavements	
			AC Thickness (inches)	Class II Aggregate Base Thickness (inches)
Truck/ Bus Loading and Drive Areas	7.0	50	4.0	5
Auto Parking Area	5.0	50	3.0	4

\* Caltrans class 2 aggregate base, \*\* Concrete should have a modulus of rupture of at least 600 psi



Asphalt concrete paved areas should be designed, constructed, and maintained in accordance with, for example, the recommendations of the Asphalt Institute, or other widely recognized authority. Concrete paved areas should be designed and constructed in accordance with the recommendations of the American Concrete Institute or other widely recognized authority, particularly with regard to thickened edges, joints, and drainage. The Standard Specifications for Public Works construction (“Greenbook”) or CalTrans Standard Specifications may be referenced for pavement materials specifications.

Alternatively, a 6 inch thick concrete pavement can be installed directly upon subgrade compacted to 95% relative compaction. To significantly reduce concrete shrinkage cracking concrete pavements could be reinforced with nominal rebar, such as minimum #4 bars spaced no greater than 24 inches, on center, both ways, placed at above mid-slab height, but with proper concrete cover, or as designed by your structural designer. Concrete pavements not supporting heavy traffic could be unreinforced provided they are constructed with expansion/contraction and/or construction joints spaced no greater than 24 times the pavement thickness, both ways, in nearly square patterns, and are detailed in general accordance with ACI Guidelines. Doweling of concrete pavements at critical pathways is also recommended.

#### 5.10 Drainage

Foundation and concrete-slab-on grade performance depends greatly on how well the runoff waters drain from the site. This is true both during construction and over the entire life of the structure. The ground surface around structures should be graded so that water flows rapidly away from the structures without ponding. The surface gradient needed to do this depends on the landscaping type.

Should excessive irrigation, waterline breaks, or unusually high rainfall occur, saturated zones and groundwater may develop. Consequently, the site should be graded so that water drains away readily without saturating the foundation or landscaped areas or cascading over slope faces. A potential source of water, such as water pipes, drains, and the like should be frequently examined for signs of leakage or damage. Any such leakage or damage should be repaired promptly. The project

Civil Engineers should thoroughly evaluate the on-site drainage and make provisions as necessary to keep surface waters from affecting the site.

#### 5.11 Construction Observation

The recommendations provided in this report are based limited subsurface information observed, at locations, and within, exploratory borings performed for this project and preliminary concept design proposed construction as of the date of publication. The interpolated subsurface conditions, on which this report relies, should be checked in the field during construction to verify conditions described herein are as anticipated. Any changes which occur to preliminary information provided to this office as of the date of this publication, this office should be notified and afforded an opportunity to update information provided in this report.

Recommendations provided in this report are based on the understanding and assumption that CTE will provide the observation and testing services for the project. All earthworks should be observed and tested to verify that grading activity has been performed according to the recommendations contained within this report. The project engineer should evaluate all footing trenches before reinforcing steel placement.

#### 5.12 Plan Review

CTE should review project grading and foundation plans before the start of earthworks to identify potential conflicts and to verify that the recommendations contained in the report are to be implemented.

### 6.0 LIMITATIONS OF INVESTIGATION

As indicated, the recommendations presented herein are based on the field exploration, laboratory testing and our geologic and engineering analysis. Following completion of testing, these recommendations will be confirmed and or modified, if necessary, based on the materials exposed and re-worked during grading.

The field evaluation, laboratory testing and geotechnical analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable



geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report.

Variations may exist and conditions not observed or described in this report may be encountered during construction. Our conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if required, will be provided upon request.

We appreciate the opportunity to be of service on this project. Should you have any questions or need further information please do not hesitate to contact this office.

Respectfully submitted,

CTE CAL, INC.



Rodney D. Ballard, GE 2173  
Principal Geotechnical Engineer



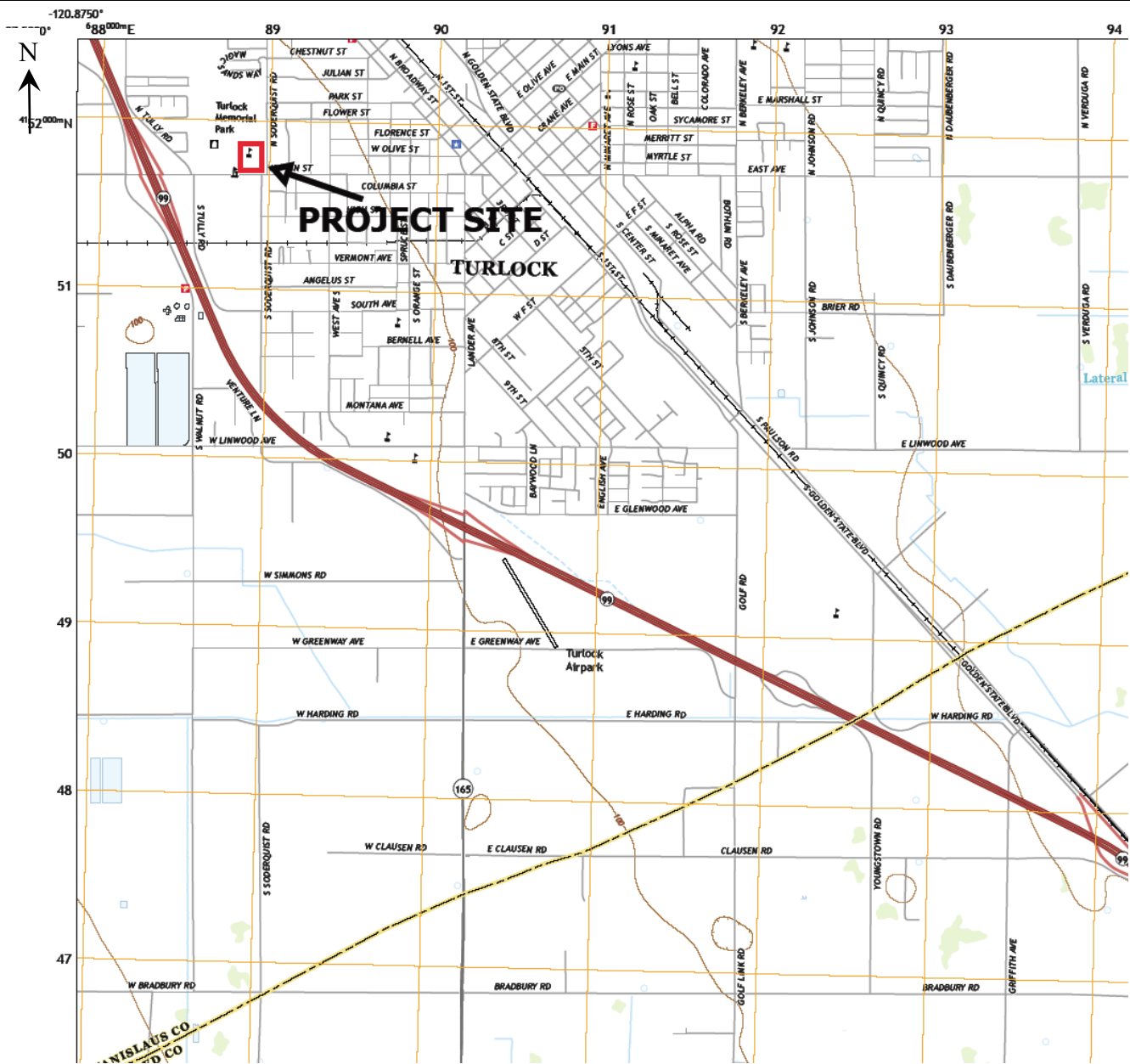
Jim Fitzgerald, CEG 2436  
Engineering Geologist



T. Alan Krause  
Project Geological Engineer



Kristin Kohls  
Staff Geologist



Source: USGS Turlock 7.5 Minute Quadrangle, 1:24,000; 2018



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**SITE INDEX MAP**  
 Osborn Elementary School  
 201 Soderquist Road  
 Turlock, California

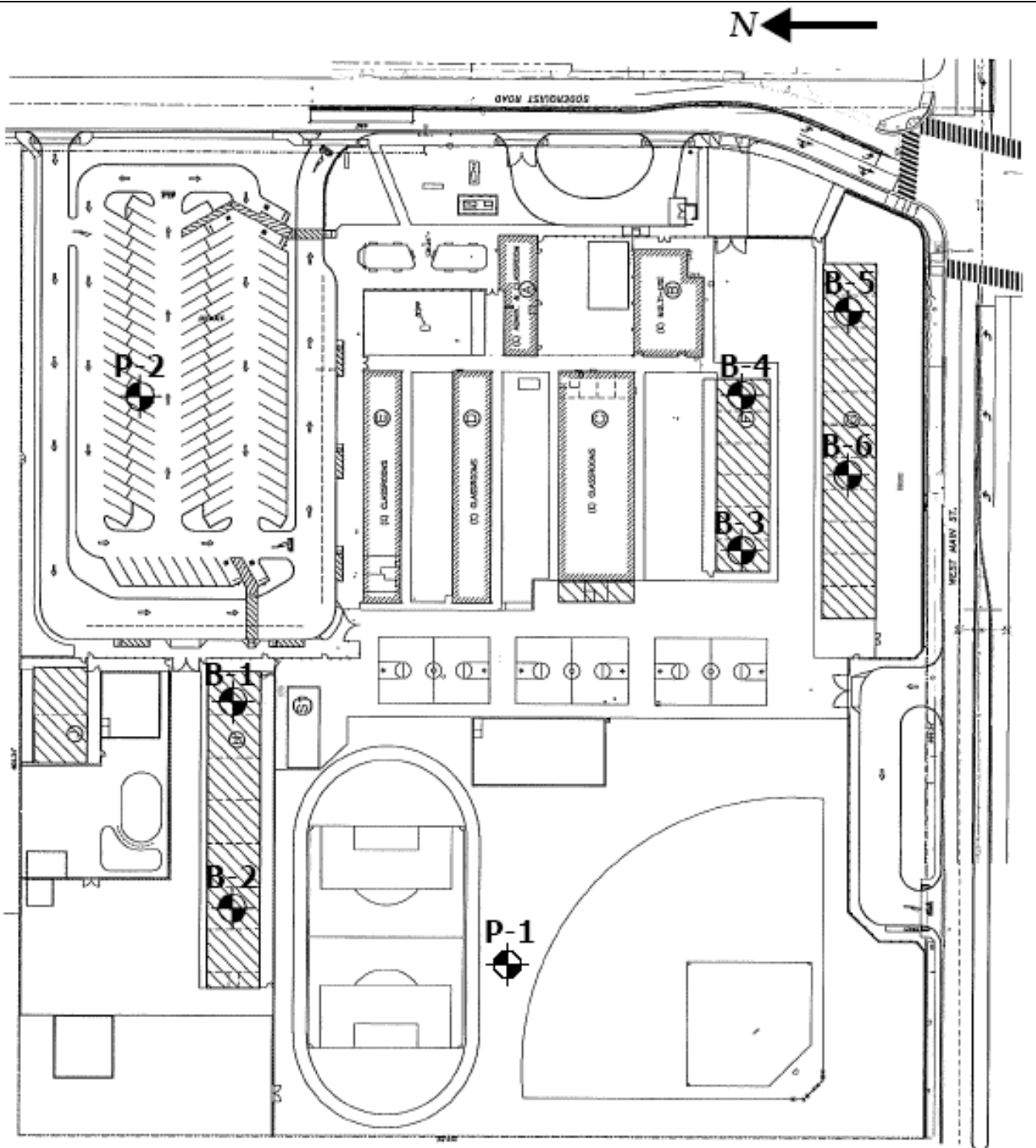
CTE JOB NO.  
**25-0908G**

SCALE  
**NTS**

DATE  
**12/31/19**

FIGURE  
**1**





⊙ - CTE Cal Inc. Exploration Location 10/26/19

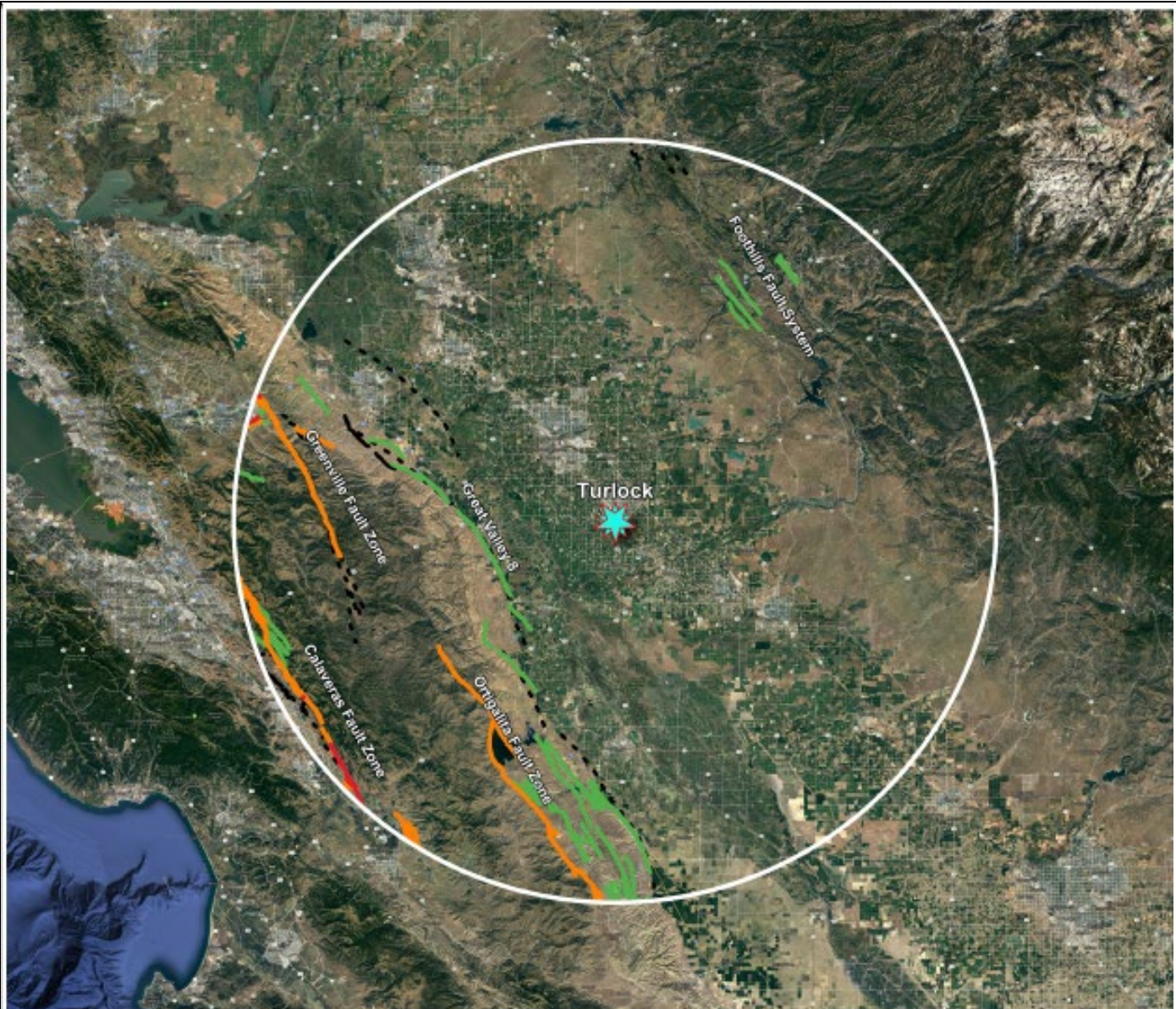

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**EXPLORATION MAP**  
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CTE JOB NO.  
**25-0908G**  
 SCALE  
**N.T.S.**

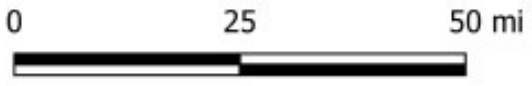
DATE  
**12/31/19**

FIGURE  
**2**



**LEGEND**

- Wakefield ES Site
- 100 km Radius
- Historic <150 yr
- Latest Qt <15,000 yr
- Late Qt <130,000 yr
- Mid-Late Qt <750,000 yr
- Undifferentiated <1.6 Myr



**NOTES:**  
 USGS 2017 Quaternary Fault and Fold Database of the United States

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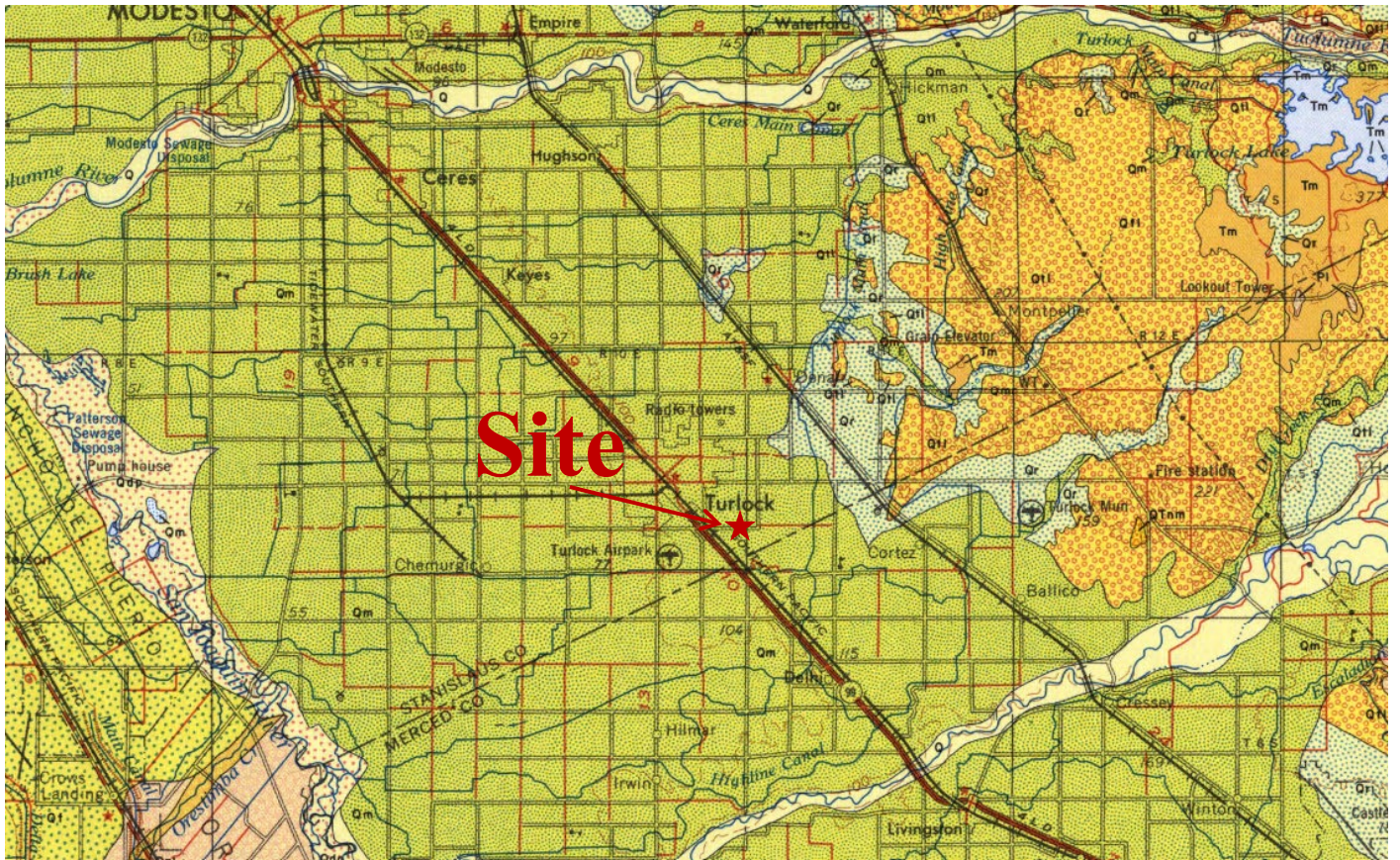
**EXPLORATION MAP**  
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**N.T.S.**

DATE  
**12/31/19**

FIGURE  
**3**



**LEGEND**

- Q Alluvium
- Qdp Dos Palos Alluvium
- Qm Modesto Formation
- Qr Riverbank Formation
- Qtl Turlock Lake Formation

**NOTES:**

Geologic Map of the San Francisco – San Jose Quadrangle. California Geological Survey, Regional Geologic Map No. 5A, 1:250,000 scale. Compilation by: D.L. Wagner et al.; 1991.



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**REGIONAL GEOLOGIC MAP**  
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SCALE

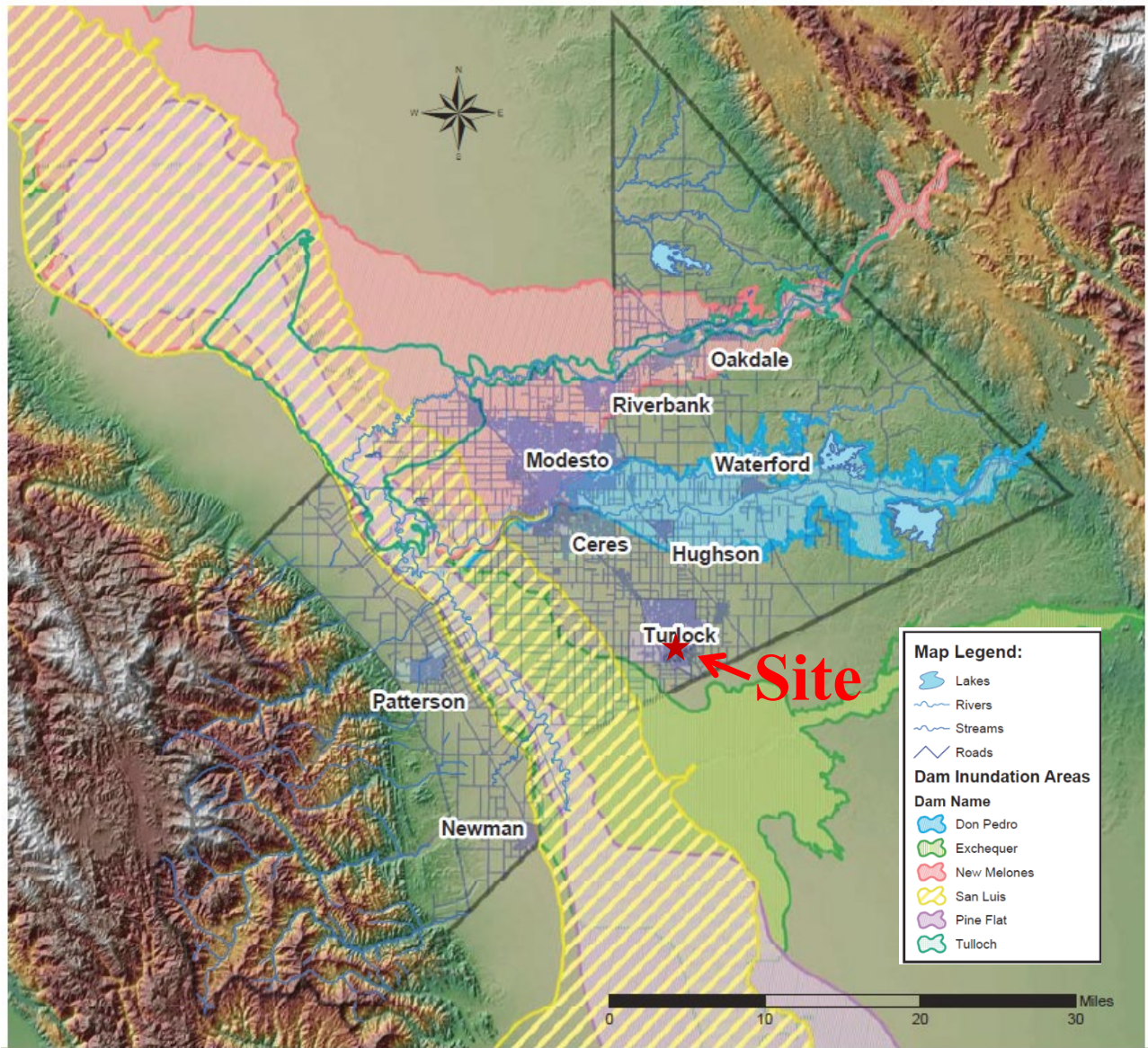
**N.T.S.**

DATE

**12/31/19**

FIGURE

**4**



**NOTES:**

Stanislaus County Board of Supervisors; "Stanislaus County Multi-Jurisdictional Hazard Mitigation Plan", p v-6, November 2009.



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**DAM INUNDATION MAP**  
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**25-0908G**

SCALE

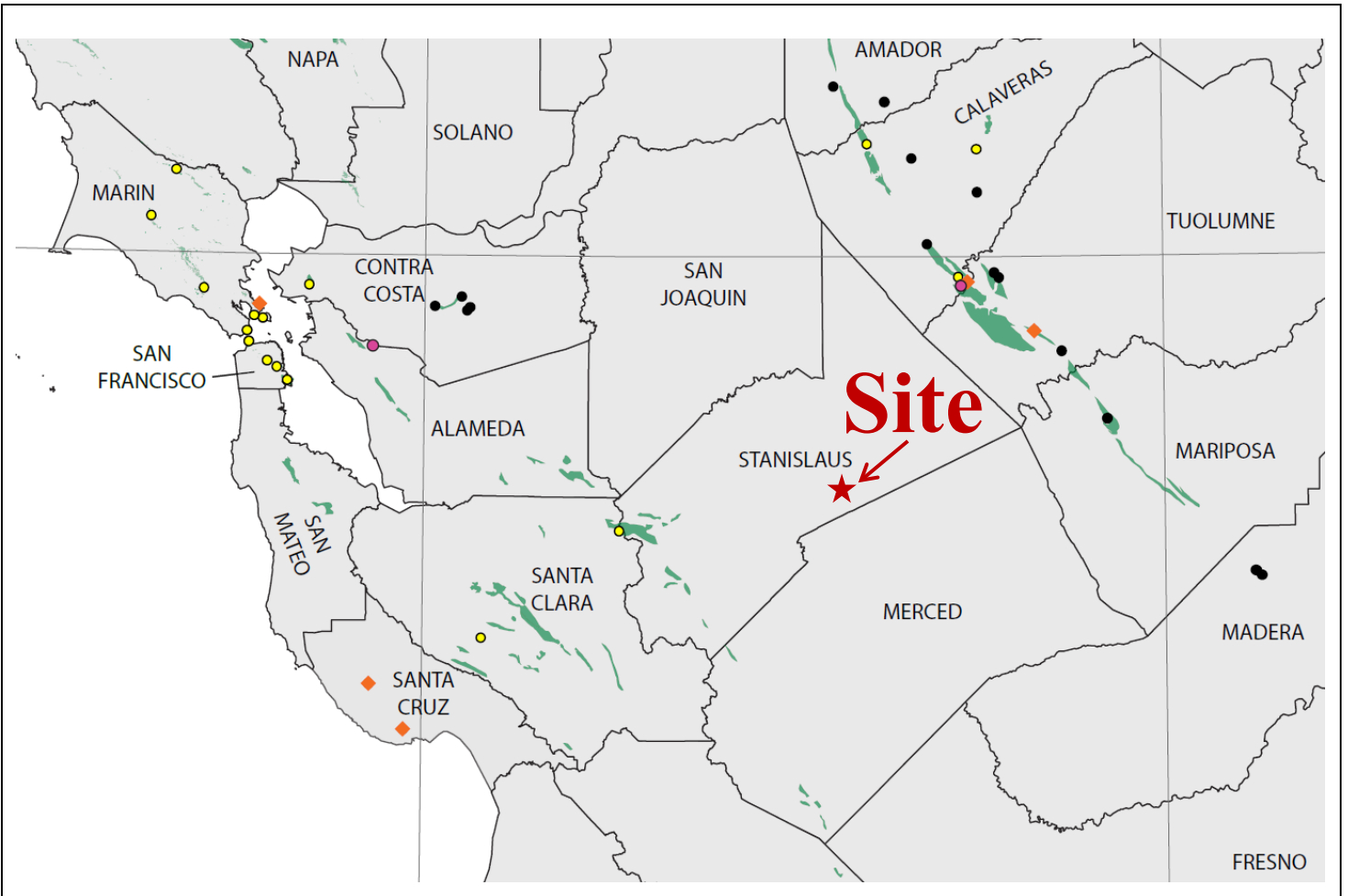
**As Shown Above**

DATE

**12/31/19**

FIGURE

**5**



**EXPLANATION**

- Former asbestos mine (25 sites)
- Former asbestos prospect (72 sites)
- Reported asbestos occurrence (138 sites)
- Asbestos-bearing talc deposit (55 sites)
- ◆ Reported fibrous amphibole(s) (16 sites)
- Ultramafic rock in outcrop (from Krevor and others, 2009)



**SCALE**



**NOTES:**

USGS, *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California*, B.S. Van Gosen and J.P. Clinkenbeard, 2011; Map Sheet 59



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**ASBESTOS HAZARD MAP**  
 Osborn Elementary School  
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SCALE

**As Shown Above**

DATE

12/31/19

FIGURE

6

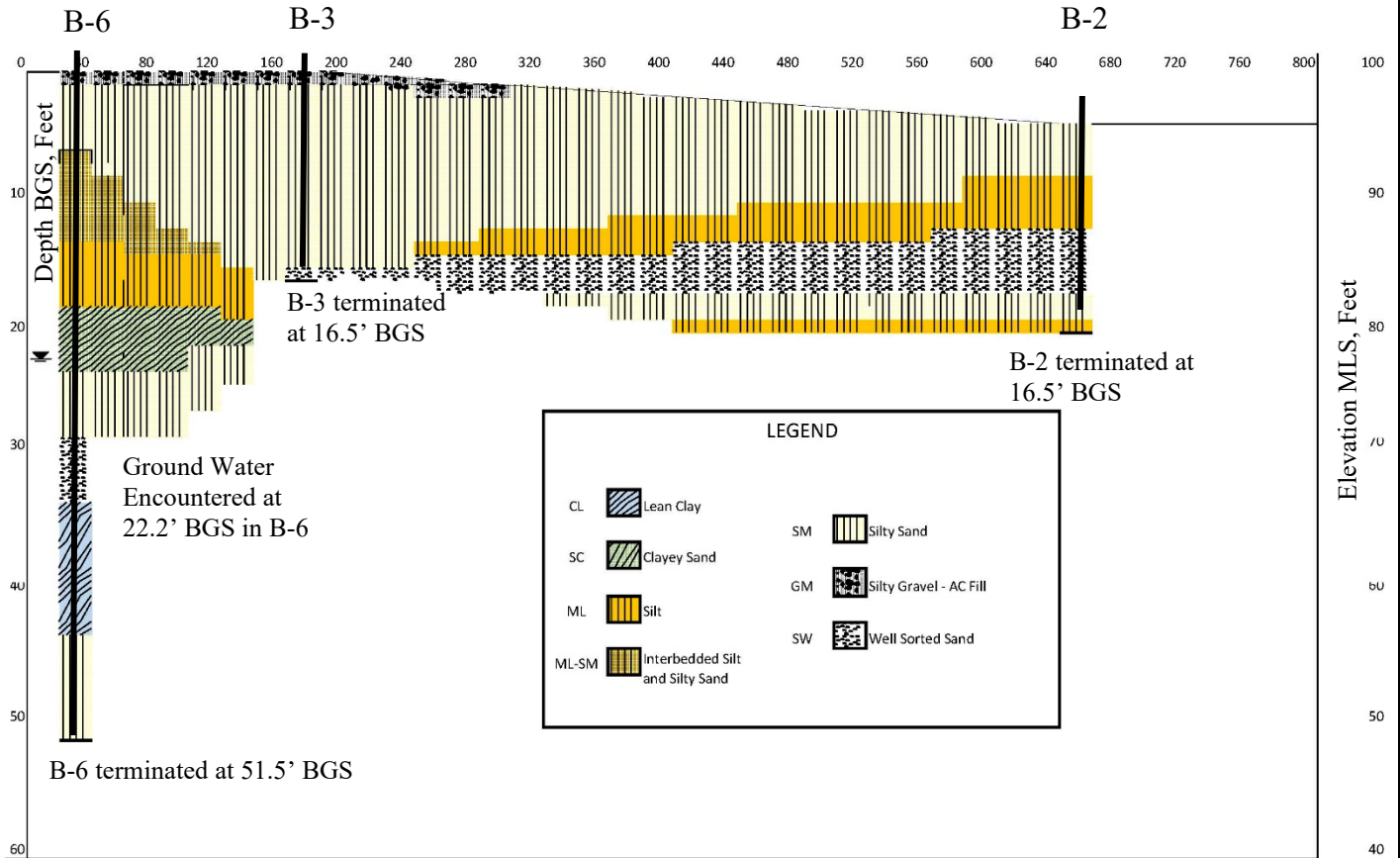
Southeast

Distance, Feet

Northwest

A

A'



**NOTES:**

BGS: Below Ground Surface  
MSL: Mean Sea Level



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**SITE GEOLOGIC CROSS SECTION A-A'**  
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Turlock, California

CTE JOB NO.

**25-0908G**

SCALE

**V:H = 10:1**

DATE

**12/31/19**

FIGURE

**7**

APPENDIX A

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## REFERENCES CITED

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APPENDIX B

FIELD EXPLORATION METHODS, BORING LOGS,  
PERCOLATION TEST RESULTS



## DEFINITION OF TERMS

PRIMARY DIVISIONS		SYMBOLS		SECONDARY DIVISIONS	
<b>COARSE GRAINED SOILS</b> MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	<b>GRAVELS</b> MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES	
		GRAVELS WITH FINES	GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES	
			GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
		GRAVELS WITH FINES	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
	SW		WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		
	<b>SANDS</b> MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
			SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
		SANDS WITH FINES	SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
			ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS	
	<b>FINE GRAINED SOILS</b> MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	<b>SILTS AND CLAYS</b> LIQUID LIMIT IS LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
<b>SILTS AND CLAYS</b> LIQUID LIMIT IS GREATER THAN 50		OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY		
		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS		
<b>SILTS AND CLAYS</b> LIQUID LIMIT IS GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS		
<b>HIGHLY ORGANIC SOILS</b>		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS		

### GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	
12"	3"	3/4"	4	10	40	200	
CLEAR SQUARE SIEVE OPENING				U.S. STANDARD SIEVE SIZE			

### ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density  
 GS- Grain Size Distribution  
 SE- Sand Equivalent  
 EI- Expansion Index  
 CHM- Sulfate and Chloride  
 Content, pH, Resistivity  
 COR - Corrosivity  
 SD- Sample Disturbed

PM- Permeability  
 SG- Specific Gravity  
 HA- Hydrometer Analysis  
 AL- Atterberg Limits  
 RV- R-Value  
 CN- Consolidation  
 CP- Collapse Potential  
 HC- Hydrocollapse  
 REM- Remolded

PP- Pocket Penetrometer  
 WA- Wash Analysis  
 DS- Direct Shear  
 UC- Unconfined Compression  
 MD- Moisture/Density  
 M- Moisture  
 SC- Swell Compression  
 OI- Organic Impurities



PROJECT:  
CTE JOB NO:  
LOGGED BY:

DRILLER:  
DRILL METHOD:  
SAMPLE METHOD:

SHEET: of  
DRILLING DATE:  
ELEVATION:

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING LEGEND	
							DESCRIPTION	Laboratory Tests
0							Block or Chunk Sample	
							Bulk Sample	
5								
							Standard Penetration Test	
10								
							Modified Split-Barrel Drive Sampler (Cal Sampler)	
							Thin Walled Army Corp. of Engineers Sample	
15								
							Groundwater Table	
20								
							Soil Type or Classification Change	
							Formation Change [(Approximate boundaries queried (?))]	
25					"SM"			

Quotes are placed around classifications where the soils exist in situ as bedrock



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PROJECT: Osborn Elementary School, Turlock      DRILLER: H1 Drilling-CME-75      SHEET: 1 of 1  
 CTE JOB NO: 25-0908G      DRILL METHOD: 4" Auger      DRILLING DATE: 10/26/2019  
 LOGGED BY: A. Krause      SAMPLE METHOD: SPT      ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-1	
							DESCRIPTION	Laboratory Tests
0								
3		4	104	9.4	SM		Loose, dark brown, damp, silty fine SAND	MD
4		3						
4		4						
5		3	99.6	4.3	SM		As Above, light brown	MD
4		4						
4		4						
10		7	99.6	4.3	SM		As Above, Medium dense	MD
4		4			SW		Loose, light brown, dry-damp, fine-coarse SAND with silt	
4		4						
15		13	129.3	6.8	SM		Very dense, light brown, damp, slightly cemented silty fine to coarse SAND	MD
24		24						
28		28						
							Total Depth= 16.5 ft No Free Groundwater encountered Boring Grout Backfilled 10/26/19	

BORING: B-1



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PROJECT: Osborn Elementary School, Turlock      DRILLER: H1 Drilling-CME-75      SHEET: 1 of 1  
 CTE JOB NO: 25-0908G      DRILL METHOD: 4" Auger      DRILLING DATE: 10/26/2019  
 LOGGED BY: A. Krause      SAMPLE METHOD: SPT      ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-2	
							DESCRIPTION	Laboratory Tests
0								
2.3	2 3 3		109.3	7.1	SM		Loose, dark brown, damp, silty fine SAND	MD
5	4 8 10				SM		Medium dense, light brown, damp, low plastic clayey, silty, fine-coarse SAND	LL-PI= Non plastic 46.2% <#200
10	2 3 3		102.5	3.0	SW		Loose, light gray, dry, fine to coarse SAND with trace silt	MD
15	5 10 10				SM		Medium dense, dark brown, damp, silty fine to coarse SAND with trace fine gravel	MD
			104.9	20.3	ML/CL		Very stiff, light gray, damp-moist, low plastic clayey SILT & silty CLAY	MD PP=3.5 tsf
							Total Depth= 16.5 ft No Free Groundwater encountered Boring Grout Backfilled 10/26/19	
25								

BORING: B-2



PROJECT: Osborn Elementary School, Turlock      DRILLER: H1 Drilling-CME-75      SHEET: 1 of 1  
 CTE JOB NO: 25-0908G      DRILL METHOD: 4" Auger      DRILLING DATE: 10/26/2019  
 LOGGED BY: A. Krause      SAMPLE METHOD: SPT      ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-3		
							DESCRIPTION	Laboratory Tests	
0					GM		A/C to 0.2', then silty sandy fine GRAVEL (AB/Fill)		
9		9	101.1	2.7	SM		Medium dense, light brown, dry, silty fine SAND	MD	
5		3 4 5	108.2	3.4	SM		Loose, light brown, dry, silty fine SAND	MD	
10		5 6 8	101.5	2.5	SM		Medium dense, light brown, dry, silty fine SAND	MD	
15		9 14 16	113.9	2.3	SM SW		Dense, light brown, dry, silty fine to coarse SAND to clean fine to coarse SAND	MD	
							Total Depth= 16.5 ft No Free Groundwater encountered Boring Grout Backfilled and AC patched 10/26/19		



PROJECT: Osborn Elementary School, Turlock      DRILLER: H1 Drilling-CME-75      SHEET: 1 of 1  
 CTE JOB NO: 25-0908G      DRILL METHOD: 4" Auger      DRILLING DATE: 10/26/2019  
 LOGGED BY: A. Krause      SAMPLE METHOD: SPT      ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-4	
							DESCRIPTION	Laboratory Tests
0					GM		A/C to 0.2', then silty sandy fine GRAVEL (AB/Fill)	
0-4	6 4 4		105.1	4.0	SM		Loose, brown, damp silty fine SAND	MD
4-5							Medium dense, brown, damp, silty fine SAND	
5-10	7 9 10		93.1	22.5	SM ML		Very stiff, light brown, moist, laminated brown & orange brown, non-plastic SILT with trace of fine sand	MD LL-PI= Non plastic
10-15	17 22 23		122.7	7.1	SM w/ML		Dense, laminated brown & orange brown, damp, silty fine to coarse SAND with locally interbedded with thin (<2") layers very stiff SILT & trace fine gravel	MD
15-16.5	9 8 15				SW		Medium dense, light brown, dry, clean, fine to coarse SAND with trace fine gravel	
16.5-25							Total Depth= 16.5 ft No Free Groundwater encountered Boring Grout Backfilled & A/C patched 10/26/19	





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PROJECT: Osborn Elementary School, Turlock      DRILLER: H1 Drilling-CME-75      SHEET: 1 of 1  
 CTE JOB NO: 25-0908G      DRILL METHOD: 4" Auger      DRILLING DATE: 10/26/2019  
 LOGGED BY: A. Krause      SAMPLE METHOD: SPT      ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-5	
							DESCRIPTION	Laboratory Tests
0					GM		A/C to 0.2', then silty sandy fine GRAVEL (AB/Fill)	
18 16 13		13	116.0	2.2	SM		Medium Dense, brown, dry, silty fine SAND	MD
5		7 9 14	104.5	4.6	SM		As Above	MD
10		17 24 28	121.6	3.2	SM		Very dense, light brown, dry, silty fine SAND	MD
15		7 13 16			ML		Very stiff, buff, dry, non-plastic SILT locally interbedded with thin layers clayey SILT	
20							Total Depth= 16.5 ft No Free Groundwater encountered Boring Grout Backfilled 10/26/19	



PROJECT: Osborn Elementary School, Turlock DRILLER: H1 Drilling--CME-75 SHEET: 1 of 2  
 CTE JOB NO: 25-0908G DRILL METHOD: 4" Auger/HQ M.R./Casing Advance DRILLING DATE: 10/26/2019  
 LOGGED BY: A. Krause SAMPLE METHOD: SPT ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-6	
							DESCRIPTION	Laboratory Tests
0					GM	A/C to 0.2', then silty sandy fine GRAVEL (AB/Fill)		
6 7 7		6 7 7	111.2	2.7	SM	Medium dense, brown, dry, silty fine SAND		4" Auger to 25'
5		11 12 16	90.6	6.6	SM w/ML	Medium dense, light gray, damp, silty fine SAND, locally interbedded with stiff very fine sandy SILT		MD
10		12 20 35	122.0	5.6	SM w/ML	Very dense, light brown, damp, silty fine SAND with local layers of very stiff fine sandy SILT		6" Casing
15		7 13 16	103.8	21.2	ML	Very stiff, light brown, non-plastic fine sandy SILT		MD
20		8 16 22	121.0	12.7	SC	Dense, gray, moist, clayey fine-coarse SAND		MD
			10/26/19	22.2'				GWE @ 22.2 ft while augering
25					SM	Very dense, brown, wet, silty fine-coarse SAND		End Auger drilling Set 6" casing at 8 ft

Cont'd on page 2





PROJECT: Osborn Elementary School, Turlock DRILLER: H1 Drilling--CME-75 SHEET: 2 of 2  
 CTE JOB NO: 25-0908G DRILL METHOD: 4" Auger/HQ M.R./Casing Advance DRILLING DATE: 10/27/2019  
 LOGGED BY: A. Krause SAMPLE METHOD: SPT ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-6 (Cont'd)		Laboratory Tests
							DESCRIPTION		
25		7 20 30	134.2	11.2	SM		Very dense, brown, wet, fine to coarse SAND with silt	<i>HQ Mud Rotary Casing Advance</i> 23.1% <#200 MD	
30		14 18 22	115.4	17.1	SW-SM		Dense, brown, wet, fine to coarse SAND with some silt	<i>End Day 10/26/19 HQ Mud Rotary Casing Advance Good Circulation</i> 7.5% <#200 MD	
35		10 23 30	126.2	13.2	CL		Hard, light gray, moist, fine sandy low plastic CLAY to low plastic silty CLAY	<i>HQ Mud Rotary Casing Advance Good Circulation</i> PP=4.5-5.5 tsf MD	
40		9 16 20	118.3	18.1	CL		As Above	<i>HQ Mud Rotary Casing Advance Good Circulation</i> PP=4.0-4.5 tsf MD	
45		21 30 40	113.8	18.3	SM		Very dense, brown, wet, silty, fine-coarse SAND to silty fine SAND	<i>HQ Mud Rotary Casing Advance Good Circulation</i> MD	
50		20 39 43			SM		As Above		
							Total Depth=51.5 ft, Groundwater encountered at 22.2 while augering; Boring Grout Backfilled 10/27/19		



PROJECT: Osborn Elementary School, Turlock      DRILLER: H1 Drilling--CME-75      SHEET: 1 of 1  
 CTE JOB NO: 25-0908G      DRILL METHOD: 4" Auger      DRILLING DATE: 10/26/2019  
 LOGGED BY: A. Krause      SAMPLE METHOD: SPT      ELEVATION: EGS

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: P-1	
							DESCRIPTION	Laboratory Tests
0					ML		Brown, damp, fine sandy SILT with local layer clayey silt	
5					SM		Light brown, silty fine SAND	
10							Total Depth= 7.0 ft No Free Groundwater encountered Percolation Test Performed (See Percolation Data Sheet) Boring Backfilled 10/26/19	
15								
20								
25								



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PROJECT:	Osborn Elementary School, Turlock	DRILLER:	H1 Drilling--CME-75	SHEET:	1	of	1
CTE JOB NO:	25-0908G	DRILL METHOD:	4" Auger	DRILLING DATE:	10/26/2019		
LOGGED BY:	A. Krause	SAMPLE METHOD:	SPT	ELEVATION:	EGS		

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: P-2	
							DESCRIPTION	Laboratory Tests
0					ML		Brown, damp, fine sandy SILT with local layer clayey silt	RV=78 CHM
5					SM			
10	Total depth =6.5 ft No Free Groundwater encountered Percolation test performed (See Percolation Data Sheet) Boring Backfilled 10/26/19							
15								
20								
25								



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### PERCOLATION TEST DATA SHEET

PROJECT: Osborn Academy	PROJECT No: 25-0908G	TEST DATE: 10/26/2019
Test Hole No: P-1	Tested By: RS	DRILL DATE: 10/26/2019
Depth of Test Hole, <b>Dt</b> : 7'	USCS Classification: Brown, Damp, Silty Fine SAND (SM)	
Test Hole Dimensions (Inches)		
Diameter (if round)= 6"		

#### PRE SATURATION

Trial No.	Start Time	Stop Time	Time Interval (min)	Initial Depth to Water (in)	Final Depth to Water (in)	Change in Water Level (in)	Comments:
1	9:47	10:17	30	12.75	0.00	12.75	
2	10:17	10:47	30	12.50	2.00	10.50	

#### TEST MEASUREMENTS

Trial No.	Start Time	Stop Time	$\Delta t$ Time Interval (min)	$D_o$ Initial Depth to Water (in)	$D_f$ Final Depth to Water (in)	$\Delta D$ Change in Water Level (in)	Percolation Rate (min./in.)
1	10:47	10:57	10	6.00	3.00	3.00	3.33
2	10:57	11:07	10	6.00	3.50	2.50	4.00
3	11:07	11:17	10	6.00	3.50	2.50	4.00
4	11:17	11:27	10	6.00	3.50	2.50	4.00
5	11:27	11:37	10	6.00	3.50	2.50	4.00
6	11:37	11:47	10	6.00	3.50	2.50	4.00
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Comments: Final Steady Percolation Rate = 4 min/in  
 See attachment for conversion to gal/sf per day  
 Test hole backfilled 10/26/19



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### PERCOLATION TEST DATA SHEET

PROJECT: Osborn Academy	PROJECT No: 25-0908G	TEST DATE: 10/26/2019
Test Hole No: P-2	Tested By: RS	DRILL DATE: 10/26/2019
Depth of Test Hole, <b>D<sub>t</sub></b> : 6.5'	USCS Classification: Brown, Damp, Silty Fine SAND (SM)	
Test Hole Dimensions (Inches)		
Diameter (if round)= 6"		

#### PRE SATURATION

Trial No.	Start Time	Stop Time	Time Interval (min)	Initial Depth to Water (in)	Final Depth to Water (in)	Change in Water Level (in)	Comments:
1	10:15	10:38	23	12.00	0.50	11.50	
2	10:38	11:00	22	12.00	3.50	8.50	

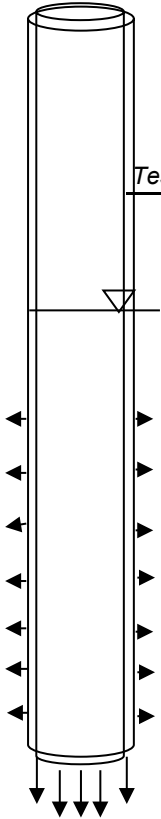
#### TEST MEASUREMENTS

Trial No.	Start Time	Stop Time	$\Delta t$ Time Interval (min)	$D_o$ Initial Depth to Water (in)	$D_f$ Final Depth to Water (in)	$\Delta D$ Change in Water Level (in)	Percolation Rate (min./in.)
1	11:00	11:10	10	6.00	4.50	1.50	6.67
2	11:10	11:20	10	6.00	4.50	1.50	6.67
3	11:20	11:30	10	6.00	4.50	1.50	6.67
4	11:30	11:40	10	6.00	4.50	1.50	6.67
5	11:40	11:50	10	6.00	4.50	1.50	6.67
6	11:50	12:00	10	6.00	4.50	1.50	6.67
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Comments: Final Steady Percolation Rate = 6.67 min/in  
 See attachment for conversion to gal/sf per day  
 Test hole backfilled 10/26/19

**INFILTRATION RATE PER PORCHET METHOD**

Reference: "Riverside County-Low Impact Development BMP Design Handbook" (Page 20)



*Percolation Data at the Final Interval*

Test No.	Radius	Time Interval ( $\Delta t$ )	Initial Depth of Water in inches ( $D_o$ )	Final Depth of Water in inches ( $D_f$ )	Change in Height of Water in inches ( $\Delta H$ )	Average Head Over Time Interval in inches ( $H_{avg}$ )
P-1:	3.0	10.00	6.00	3.50	2.50	4.75
P-2:	3.0	10.00	6.00	4.50	1.50	5.25

Infiltration Rate  $I_t = (\Delta H \cdot 60 \cdot r) / \Delta t (r + 2H_{avg})$

P-1:  $I_t = (2.50 \text{ in})(60 \text{ min/hr})(3 \text{ in}) / (10 \text{ min}) (3 \text{ in} + 2(4.75 \text{ in})) = 3.60 \text{ in/hr}$

P-2:  $I_t = (1.25 \text{ in})(60 \text{ min/hr})(3 \text{ in}) / (10 \text{ min}) (3 \text{ in} + 2(5.25 \text{ in})) = 2.00 \text{ in/hr}$

Infiltration Rate in gal/sf/day =  $(I_t \text{ in/hr})(24 \text{ hr/day})(7.48 \text{ gal / cf})(\text{ft}/12 \text{ in})$

P-1=  $((3.60)(24)(7.48))/12 = 53.9 \text{ gal/sf/day}$

P-2=  $((2.00)(24)(7.48))/12 = 29.9 \text{ gal/sf/day}$



## APPENDIX C

### LABORATORY METHODS

Laboratory tests were performed on representative soil samples to detect their relative engineering properties. Tests were performed following test methods of the American Society for Testing Materials or other accepted standards. The following presents a brief description of the various test methods used. The result of the laboratory tests are presented on the test boring logs or following this Appendix section.

#### Natural Moisture Content

The procedure of ASTM D 2216 was used to measure the moisture content of representative samples.

#### Classification

Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D2487.

#### Atterberg Limits

The procedure of ASTM D4318 was used to measure the liquid limit, plastic limit and plasticity index of representative samples.

#### Material Finer than No. 200 Sieve

Particle-size analyses were performed on selected representative samples according to ASTM D1140.

#### R-Value

The procedure of ASTM D2844 was performed to determine the potential strength of subgrade and base materials for use in road pavements.

#### Expansion Index

The ASTM D4829 procedure was used on selected samples to determine the expansion potential.

#### Sieve Analysis

The ASTM C136 procedure was used to determine the particle size distribution of selected samples.



### REPORT OF RESISTANCE 'R' VALUE-EXPANSION PRESSURE

**Job Name:** Osborn Academy  
**Job No.** 25-0908G  
**Lab No.** 5169  
**Sample No.** P2 @ 1-3'

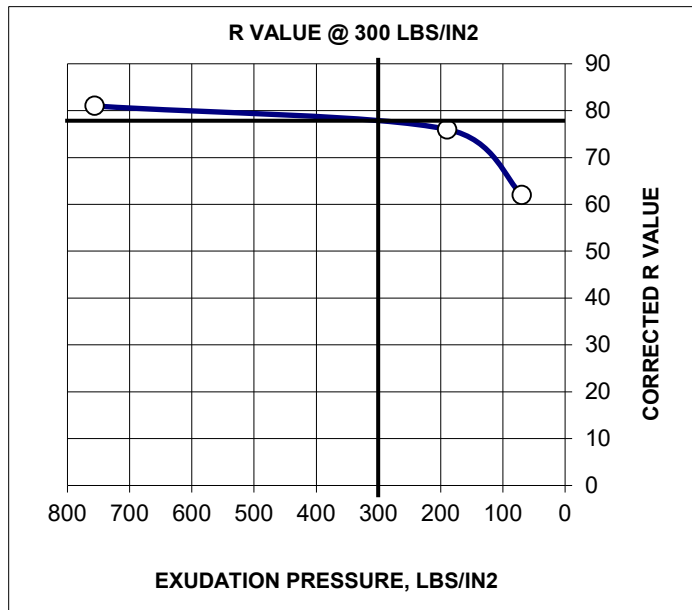
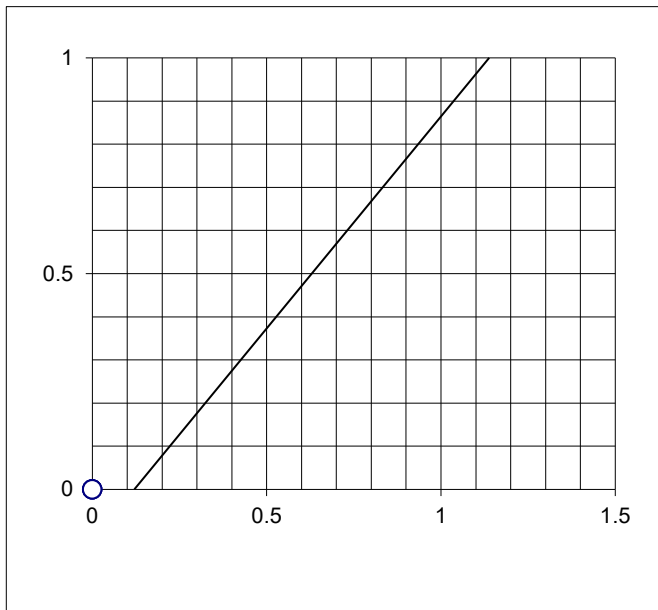
**Date:** 10/27/2019  
**Submitted By:** AK  
**Tested/ Calc.By:** KK  
**Type of Material:** Sand with silt SM

**Test Procedure:** ASTM D2844

Specimen/ Mold No.	0	J	209
Compactor Air Pressure, - ft.lbs.	250	350	350
Initial Moisture, - %	6.3%	6.3%	6.3%
Sample Size - g	1200	1200	1200
Water Added, - ml	80	50	36
Moisture at Compaction, - %	12.9%	10.4%	9.3%
Wt. Of Briquette and Mold, - g	3207.3	3200.1	3194.3
Wt. Of Mold, - g	2092.8	2082.2	2090
Wt. Of Briquette, - g	1114.5	1117.9	1104.3
Height of Briquette, - in	2.55	2.55	2.50
Dry Density, - pcf	117.2	120.2	122.5
Stabilometer PH @ 2000 lbs	37	22	20
Displacement	4.89	4.83	4.10
R' Value	62	76	81
Corrected 'R' Value	62	76	81
Exudation Pressure, - lbs	866	2368	9452
Exudation Pressure, - psi	69	189	756
Stabilometer Thickness - ft	0	0	0
Expansion - in.	0	0	0
Expansion Pressure - Pascals	0	0	0
Expansion Press, Thick-ft	0	0	0

**R-value** 78

TI	5
Expansion	100



Cover Thickness by Expansion Pressure-Feet

Expansion From Graph:



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## MOISTURE & DENSITY TEST

Client: FF & J

Sample Date: 10/26/2019

Project Name: Osburn Elementary School

Lab Number: 1491

Project Number: 25-0908G

Sample No.	B-1	B-1	B-1	B-2	B-2
DEPTH FT	1	10	15	1	10
SAMPLE HT	6.01	6.01	6.00	6.00	6.00
TUBE DIA.	1.41	1.42	1.38	1.38	1.39
SOIL+RING	411.2	378.7	447.5	416.7	392.7
RING	131.0	119.0	122.2	141.0	140.4
SOIL WT., g	280.2	259.7	325.3	275.7	252.3
SOIL, LB	0.61772	0.57253	0.71715	0.60780	0.55622
VOL. SOIL	0.00543	0.00551	0.00519	0.00519	0.00527
WET DENS	113.7	103.9	138.1	117.0	105.6
SOIL WET	280.2	259.7	325.3	275.7	252.3
SOIL DRY	256.1	248.9	304.6	257.5	245.0
% MOIST	9.4%	4.3%	6.8%	7.1%	3.0%
DRY DENS	104.0	99.6	129.3	109.3	102.5

Reviewed By: Laboratory Manager

Date: \_\_\_\_\_



## MOISTURE & DENSITY TEST

Client: FF & J

Sample Date: 10/26/2019

Project Name: Osburn Elementary School

Lab Number: 1491

Project Number: 25-0908G

Sample No.	B-2	B-3	B-3	B-3	B-3
DEPTH FT	15	1	5	10	15
SAMPLE HT	6.00	6.00	6.00	6.00	6.01
TUBE DIA.	1.34	1.40	1.40	1.42	1.39
SOIL+RING	411.8	378.8	391.9	379.8	408.4
RING	131.7	127.1	120.7	120.4	129.5
SOIL WT., g	280.1	251.7	271.2	259.4	278.9
SOIL, LB	0.61750	0.55489	0.59788	0.57187	0.61486
VOL. SOIL	0.00490	0.00535	0.00535	0.00550	0.00528
WET DENS	126.1	103.8	111.9	104.0	116.5
SOIL WET	280.1	251.7	271.2	259.4	278.9
SOIL DRY	232.9	245.0	262.3	253.1	272.7
% MOIST	20.3%	2.7%	3.4%	2.5%	2.3%
DRY DENS	104.9	101.1	108.2	101.5	113.9

Reviewed By: Laboratory Manager

Date: \_\_\_\_\_



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## MOISTURE & DENSITY TEST

Client: FF & J

Sample Date: 10/26/2019

Project Name: Osburn Elementary School

Lab Number: 1491

Project Number: 25-0908G

Sample No.	B-4	B-4	B-4	B-5	B-5
DEPTH FT	1	5	10	1	5
SAMPLE HT	6.01	6.00	6.00	6.00	6.00
TUBE DIA.	1.40	1.38	1.41	1.38	1.40
SOIL+RING	395.3	398.5	443.7	420.7	385.0
RING	130.0	129.7	120.5	141.4	120.0
SOIL WT., g	265.3	268.8	323.2	279.3	265.0
SOIL, LB	0.58488	0.59259	0.71252	0.61574	0.58422
VOL. SOIL	0.00535	0.00519	0.00542	0.00519	0.00535
WET DENS	109.2	114.1	131.4	118.6	109.3
SOIL WET	265.3	268.8	323.2	279.3	265.0
SOIL DRY	255.2	219.4	301.8	273.3	253.4
% MOIST	4.0%	22.5%	7.1%	2.2%	4.6%
DRY DENS	105.1	93.1	122.7	116.0	104.5

Reviewed By: Laboratory Manager

Date: \_\_\_\_\_



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## MOISTURE & DENSITY TEST

Client: FF & J

Sample Date: 10/26/2019

Project Name: Osburn Elementary School

Lab Number: 1491

Project Number: 25-0908G

Sample No.	B-5	B-6	B-6	B-6	B-6
DEPTH FT	10	1	5	10	15
SAMPLE HT	6.01	6.01	6.00	6.00	6.00
TUBE DIA.	1.39	1.39	1.41	1.42	1.41
SOIL+RING	423.0	395.6	379.4	440.7	431.9
RING	122.7	122.3	141.9	119.6	122.6
SOIL WT., g	300.3	273.3	237.5	321.1	309.3
SOIL, LB	0.66204	0.60251	0.52359	0.70789	0.68188
VOL. SOIL	0.00528	0.00528	0.00542	0.00550	0.00542
WET DENS	125.4	114.2	96.6	128.7	125.8
SOIL WET	300.3	273.3	237.5	321.1	309.3
SOIL DRY	291.1	266.2	222.8	304.2	255.3
% MOIST	3.2%	2.7%	6.6%	5.6%	21.2%
DRY DENS	121.6	111.2	90.6	122.0	103.8

Reviewed By: Laboratory Manager

Date: \_\_\_\_\_



## MOISTURE & DENSITY TEST

Client: FF & J

Sample Date: 10/26/2019

Project Name: Osburn Elementary School

Lab Number: 1491

Project Number: 25-0908G

Sample No.	B-6	B-6	B-6	B-6	B-6
DEPTH FT	20	25	30	35	40
SAMPLE HT	6.00	6.00	6.00	6.00	6.00
TUBE DIA.	1.40	1.38	1.40	1.41	1.39
SOIL+RING	453.1	493.0	469.7	471.9	456.6
RING	122.4	141.6	142.0	120.5	122.6
SOIL WT., g	330.7	351.4	327.7	351.4	334.0
SOIL, LB	0.72906	0.77469	0.72244	0.77469	0.73633
VOL. SOIL	0.00535	0.00519	0.00535	0.00542	0.00527
WET DENS	136.4	149.2	135.2	142.9	139.7
SOIL WET	330.7	351.4	327.7	351.4	334.0
SOIL DRY	293.4	316.1	279.9	310.4	282.7
% MOIST	12.7%	11.2%	17.1%	13.2%	18.1%
DRY DENS	121.0	134.2	115.4	126.2	118.3

Reviewed By: \_\_\_\_\_  
Laboratory Manager

Date: \_\_\_\_\_



## MOISTURE & DENSITY TEST

Client: FF & J

Sample Date: 10/26/2019

Project Name: Osburn Elementary School

Lab Number: 1491

Project Number: 25-0908G

Sample No.	B-6				
DEPTH FT	45				
SAMPLE HT	6.00				
TUBE DIA.	1.40				
SOIL+RING	458.2				
RING	131.9				
SOIL WT., g	326.3				
SOIL, LB	0.71936				
VOL. SOIL	0.00535				
WET DENS	134.6				
SOIL WET	326.3				
SOIL DRY	275.8				
% MOIST	18.3%				
DRY DENS	113.8				

Reviewed By: Laboratory Manager

Date: \_\_\_\_\_





## Material Finer than #200 Sieve

ASTM D-1140

Project Name: Osburn Elementary School

Date Received: 10/30/2019

Project #: 25-0908G

Sampled By: AK

Sample Description: \_\_\_\_\_

Lab #: 1491

Sample Location: B-2 @ 5

Initial Dry Wt. + Tare (g):

Oven Dry Wt. + Tare (g):

Tare:

Soil Loss (g):

Percent Finer than # 200 Sieve:

63

Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

Laboratory Manager



## Material Finer than #200 Sieve

ASTM D-1140

Project Name: Osburn Elementary School

Date Received: 10/30/2019

Project #: 25-0908G

Sampled By: AK

Sample Description: \_\_\_\_\_

Lab #: 1491

Sample Location: B-6 @ 25

Initial Dry Wt. + Tare (g):

Oven Dry Wt. + Tare (g):

Tare:

Soil Loss (g):

Percent Finer than # 200 Sieve:

63

Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

Laboratory Manager



## Material Finer than #200 Sieve

ASTM D-1140

Project Name: Osburn Elementary School

Date Received: 10/30/2019

Project #: 25-0908G

Sampled By: AK

Sample Description: \_\_\_\_\_

Lab #: 1491

Sample Location: B-6 @ 30

Initial Dry Wt. + Tare (g):

Oven Dry Wt. + Tare (g):

Tare:

Soil Loss (g):

Percent Finer than # 200 Sieve:

63

Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

Laboratory Manager

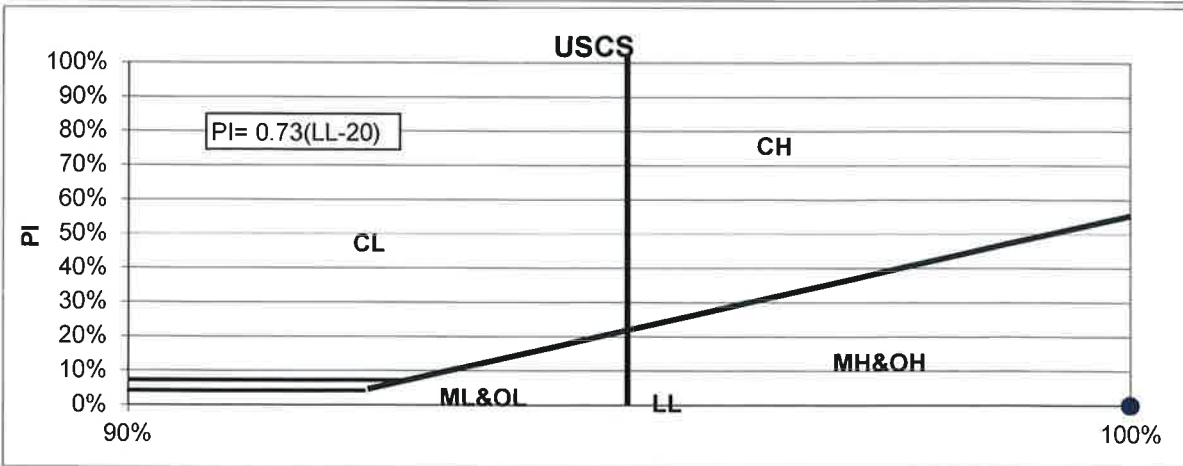
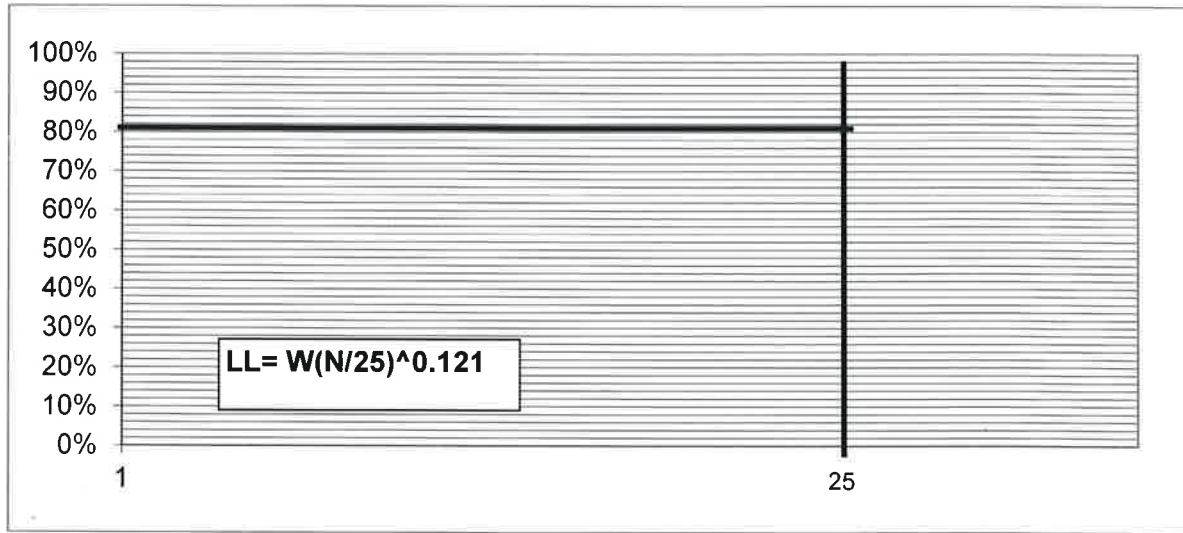


**Job Name:** Osburn Elementary School      **Date:** 10/26/19  
**Job Number:** 25-0908G      **Boring:** \_\_\_\_\_  
**Sample Nr. :** 1491      **Depth:** 5-4 @ 5

**ATTERBERG**

LIQUID LIMITS				PLASTIC LIMIT	
WET SOIL					
DRY SOIL					
TARE					
WATER	0.00	0.00	0.00	0.00	0.00
# BLOWS					
% MOIST					
ONE POINT				PL	PI #VALUE!

Non Plastic



**REVIEWED BY:** \_\_\_\_\_      **DATE:** \_\_\_\_\_

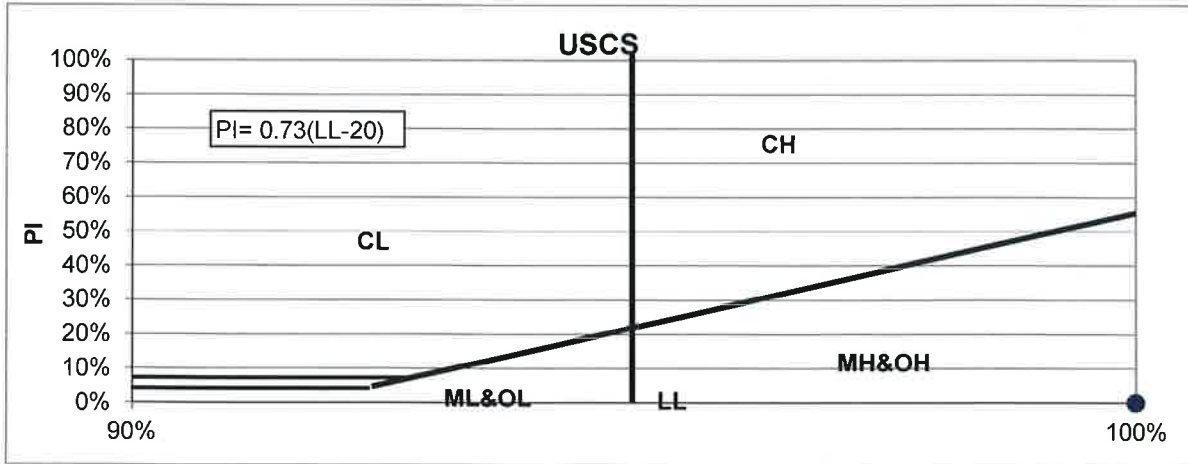
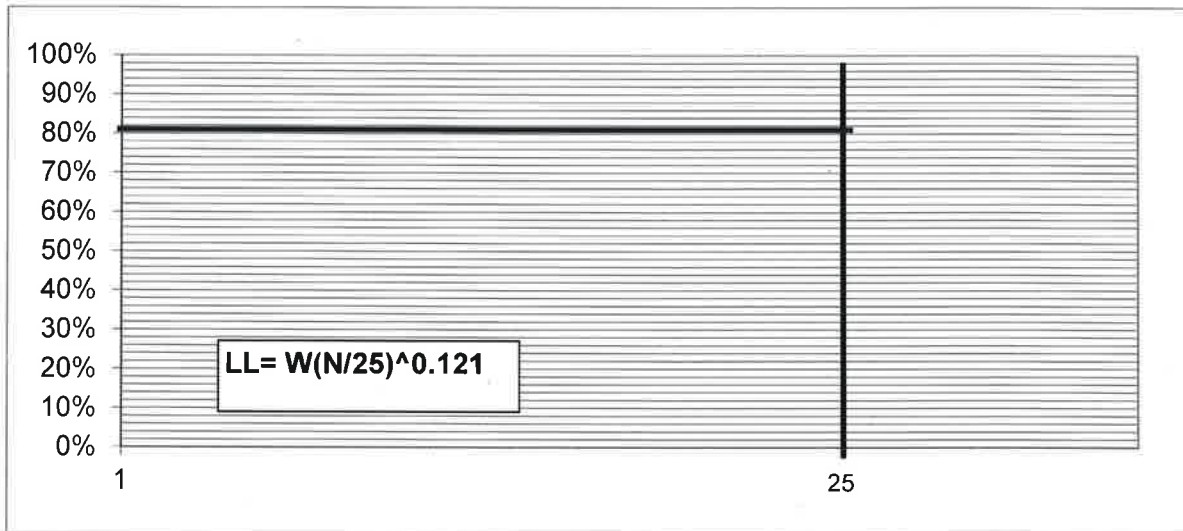


**Job Name:** Osburn Elementary School      **Date:** 10/26/19  
**Job Number:** 25-0908G      **Boring:** \_\_\_\_\_  
**Sample Nr. :** 1491      **Depth:** 5-2 @ 5

**ATTERBERG**

LIQUID LIMITS				PLASTIC LIMIT	
WET SOIL					
DRY SOIL					
TARE					
WATER	0.00	0.00	0.00	0.00	0.00
# BLOWS					
% MOIST					
ONE POINT				PL	PI
				#VALUE!	

Non Plastic



**REVIEWED BY:** \_\_\_\_\_      **DATE:** \_\_\_\_\_

# AGGREGATE GRADATION and MINUS NO. 200 WASH

ASTM D5444

DATE: 10/30/2019

PROJECT NO.: 25-0908G

SAMPLE NO.: 1491

## AGGREGATE GRADATION

INITIAL DRY MASS OF SAMPLE: 472.8 GRAMS

SIEVE SIZE	MASS RETAINED	PERCENT RETAINED	ACCUM. % RETAINED	PERCENT PASSING	SPECS % PASSING
3 in.	0.0	0.0	0.0	100	
2 1/2 in.	0.0	0.0	0.0	100	
2 in.	0.0	0.0	0.0	100	
1 1/2 in.	0.0	0.0	0.0	100	
1 in.	0.0	0.0	0.0	100	
3/4 in.	0.0	0.0	0.0	100	
1/2 in.	0.0	0.0	0.0	100	
3/8 in.	6.7	1.4	1.4	99	
No. 4	18.6	3.9	3.9	96	0-15
No. 8	25.2	5.3	5.3	95	
No. 10	42.5	9.0	9.0	91	
No. 16	135.7	28.7	28.7	71	
No. 30	259.6	54.9	54.9	45	
No. 40	259.6	54.9	54.9	45	
No. 50	259.6	54.9	54.9	45	
No. 100	372.3	78.7	78.7	21	
No. 200	405.9	85.9	85.9	14.2	
PAN	409.9	86.7	XXXXXXXX	XXXXXXXX	XXXXXXXX
SUM	2102.6	XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX

## MINUS NO. 200 WASH

PAN NUMBER:	
MASS OF PAN:	0.00
MASS OF SAMPLE WITH PAN BEFORE WASH:	0.00
MASS OF SAMPLE (BEFORE WASH):	472.80
MASS OF SAMPLE WITH PAN AFTER WASH:	0.00
MASS OF OVEN DRY SAMPLE:	409.90
PERCENT PASSING NO. 200:	13.30

TECHNICIAN: \_\_\_\_\_

REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# GeoAnalytical Laboratories, Inc.

2300 Maryann Dr. Turlock, CA 95380 Phone (209) 669-0100 Fax (209) 593-2212  
email: [info@geoanalyticallab.com](mailto:info@geoanalyticallab.com)

Report # F9K1815

Project: 25-0908G

Date: 11/21/19

CTE Cal

Date Rec'd: 11/18/19


3628 Madison Avenue, Suite 22  
Sacramento, CA 95660


## CERTIFICATE OF ANALYSIS

Sampler: Rameel Shabdin

Sample ID: 25-0908G

Lab ID	Sample Date / Time	RL	Method	Analyte	Result	Units	Notes	Started
F9K1815-01	10/27/2019 00:00	100	300.0	Chloride	ND	mg/kg		11/19/19 11:09
		100		Sulfate	ND	mg/kg		11/19/19 11:09
		0.1	9045C	pH	8.3	Std. Units	O-04	11/19/19 11:00
		0.0001	SM2510B	Resistivity	0.02	μohm*cm		11/19/19 17:22

  
Fatima Myers  
Chemist

  
Donna Keller  
Laboratory Director

# GeoAnalytical Laboratories, Inc.

2300 Maryann Dr. Turlock, CA 95380 Phone (209) 669-0100 Fax (209) 593-2212  
email: [info@geoanalyticallab.com](mailto:info@geoanalyticallab.com)

**Report # F9K1815**

**Project: 25-0908G**

**Date: 11/21/19**

CTE Cal  
3628 Madison Avenue, Suite 22  
Sacramento, CA 95660

**Date Rec'd: 11/18/19**

## Inorganic Chemistry - Quality Control GeoAnalytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
<b>Batch F004142 - SM2510B - NO PREP</b>									
					<b>Prepared: 11/19/19 Analyzed: 11/21/19</b>				
<b>Duplicate (F004142-DUP1) Source: F9K1815-01</b>									
Resistivity	0.02	0.0001	μohm*cm		0.02		0.3	20	
<b>Batch F004143 - 300.0 - NO PREP</b>									
					<b>Prepared: 11/19/19 Analyzed: 11/21/19</b>				
<b>Blank (F004143-BLK1)</b>									
Chloride	ND	10.0	mg/kg						
Sulfate	ND	10	"						
<b>LCS (F004143-BS1)</b>									
Chloride	220	10.0	mg/kg	250.0		90	80-120		
Sulfate	123	10	"	125.0		99	80-120		
<b>LCS Dup (F004143-BSD1)</b>									
Chloride	230	10.0	mg/kg	250.0		90	80-120	0.3	20
Sulfate	120	10	"	125.0		96	80-120	3	20
<b>Duplicate (F004143-DUP1) Source: F9K1814-01</b>									
Chloride	54	100	mg/kg		59		8	20	
Sulfate	45.4	100	"		44.7		2	20	
<b>Batch F004150 - 9045C - NO PREP</b>									
					<b>Prepared &amp; Analyzed: 11/19/19</b>				
<b>Duplicate (F004150-DUP1) Source: F9K1814-01</b>									
pH	8.5	0.1	Std. Units		8.5		0.1	20	O-04



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email: [info@geoanalyticallab.com](mailto:info@geoanalyticallab.com)

**Report # F9K1815**

**Project: 25-0908G**

**Date: 11/21/19**

CTE Cal

**Date Rec'd: 11/18/19**

3628 Madison Avenue, Suite 22

Sacramento, CA 95660

## Notes and Definitions

O-04 This sample was analyzed outside the EPA recommended holding time.  
ND Analyte NOT DETECTED at or above the reporting limit  
RPD Relative Percent Difference  
RL Reporting Limit  
NA Not Applicable  
>AL Greater than establish Action Levels  
>MCL Greater than establish Maximum Contaminant Levels

APPENDIX D

EARTHQUAKE RECORDS

## EARTHQUAKE RECORDS

Earthquakes of 3.0+ Mag Occurring Within 50(km) of the Site						
Site:	37.4937	-120.8635				1 of 1
Date	Latitude	Longitude	Magnitude	Depth	Distance mi	Distance km
2/12/1974	37.499	-121.043	3.13	2.011	9.88	15.90
10/13/1977	37.49567	-121.046	3.7	14.733	10.01	16.11
8/14/1974	37.30983	-120.925	3.78	0.09	13.12	21.12
8/14/1974	37.30433	-120.9	3.28	0.077	13.21	21.27
8/13/1974	37.30583	-120.911	3.79	0.011	13.21	21.27
8/13/1974	37.3035	-120.906	3.47	-0.1	13.32	21.44
8/13/1974	37.30217	-120.904	3.1	-0.109	13.40	21.56
8/14/1974	37.30433	-120.919	3.15	0.08	13.42	21.59
8/14/1974	37.2995	-120.901	3.3	-0.03	13.55	21.80
9/20/1996	37.31017	-121.057	3.05	-0.721	16.55	26.64
9/10/1979	37.32	-121.077	3.18	-0.297	16.76	26.98
7/24/2009	37.30517	-121.073	3.15	5.262	17.38	27.96
2/25/2007	37.3055	-121.075	3.5	6.282	17.43	28.05
2/2/1979	37.65833	-121.185	3.49	18	20.99	33.78
5/19/1975	37.19517	-120.961	3.1	0.055	21.27	34.24
5/25/1975	37.194	-120.968	4.34	1.168	21.45	34.52
9/7/1994	37.52417	-121.257	3.9	1.492	21.70	34.93
6/18/1975	37.18617	-120.948	4.1	-0.081	21.72	34.95
6/11/1975	37.18567	-120.955	3.79	-0.142	21.84	35.14
8/6/1979	37.73617	-120.589	3.76	17.301	22.50	36.22
3/14/1999	37.2585	-120.575	3.94	2.082	22.69	36.51
1/8/1998	37.381	-121.3	3.19	-0.365	25.24	40.62
9/30/2003	37.3715	-121.303	3.04	-0.29	25.61	41.21
9/27/1994	37.13117	-121.026	3.12	8.431	26.55	42.73
12/2/1974	37.2055	-121.194	3.23	0.503	26.95	43.37
2/20/1975	37.33583	-121.317	3.4	1.666	27.23	43.82
12/2/1974	37.19917	-121.202	3.5	-0.357	27.57	44.37
8/8/1995	37.1035	-121.009	3	4.605	28.08	45.19
5/3/1992	37.10167	-121.02	3.25	1.686	28.37	45.66
8/26/1987	37.15117	-121.154	3.8	-0.093	28.51	45.89
12/25/1974	37.1445	-121.142	3.12	5.697	28.55	45.94
5/1/1992	37.09967	-121.026	3.53	-0.304	28.61	46.04
2/16/2001	37.091	-121.03	3.02	7.311	29.25	47.08
2/23/2001	37.09033	-121.03	3.1	5.971	29.28	47.13
10/7/1991	37.5185	-121.407	3	-0.182	29.91	48.13
2/4/1991	37.80967	-121.238	3.08	7.675	29.92	48.16
6/24/2001	37.1005	-121.104	3.11	1.532	30.17	48.55
6/24/2001	37.09833	-121.103	3.02	3.062	30.29	48.74
2/3/1991	37.81833	-121.244	3.1	9.415	30.59	49.23
10/6/1976	37.61483	-121.409	3.3	2.869	31.08	50.01

APPENDIX E

US SEISMIC DESIGN MAPS

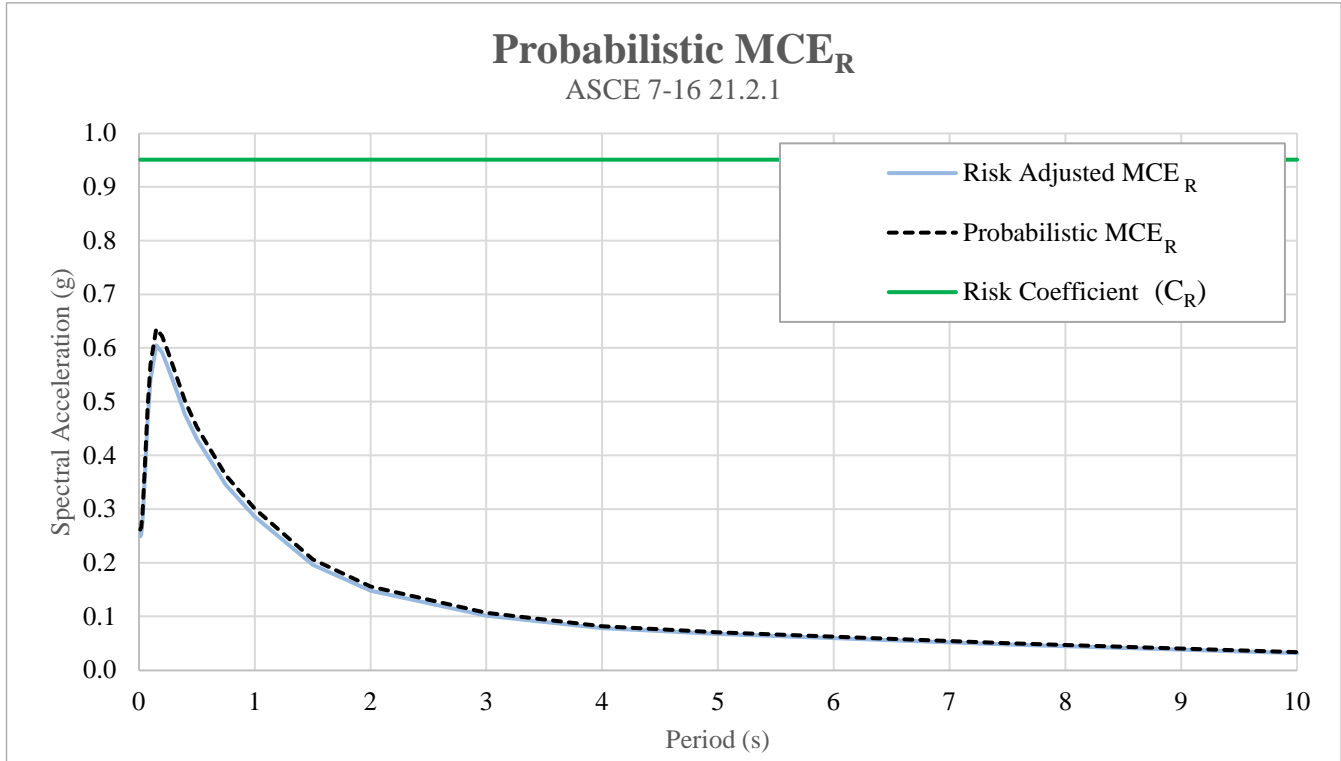


FIGURE E1

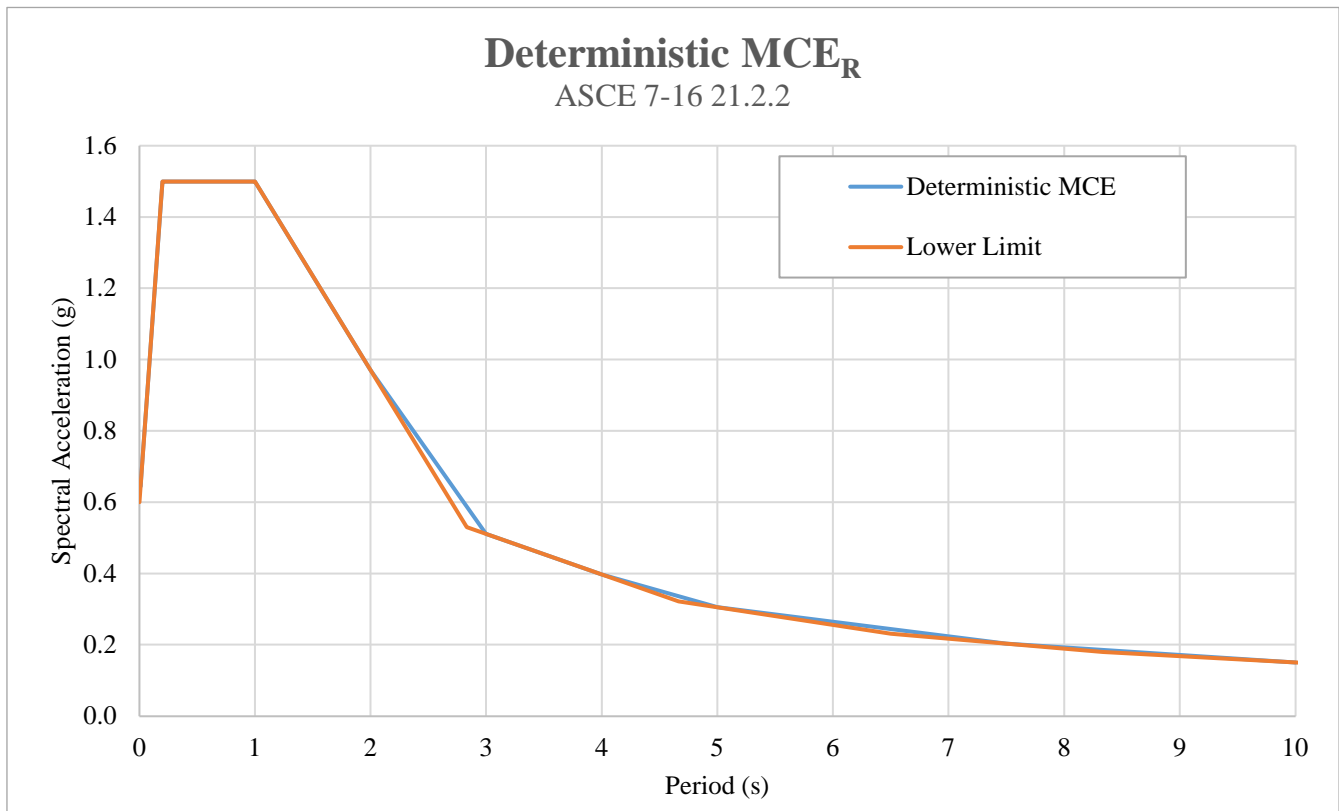
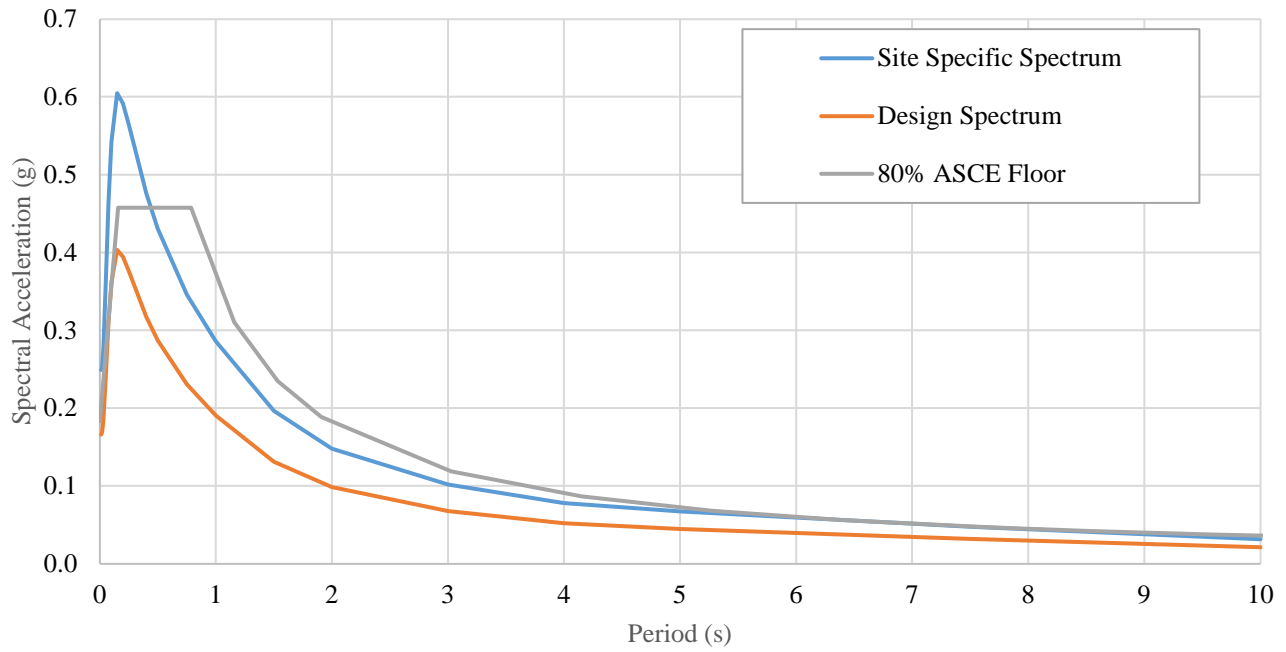


FIGURE E2

### Site Specific $MCE_R$ and Design Floor

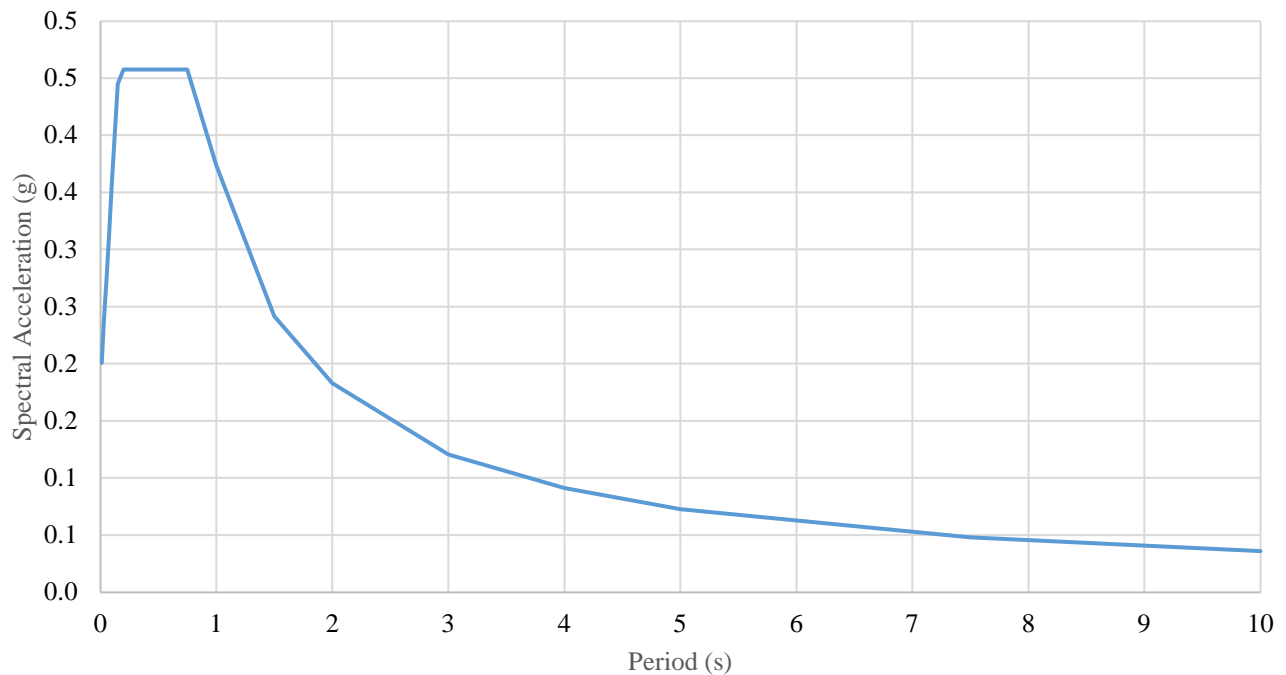
ASCE 7-16 21.2.3



**FIGURE E3**

### Site Specific Final Design Spectrum

ASCE 7-16 21.3



**FIGURE E4**

## Site Specific Seismic Response Analysis Data Table

12/30/2019

Spectral Period (s)	Spectral Acceleration (g)									
	Probabilistic MCE Response Spectrum (2% in 50 years)	$C_R$	Risk Adjusted Probabilistic $MCE_R$	Deterministic $MCE_R$ Response Spectrum (84th Percentile of Maximum Rotated Component)	Deterministic Lower Limit on $MCE_R$ Response Spectrum	Site-Specific $MCE_R$ Response Spectrum	2/3 of Site-Specific $MCE_R$ Response Spectrum	NEHRP - ASCE Design Response Spectrum	80% of NEHRP - ASCE Design Response Spectrum	Design Response Spectrum
0.01	0.262	0.951	0.24916	0.645	0.645	0.249	0.166	0.251	0.201	0.201
0.02	0.266	0.951	0.25314	0.690	0.690	0.253	0.169	0.272	0.218	0.218
0.03	0.292	0.951	0.278	0.735	0.735	0.278	0.185	0.294	0.235	0.235
0.05	0.375	0.951	0.356	0.825	0.825	0.356	0.238	0.338	0.270	0.270
0.075	0.489	0.951	0.465	0.938	0.938	0.465	0.310	0.393	0.314	0.314
0.1	0.570	0.951	0.542	1.050	1.050	0.542	0.361	0.447	0.358	0.361
0.15	0.636	0.951	0.605	1.275	1.275	0.605	0.403	0.556	0.445	0.445
0.2	0.622	0.951	0.592	1.500	1.500	0.592	0.394	0.572	0.458	0.458
0.25	0.594	0.951	0.565	1.500	1.500	0.565	0.376	0.572	0.458	0.458
0.3	0.564	0.951	0.536	1.500	1.500	0.536	0.357	0.572	0.458	0.458
0.4	0.500	0.951	0.476	1.500	1.500	0.476	0.317	0.572	0.458	0.458
0.5	0.453	0.951	0.430	1.500	1.500	0.430	0.287	0.572	0.458	0.458
0.75	0.363	0.951	0.345	1.500	1.500	0.345	0.230	0.572	0.458	0.458
1	0.301	0.951	0.286	1.500	1.500	0.286	0.191	0.467	0.373	0.373
1.5	0.207	0.951	0.196	1.235	1.235	0.196	0.131	0.302	0.242	0.242
2	0.156	0.951	0.148	0.971	0.971	0.148	0.099	0.229	0.183	0.183
3	0.107	0.951	0.102	0.511	0.511	0.102	0.068	0.151	0.121	0.121
4	0.082	0.951	0.078	0.397	0.397	0.078	0.052	0.114	0.091	0.091
5	0.071	0.951	0.067	0.305	0.305	0.067	0.045	0.091	0.073	0.073
7.5	0.050	0.951	0.048	0.203	0.203	0.048	0.032	0.060	0.048	0.048
10	0.034	0.951	0.032	0.150	0.150	0.032	0.021	0.045	0.036	0.036

## Parameter Summary:

$S_{DS}$	0.458	$S_{MS}$	0.687
$S_{D1}$	0.373	$S_{M1}$	0.560
		$PGA_M$	0.331



APPENDIX F

LIQUEFACTION ANALYSIS

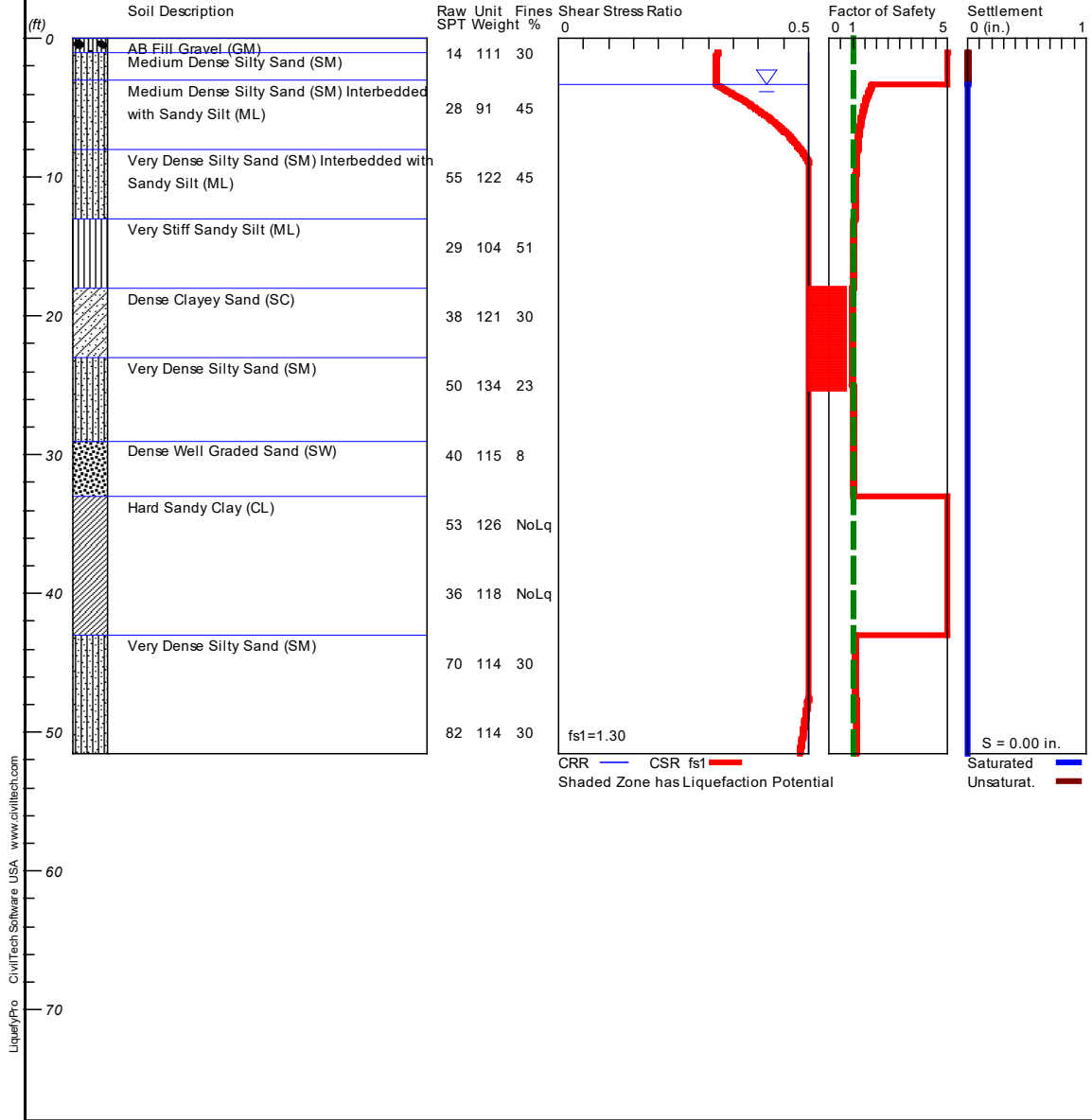


# LIQUEFACTION ANALYSIS

## Osborn Academy - Code Based

Hole No.=B6 Water Depth=3.3 ft Surface Elev.=EGS

Magnitude=7.1  
Acceleration=0.376g



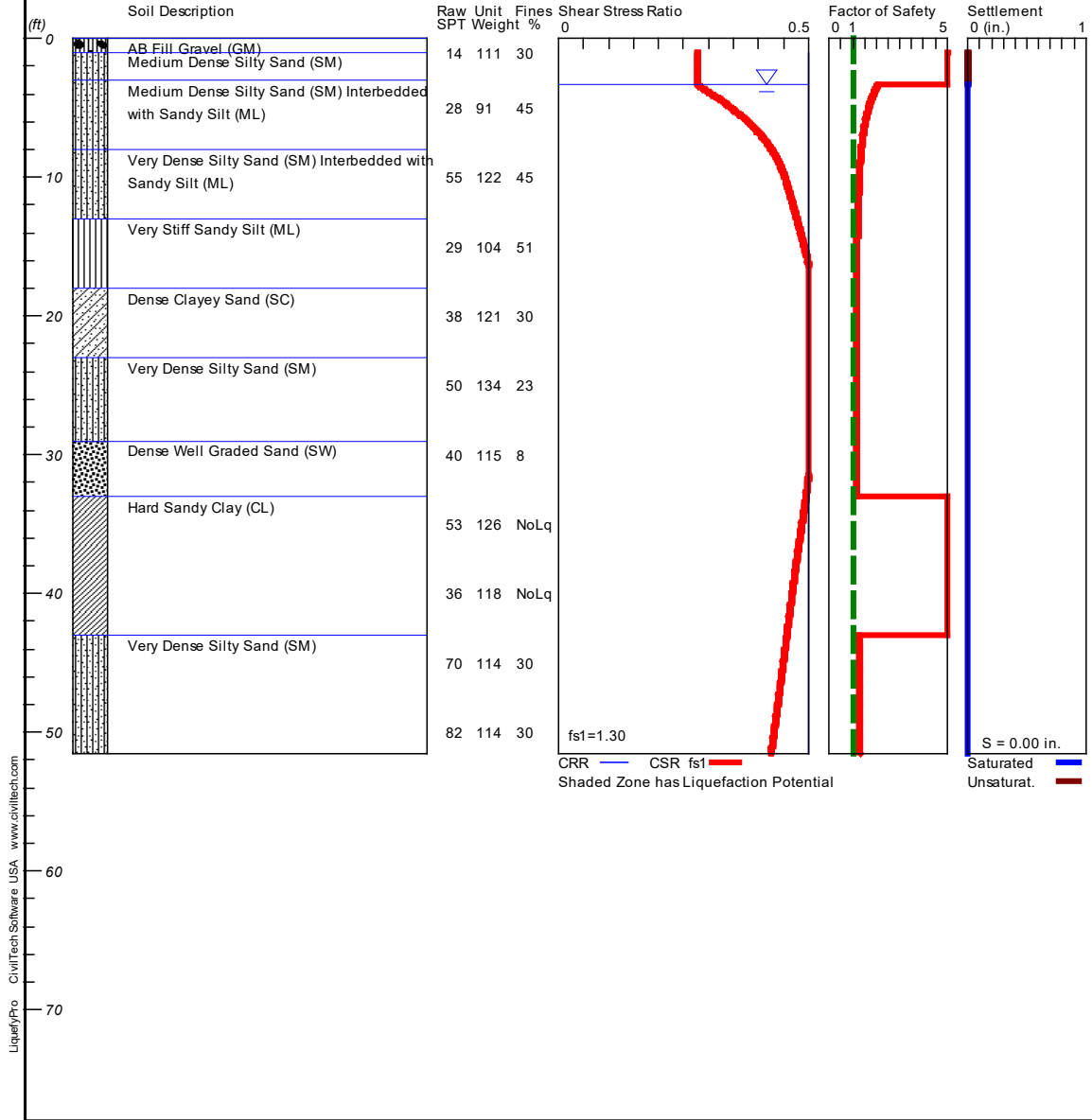
LiquefyPro CivilTech Software USA www.civiltech.com

# LIQUEFACTION ANALYSIS

## Osborn Academy - Site Specific Based

Hole No.=B6 Water Depth=3.3 ft Surface Elev.=EGS

Magnitude=7.1  
Acceleration=0.331g



APPENDIX G

STANDARD GRADING RECOMMENDATIONS

### Section 1 - General

CTE, Cal, Inc. (CTE) presents the following standard recommendations for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications. Recommendations contained in the body of the previously presented soils report shall supersede the recommendations and or requirements as specified herein. The project geotechnical consultant shall interpret disputes arising out of interpretation of the recommendations contained in the soils report or specifications contained herein.

### Section 2 - Responsibilities of Project Personnel

The geotechnical consultant should provide observation and testing services sufficient to general conformance with project specifications and standard grading practices. The geotechnical consultant should report any deviations to the client or his authorized representative.

The Client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the geotechnical consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services. During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

The Contractor is responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including, but not limited to, earth work in accordance with the project plans, specifications and controlling agency requirements.

### Section 3 - Preconstruction Meeting

A preconstruction site meeting should be arranged by the owner and/or client and should include the grading contractor, design engineer, geotechnical consultant, owner's representative and representatives of the appropriate governing authorities.

### Section 4 - Site Preparation

The client or contractor should obtain the required approvals from the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, root of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.

Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and other man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or rerouting pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant at the time of demolition.

Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the contractor from damage or injury.

Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the geotechnical consultant.

#### Section 5 - Site Protection

Protection of the site during the period of grading should be the responsibility of the contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the geotechnical consultant, the client and the regulating agencies.

Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas cannot be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.

Rain related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions as determined by the geotechnical consultant. Soil adversely affected should be classified as unsuitable materials and should be subject to overexcavation and replacement with compacted fill or other remedial grading as recommended by the geotechnical consultant.

The contractor should be responsible for the stability of all temporary excavations. Recommendations by the geotechnical consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and, therefore, should not be considered to preclude the responsibilities of the contractor. Recommendations by the geotechnical consultant should not be considered to preclude requirements that are more restrictive by the regulating agencies. The contractor should provide during periods of extensive rainfall plastic sheeting to prevent unprotected slopes from becoming saturated and unstable. When deemed appropriate by the geotechnical consultant or governing agencies the contractor shall install checkdams, desilting basins, sand bags or other drainage control measures.

In relatively level areas and/or slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1.0 foot; they should be overexcavated and replaced as compacted fill in accordance with the applicable specifications. Where affected materials exist to depths of 1.0 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. If field conditions dictate, the geotechnical consultant may recommend other slope repair procedures.

## Section 6 - Excavations

### 6.1 Unsuitable Materials

Materials that are unsuitable should be excavated under observation and recommendations of the geotechnical consultant. Unsuitable materials include, but may not be limited to, dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft bedrock and nonengineered or otherwise deleterious fill materials.

Material identified by the geotechnical consultant as unsatisfactory due to its moisture conditions should be overexcavated; moisture conditioned as needed, to a uniform at or above optimum moisture condition before placement as compacted fill.

If during the course of grading adverse geotechnical conditions are exposed which were not anticipated in the preliminary soil report as determined by the geotechnical consultant additional exploration, analysis, and treatment of these problems may be recommended.

### 6.2 Cut Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal: vertical).

The geotechnical consultant should observe cut slope excavation and if these excavations expose loose cohesionless, significantly fractured or otherwise unsuitable material, the materials should be overexcavated and replaced with a compacted stabilization fill. If encountered specific cross section details should be obtained from the Geotechnical Consultant.

When extensive cut slopes are excavated or these cut slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top of the slope.

### 6.3 Pad Areas

All lot pad areas, including side yard terrace containing both cut and fill materials, transitions, located less than 3 feet deep should be overexcavated to a depth of 3 feet and replaced with a uniform compacted fill blanket of 3 feet. Actual depth of overexcavation may vary and should be delineated by the geotechnical consultant during grading, especially where deep or drastic transitions are present.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm drainage swale and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slopes of 2 percent or greater is recommended.

## Section 7 - Compacted Fill

All fill materials should have fill quality, placement, conditioning and compaction as specified below or as approved by the geotechnical consultant.

### 7.1 Fill Material Quality

Excavated on-site or import materials which are acceptable to the geotechnical consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement. All import materials anticipated for use on-site should be sampled tested and approved prior to and placement is in conformance with the requirements outlined.

Rocks 12 inches in maximum and smaller may be utilized within compacted fill provided sufficient fill material is placed and thoroughly compacted over and around all rock to effectively fill rock voids. The amount of rock should not exceed 40 percent by dry weight passing the 3/4-inch sieve. The geotechnical consultant may vary those requirements as field conditions dictate.

Where rocks greater than 12 inches but less than four feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the recommendations below. Rocks greater than four feet should be broken down or disposed off-site.

#### 7.2 Placement of Fill

Prior to placement of fill material, the geotechnical consultant should observe and approve the area to receive fill. After observation and approval, the exposed ground surface should be scarified to a depth of 6 to 8 inches. The scarified material should be conditioned (i.e. moisture added or air dried by continued discing) to achieve a moisture content at or slightly above optimum moisture conditions and compacted to a minimum of 90 percent of the maximum density or as otherwise recommended in the soils report or by appropriate government agencies.

Compacted fill should then be placed in thin horizontal lifts not exceeding eight inches in loose thickness prior to compaction. Each lift should be moisture conditioned as needed, thoroughly blended to achieve a consistent moisture content at or slightly above optimum and thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials and weather conditions.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal: vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least six-foot wide benches and a minimum of four feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area after keying and benching until the geotechnical consultant has reviewed the area. Material generated by the benching operation should be moved sufficiently away from



the bench area to allow for the recommended review of the horizontal bench prior to placement of fill.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface or previously compacted fill should be processed by scarification, moisture conditioning as needed to at or slightly above optimum moisture content, thoroughly blended and recompact to a minimum of 90 percent of laboratory maximum dry density. Where unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be over-excavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

Rocks 12 inch in maximum dimension and smaller may be utilized in the compacted fill provided the fill is placed and thoroughly compacted over and around all rock. No oversize material should be used within 3 feet of finished pad grade and within 1 foot of other compacted fill areas. Rocks 12 inches up to four feet maximum dimension should be placed below the upper 10 feet of any fill and should not be closer than 15 feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures or deep utilities are proposed. Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so those successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the geotechnical consultant at the time of placement.

The contractor should assist the geotechnical consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill. The contractor should provide this work at no additional cost to the owner or contractor's client.

Fill should be tested by the geotechnical consultant for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Test D 1556-00, D 2922-04. Tests should be conducted at a minimum of approximately two vertical feet or approximately 1,000 to 2,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the geotechnical consultant.

### 7.3 Fill Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal: vertical).

Except as specifically recommended in these grading guidelines compacted fill slopes should be over-built two to five feet and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the geotechnical consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

At the discretion of the geotechnical consultant, slope face compaction may be attempted by conventional construction procedures including backrolling. The procedure must create a firmly compacted material throughout the entire depth of the slope face to the surface of the previously compacted firm fill intercore.

During grading operations, care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately established desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not

exceeding four feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly dozer trackrolled.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished using a berm and pad gradient of at least two percent.

### Section 8 - Trench Backfill

Utility and/or other excavation of trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 90 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to one foot wide and two feet deep may be backfilled with sand and consolidated by jetting, flooding or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of backfill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the contractor may elect the utilization of light weight mechanical compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review of the geotechnical consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the geotechnical consultant. Clean granular backfill and/or bedding are not recommended in slope areas.

### Section 9 - Drainage

Where deemed appropriate by the geotechnical consultant, canyon subdrain systems should be installed in accordance with CTE's recommendations during grading.

Typical subdrains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications.

Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, and concrete swales).

For drainage in extensively landscaped areas near structures, (i.e., within four feet) a minimum of 5 percent gradient away from the structure should be maintained. Pad drainage of at least 2 percent should be maintained over the remainder of the site.

Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns could be detrimental to slope stability and foundation performance.

### Section 10 - Slope Maintenance

#### 10.1 - Landscape Plants

To enhance surficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the southern California area and plants relative to native plants are generally desirable. Plants native to other semi-arid and arid areas may also be appropriate. A Landscape Architect should be the best party to consult regarding actual types of plants and planting configuration.

#### 10.2 - Irrigation

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.

Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.

#### 10.3 - Repair

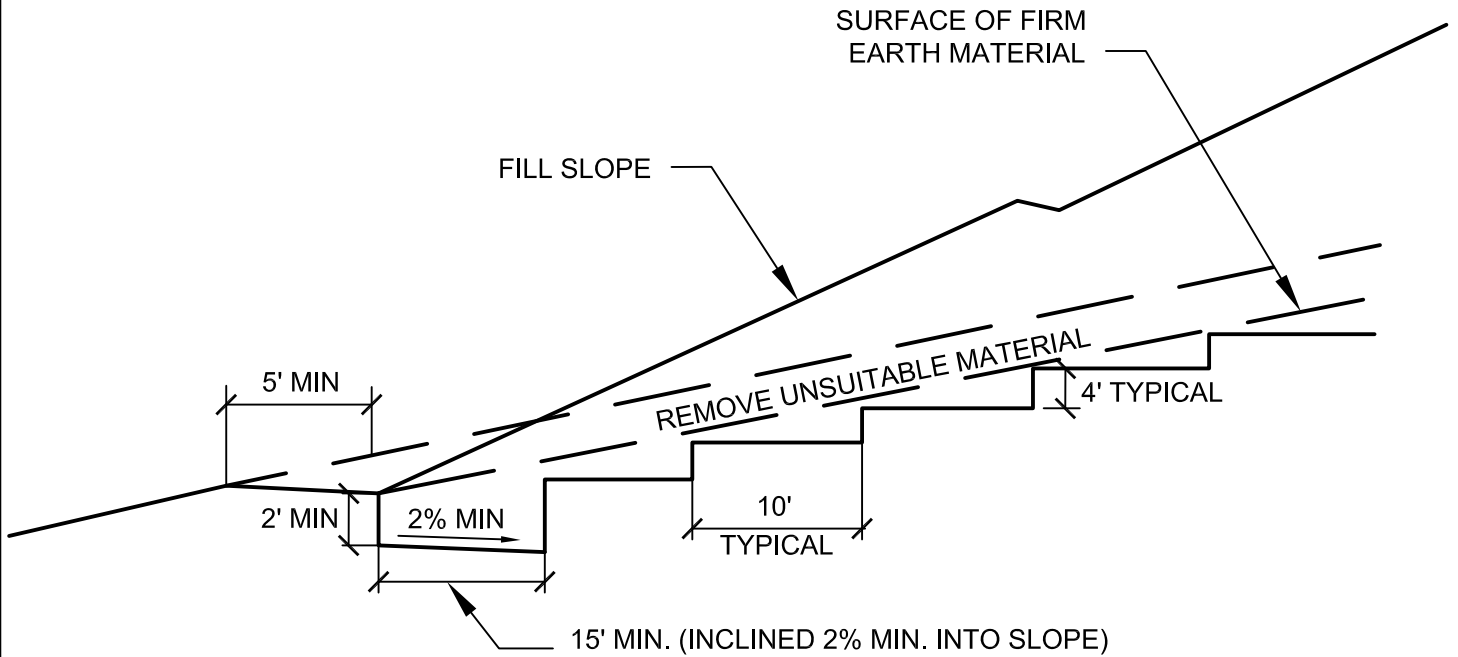
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period prior to landscape planting.

If slope failures occur, the geotechnical consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

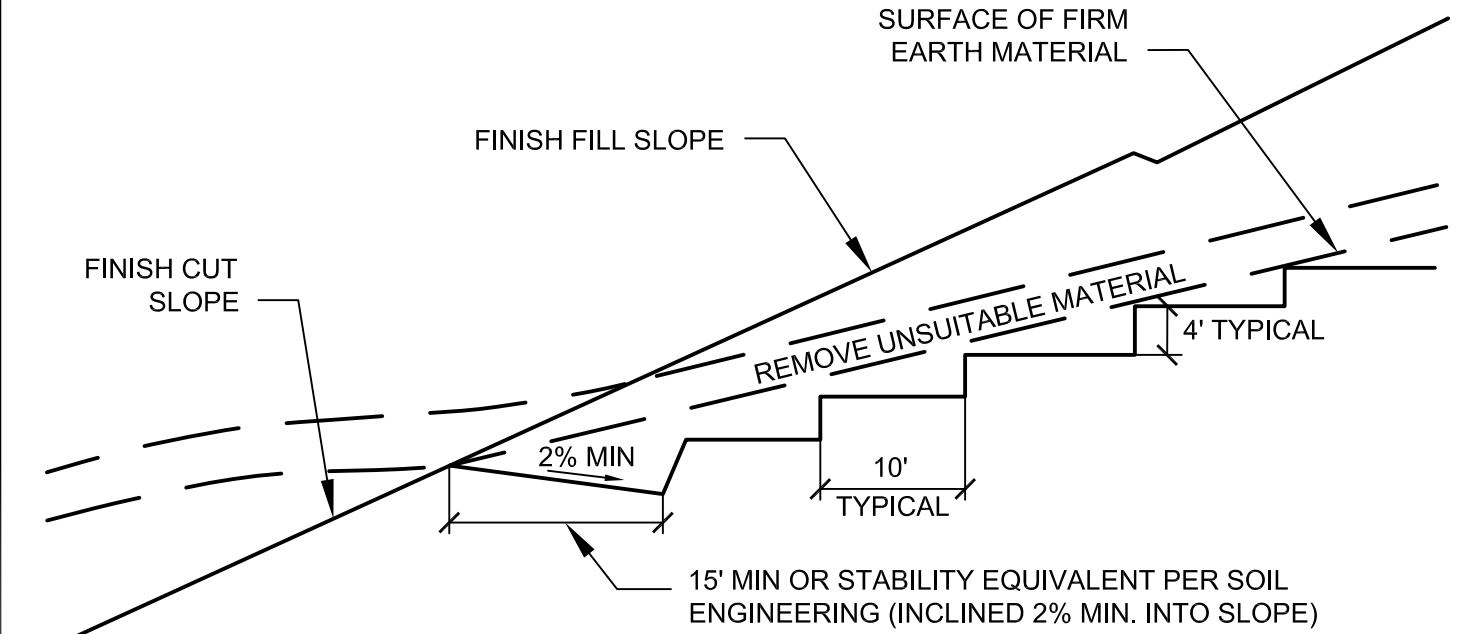
If slope failures occur as a result of exposure to period of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer one foot to three feet of a slope face).

## BENCHING FILL OVER NATURAL

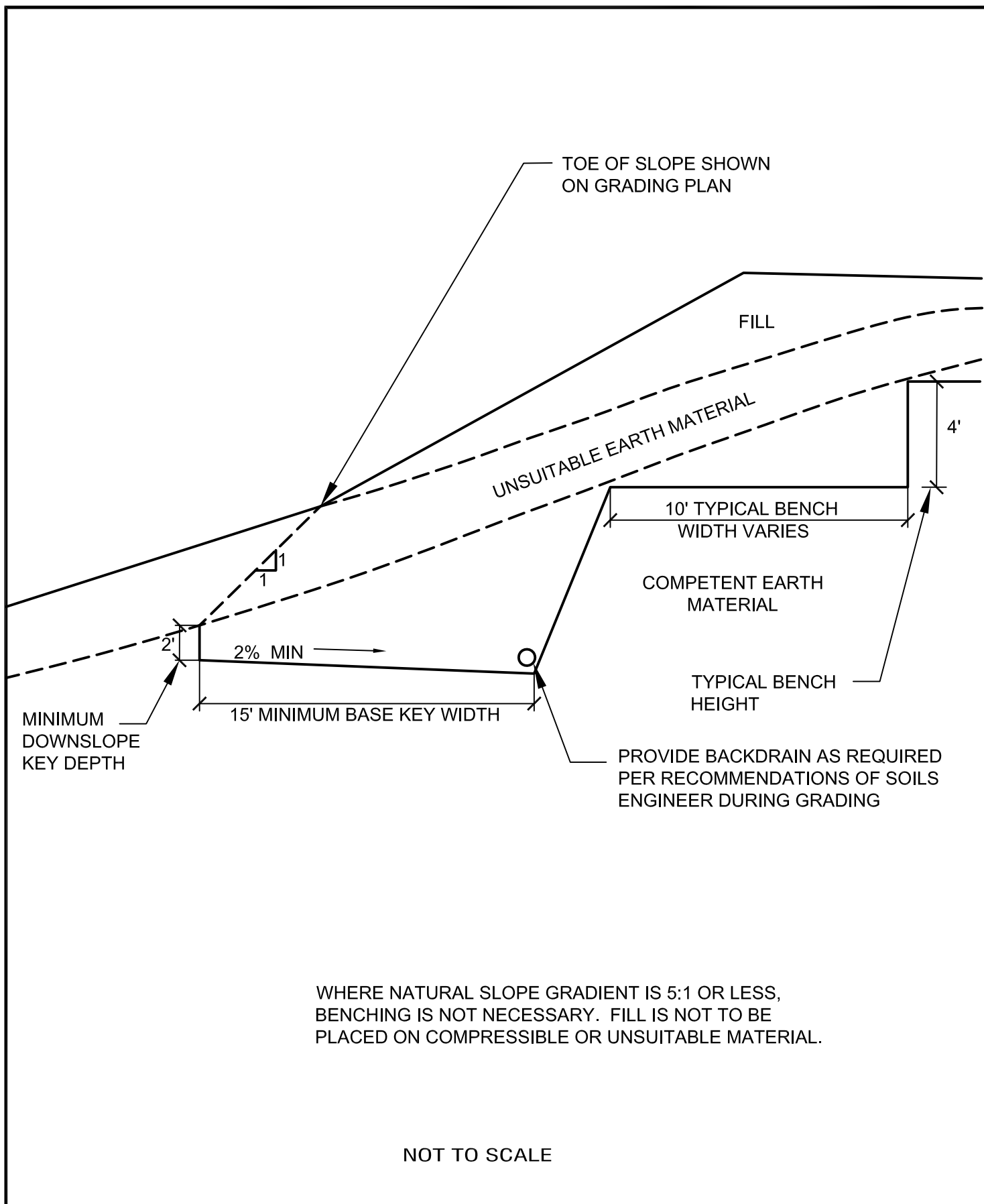


## BENCHING FILL OVER CUT



NOT TO SCALE

## **BENCHING FOR COMPACTED FILL DETAIL**



## FILL SLOPE ABOVE NATURAL GROUND DETAIL

REMOVE ALL TOPSOIL, COLLUVIUM,  
AND CREEP MATERIAL FROM  
TRANSITION

CUT/FILL CONTACT SHOWN  
ON GRADING PLAN

CUT/FILL CONTACT SHOWN  
ON "AS-BUILT"

NATURAL  
TOPOGRAPHY

CUT SLOPE\*

FILL

TOPSOIL, COLLUVIUM AND CREEP-REMOVE

4' TYPICAL

10' TYPICAL

BEDROCK OR APPROVED  
FOUNDATION MATERIAL

2% MIN

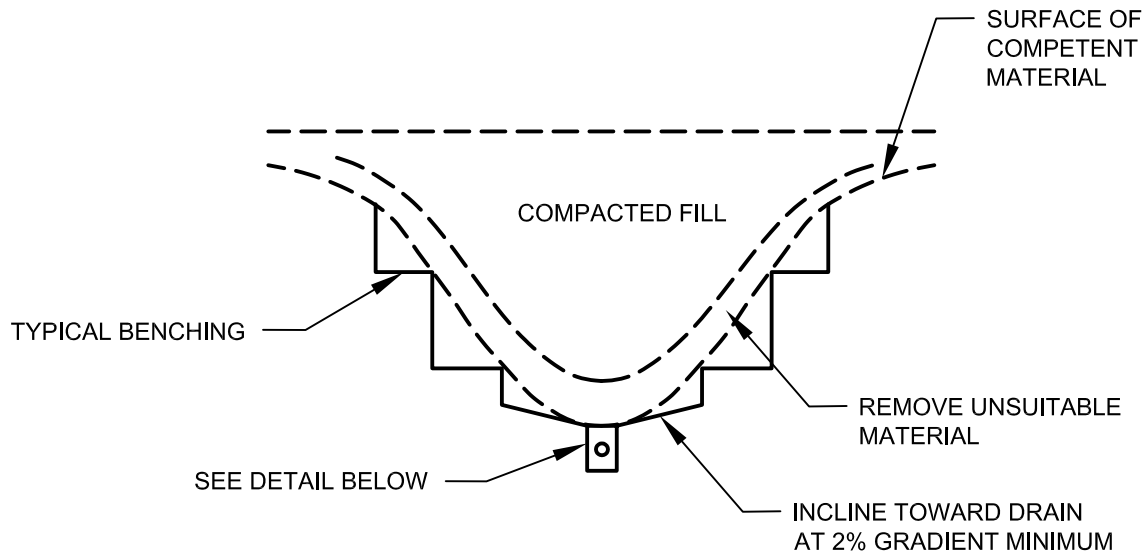
15' MINIMUM

\*NOTE: CUT SLOPE PORTION SHOULD BE  
MADE PRIOR TO PLACEMENT OF FILL

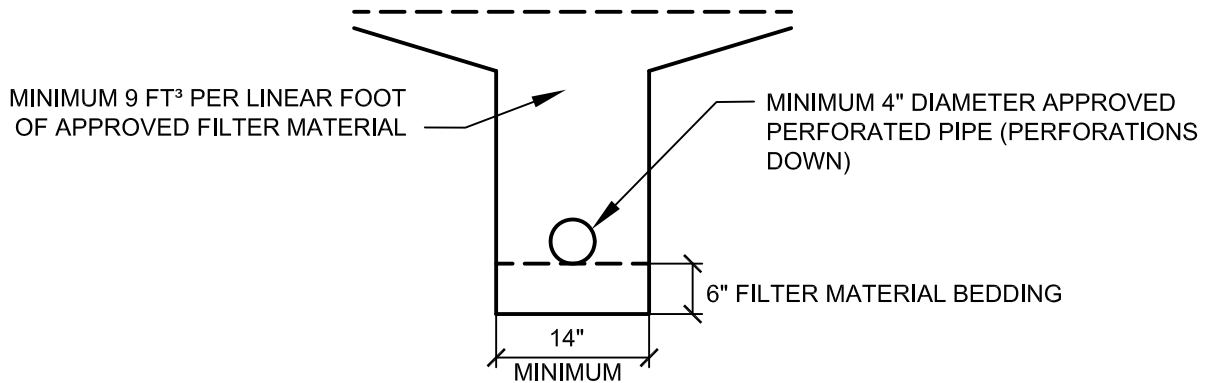
NOT TO SCALE

# FILL SLOPE ABOVE CUT SLOPE DETAIL





**DETAIL**



FILTER MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

<u>SIEVE SIZE</u>	<u>PERCENTAGE PASSING</u>
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 30	18-33
NO. 8	5-15
NO. 50	0-7
NO. 200	0-3

APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi

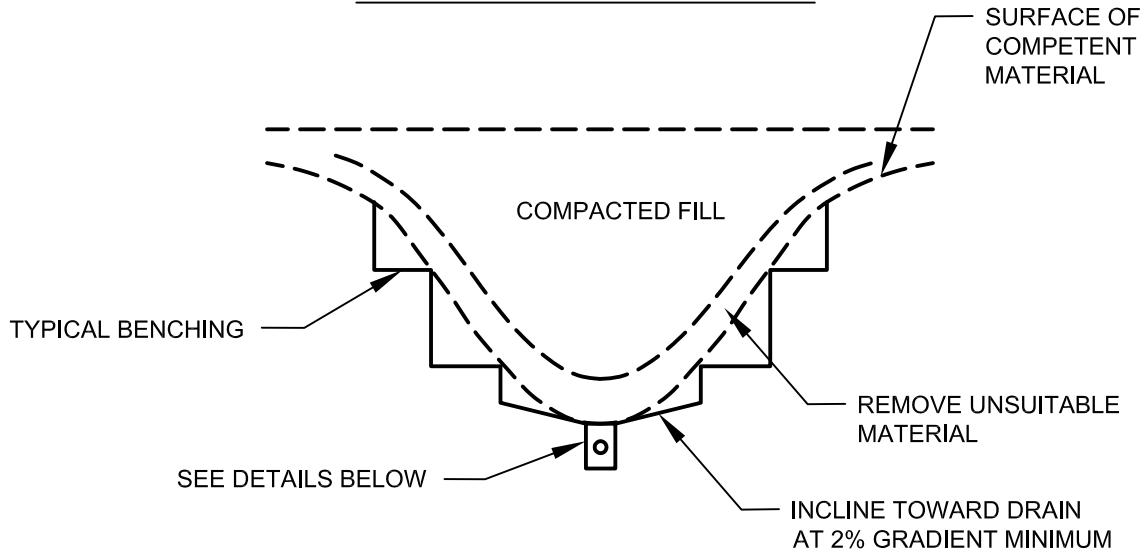
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

<u>LENGTH OF RUN</u>	<u>PIPE DIAMETER</u>
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

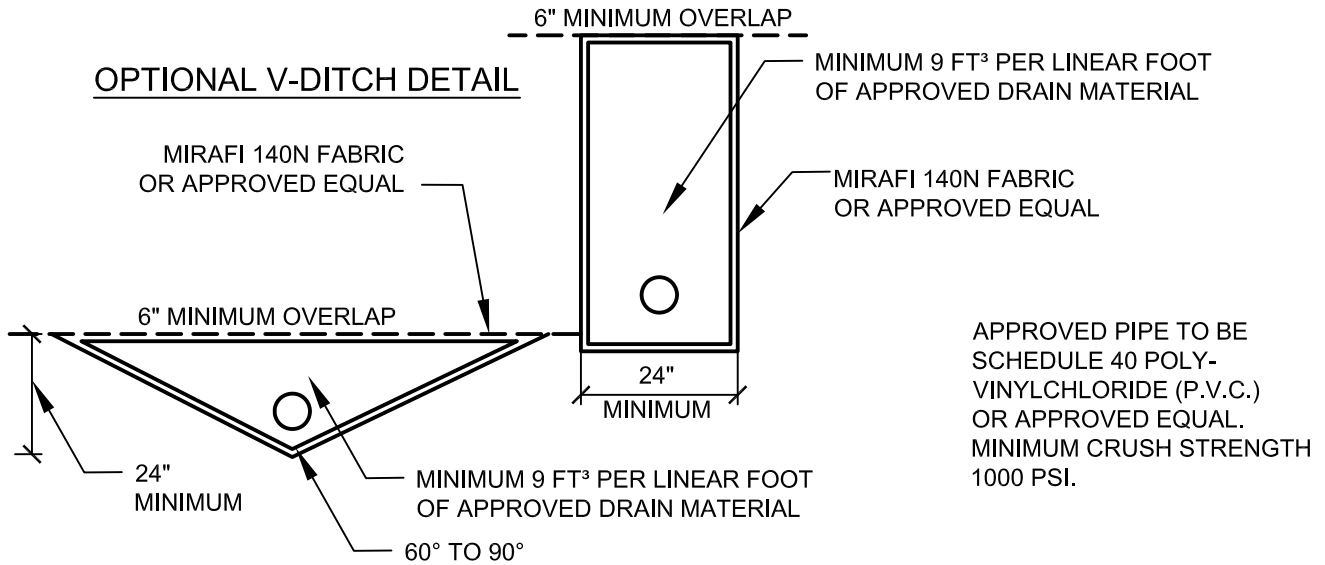
NOT TO SCALE

**TYPICAL CANYON SUBDRAIN DETAIL**

## CANYON SUBDRAIN DETAILS



## TRENCH DETAILS



DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

<u>SIEVE SIZE</u>	<u>PERCENTAGE PASSING</u>
1 ½"	88-100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

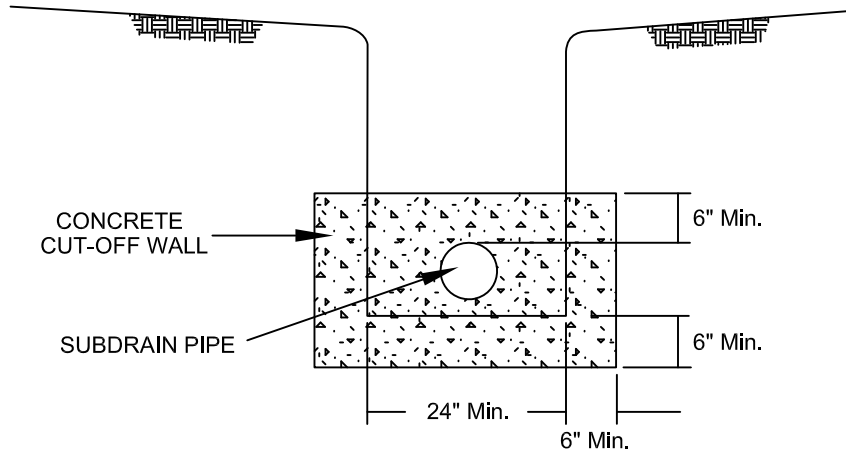
<u>LENGTH OF RUN</u>	<u>PIPE DIAMETER</u>
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

NOT TO SCALE

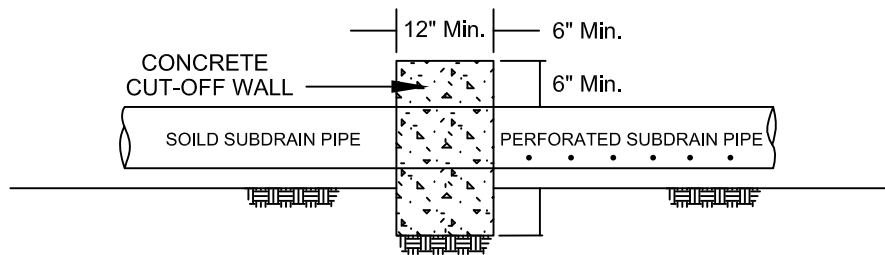
# GEOFABRIC SUBDRAIN

STANDARD SPECIFICATIONS FOR GRADING

### FRONT VIEW



### SIDE VIEW

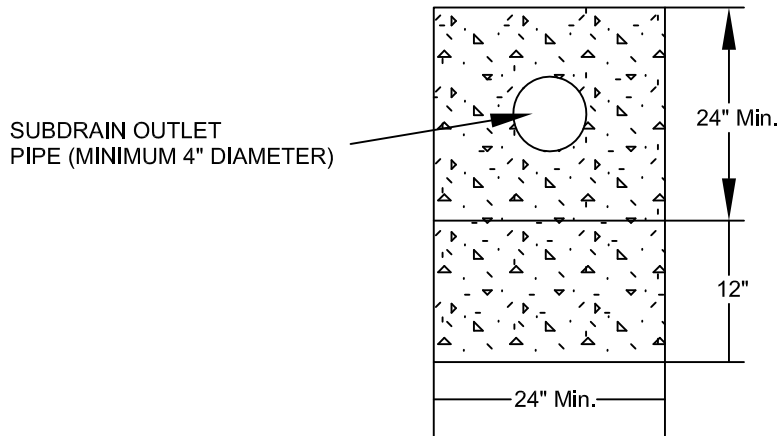


NOT TO SCALE

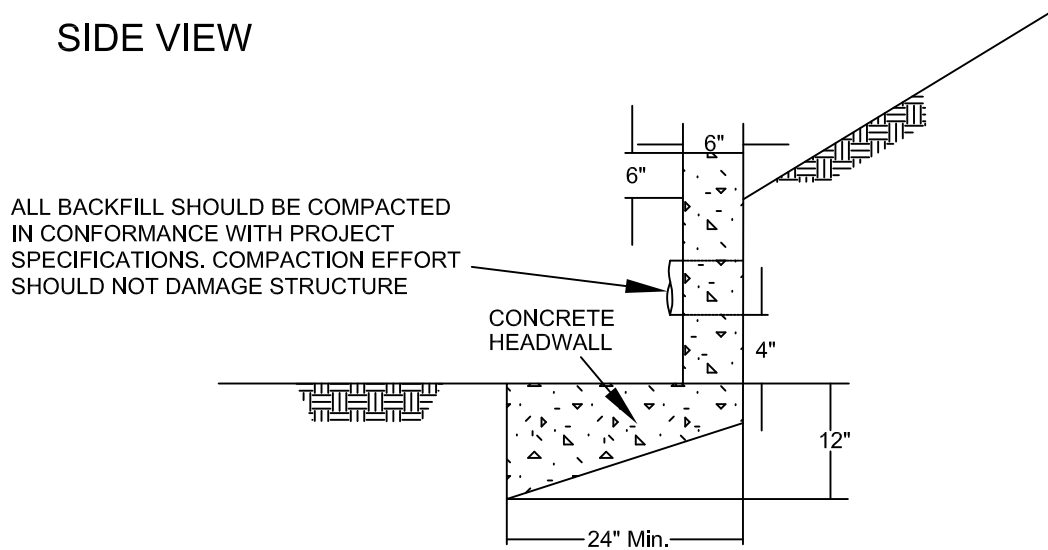
## RECOMMENDED SUBDRAIN CUT-OFF WALL

STANDARD SPECIFICATIONS FOR GRADING

# FRONT VIEW



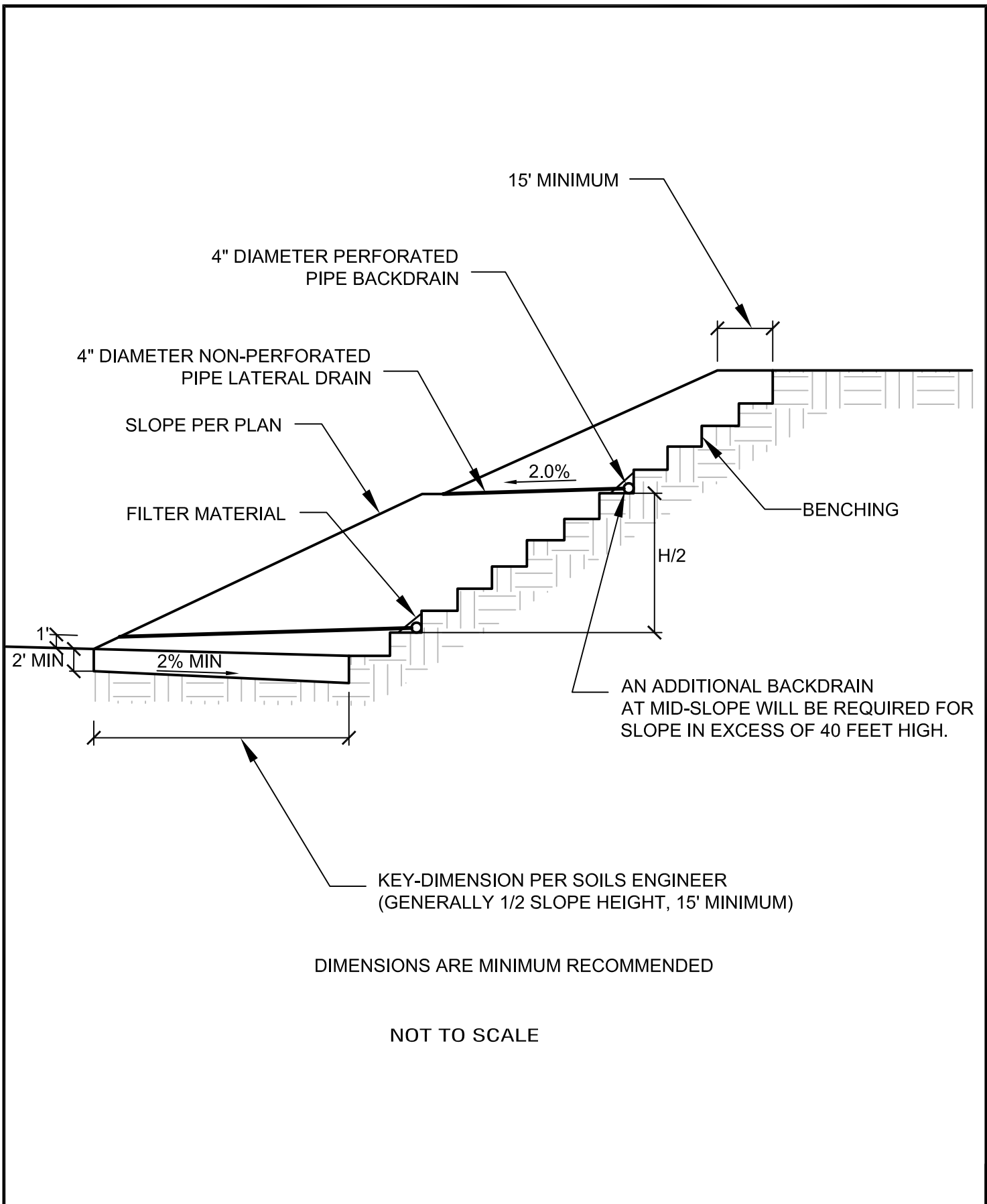
# SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF SLOPE  
OR INTO CONTROLLED SURFACE DRAINAGE DEVICE  
ALL DISCHARGE SHOULD BE CONTROLLED  
THIS DETAIL IS A MINIMUM DESIGN AND MAY BE  
MODIFIED DEPENDING UPON ENCOUNTERED  
CONDITIONS AND LOCAL REQUIREMENTS

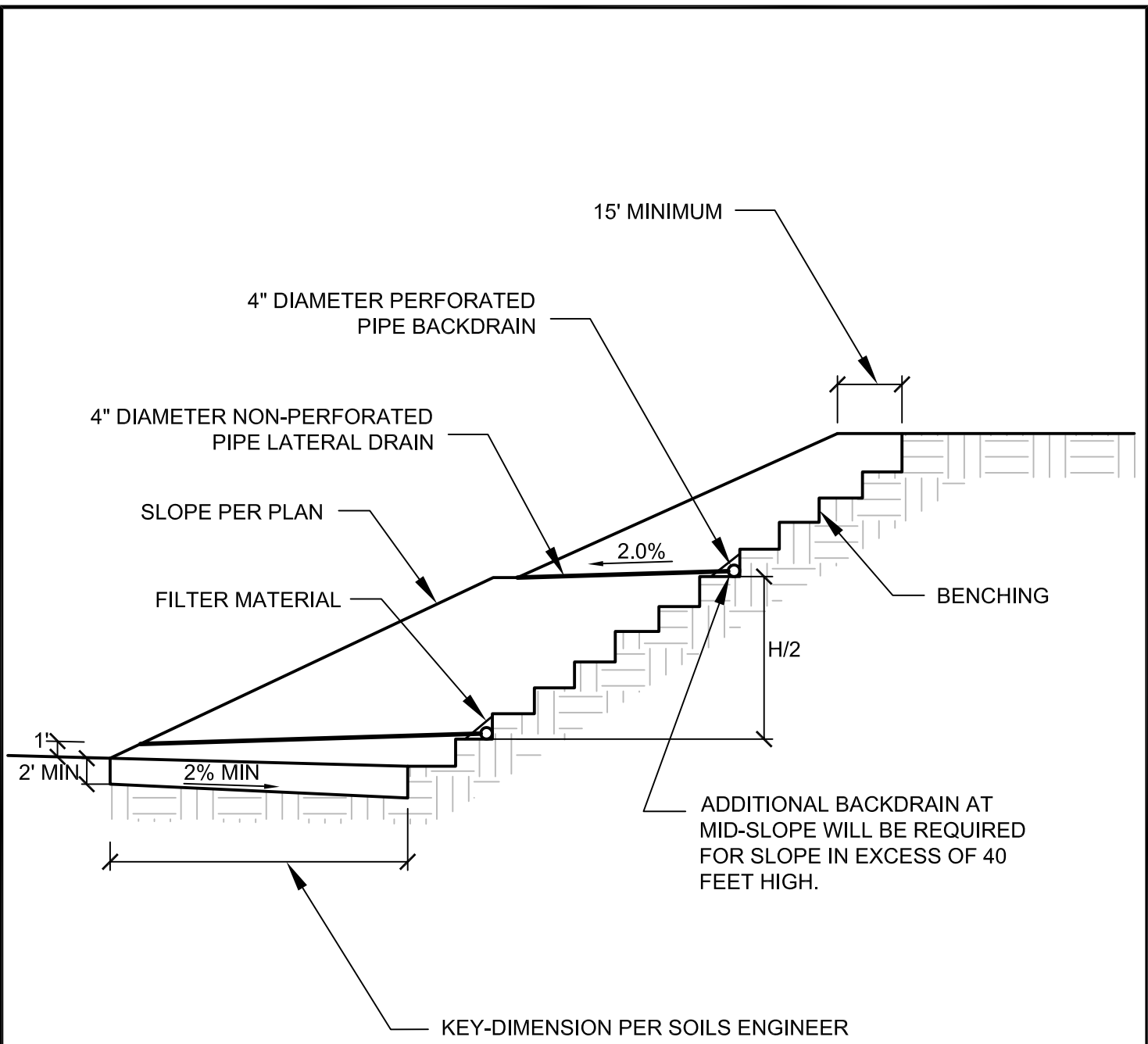
NOT TO SCALE

# TYPICAL SUBDRAIN OUTLET HEADWALL DETAIL



# TYPICAL SLOPE STABILIZATION FILL DETAIL

STANDARD SPECIFICATIONS FOR GRADING

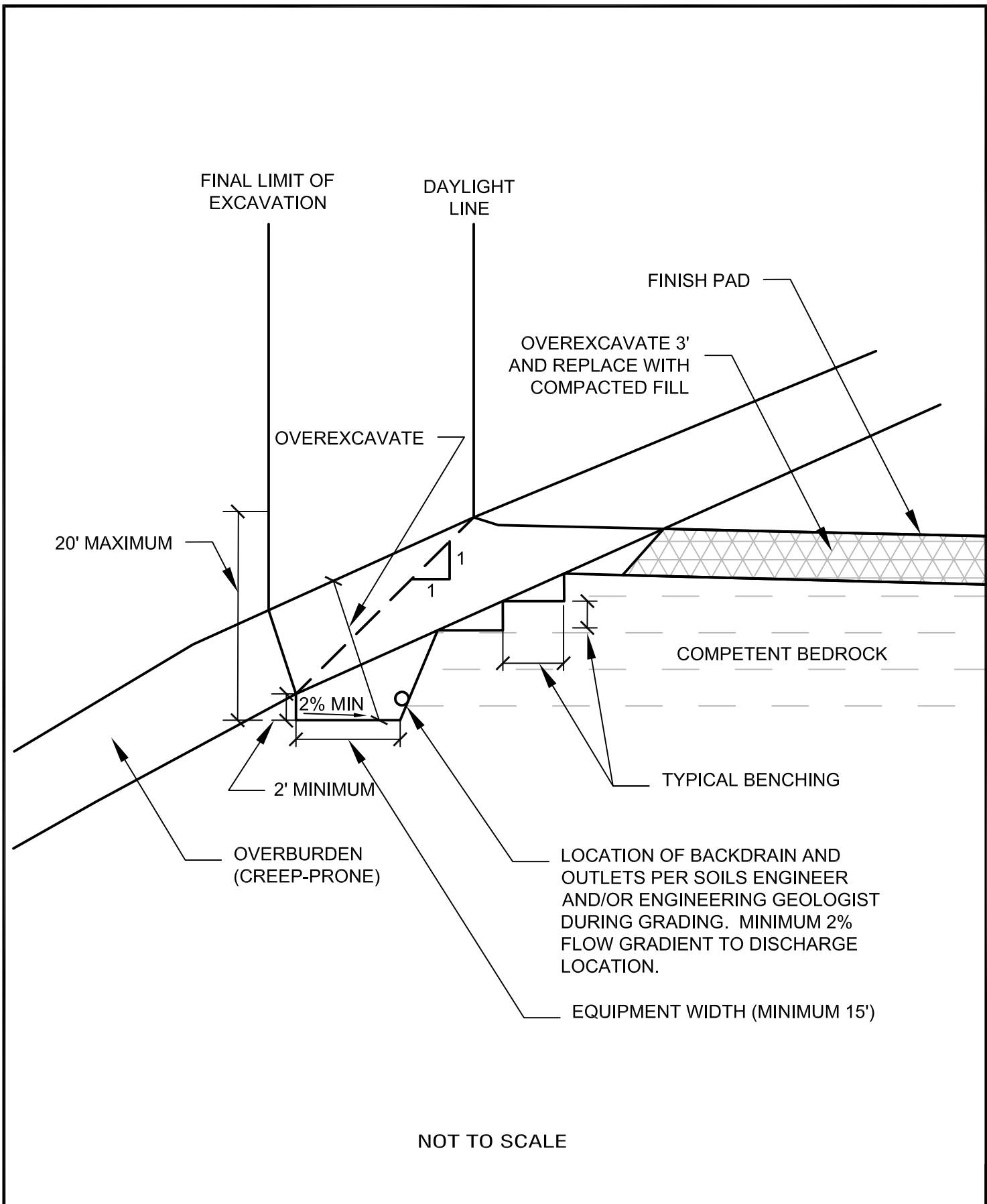


DIMENSIONS ARE MINIMUM RECOMMENDED

NOT TO SCALE

# TYPICAL BUTTRESS FILL DETAIL

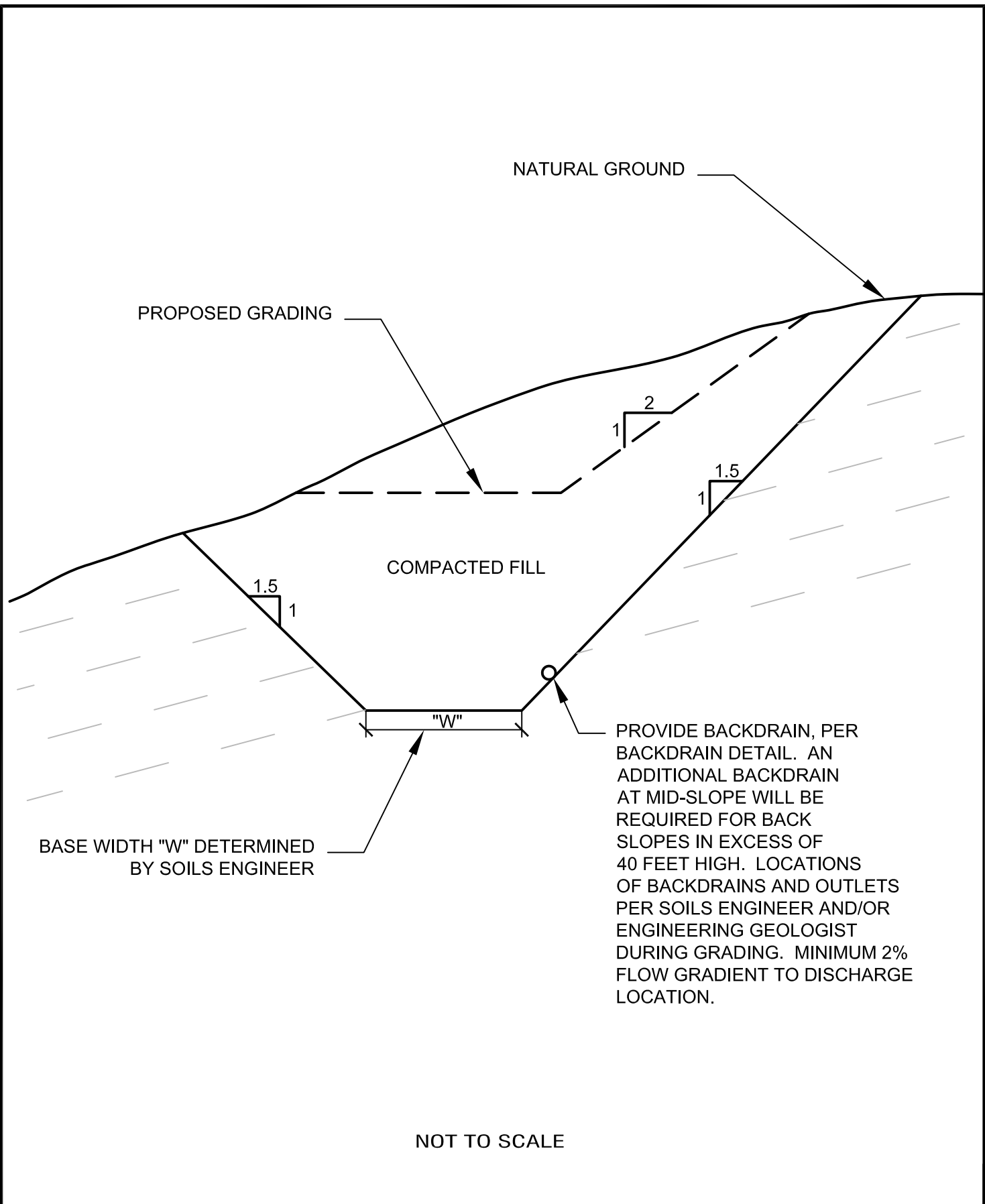
STANDARD SPECIFICATIONS FOR GRADING



NOT TO SCALE

# DAYLIGHT SHEAR KEY DETAIL

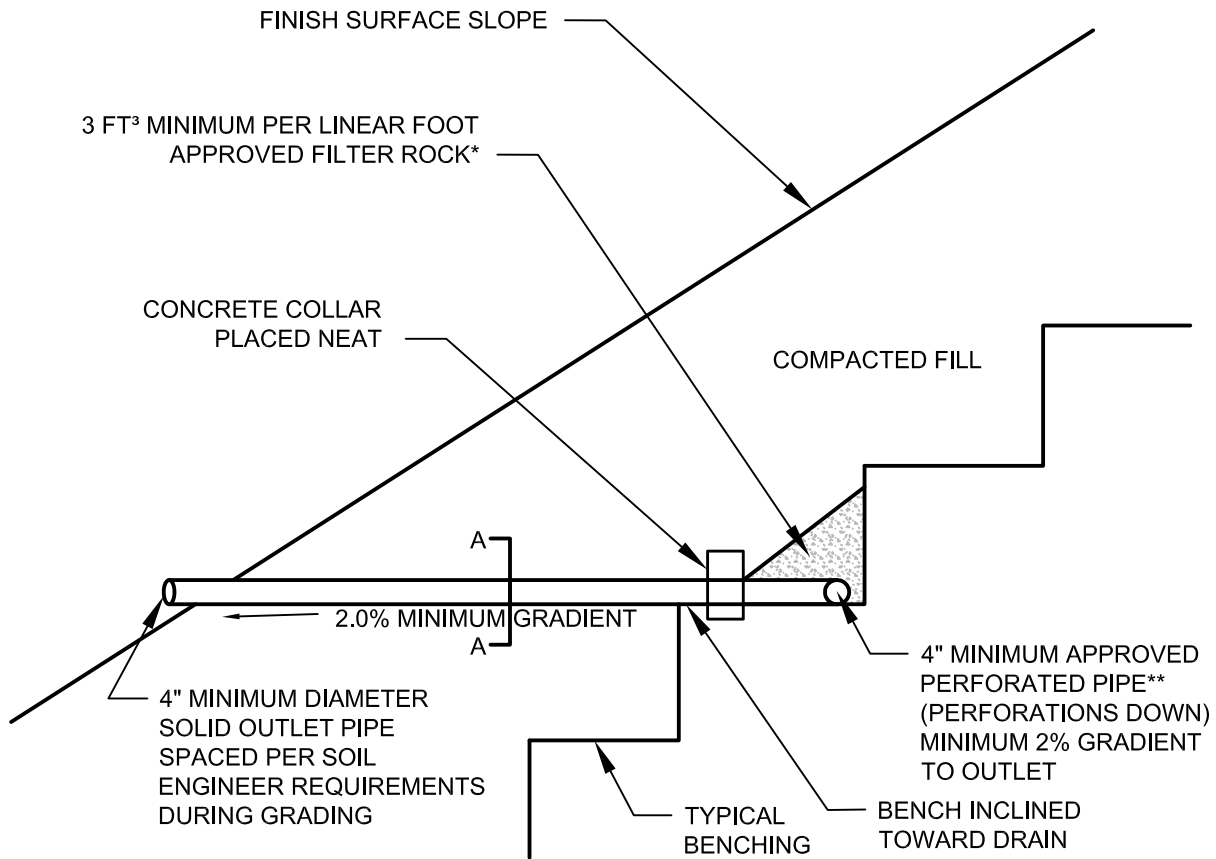
STANDARD SPECIFICATIONS FOR GRADING



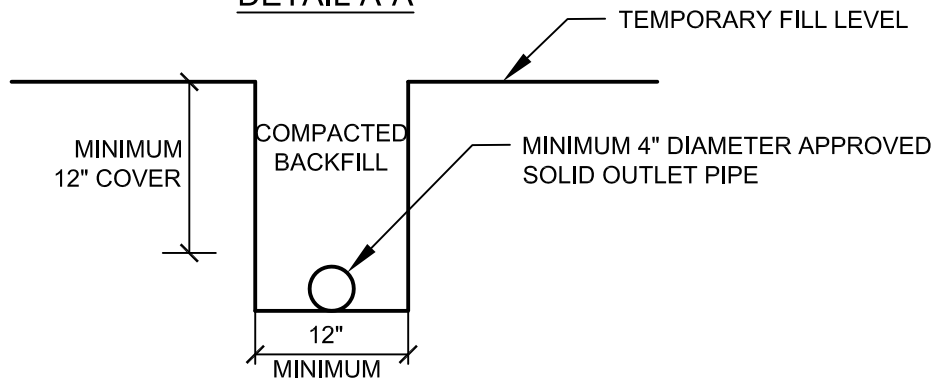
## TYPICAL SHEAR KEY DETAIL

STANDARD SPECIFICATIONS FOR GRADING





**DETAIL A-A**



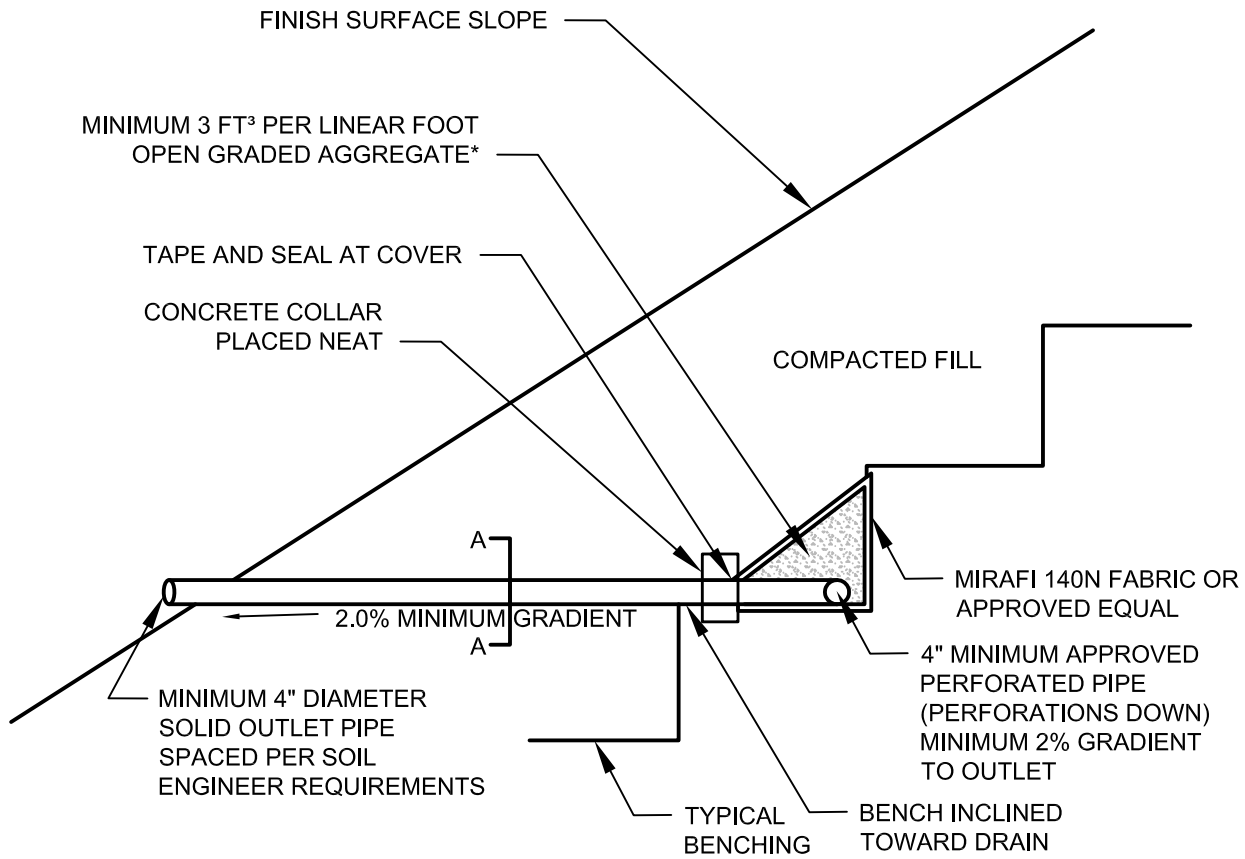
\*\*APPROVED PIPE TYPE:  
 SCHEDULE 40 POLYVINYL CHLORIDE  
 (P.V.C.) OR APPROVED EQUAL.  
 MINIMUM CRUSH STRENGTH 1000 PSI

\*FILTER ROCK TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

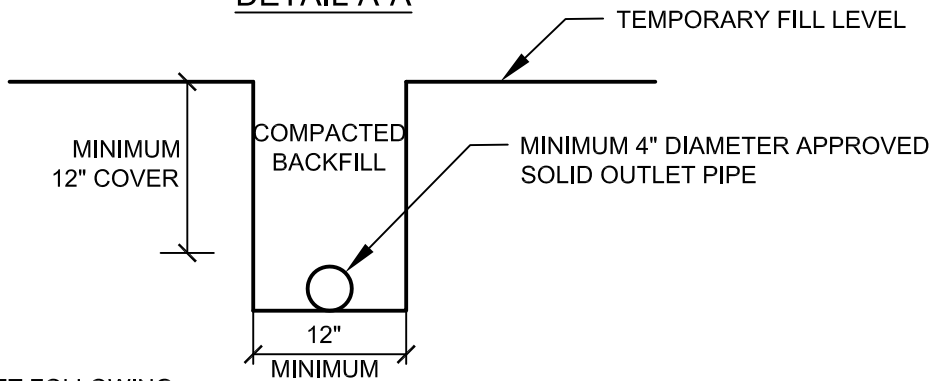
SIEVE SIZE	PERCENTAGE PASSING
1"	100
3/4"	90-100
3/8"	40-100
NO. 4	25-40
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

NOT TO SCALE

**TYPICAL BACKDRAIN DETAIL**



**DETAIL A-A**



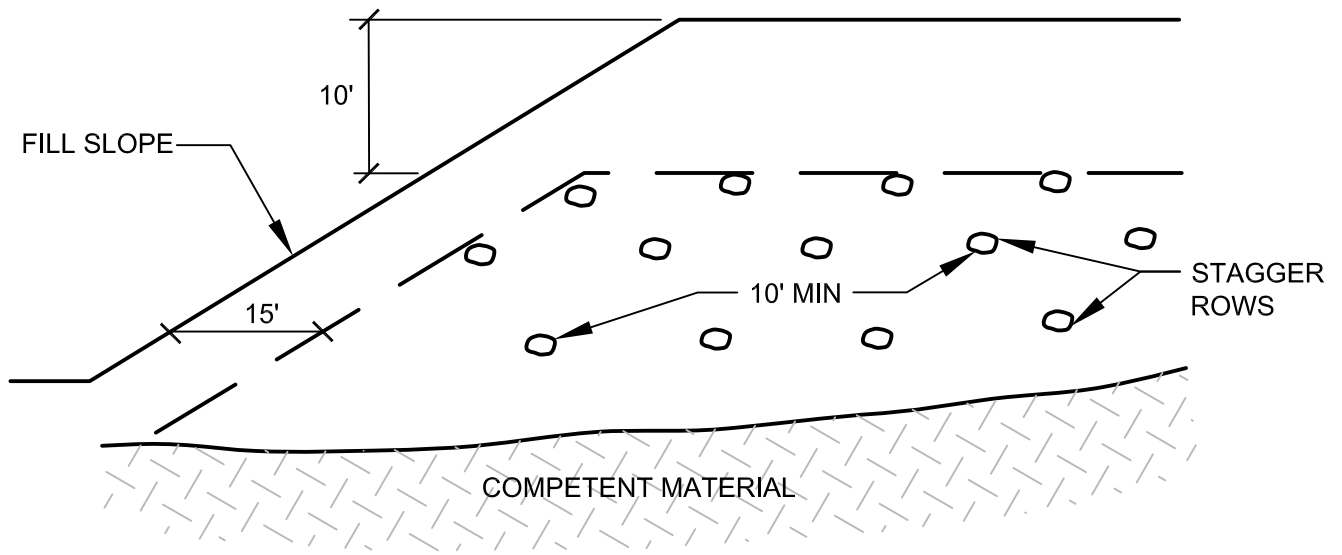
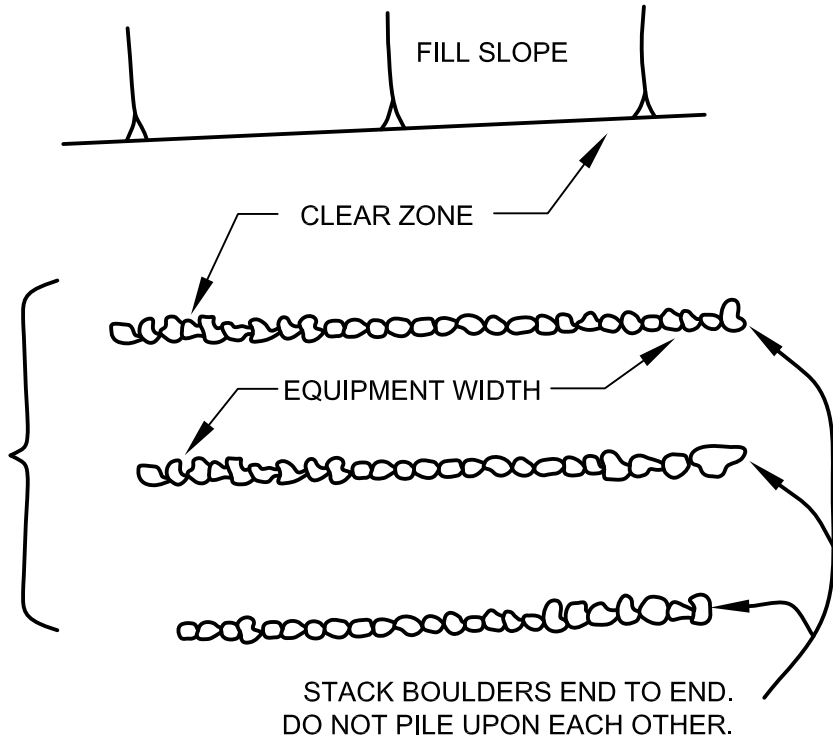
\*NOTE: AGGREGATE TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 1/2"	100
1"	5-40
3/4"	0-17
3/8"	0-7
NO. 200	0-3

NOT TO SCALE

**BACKDRAIN DETAIL (GEOFRABIC)**

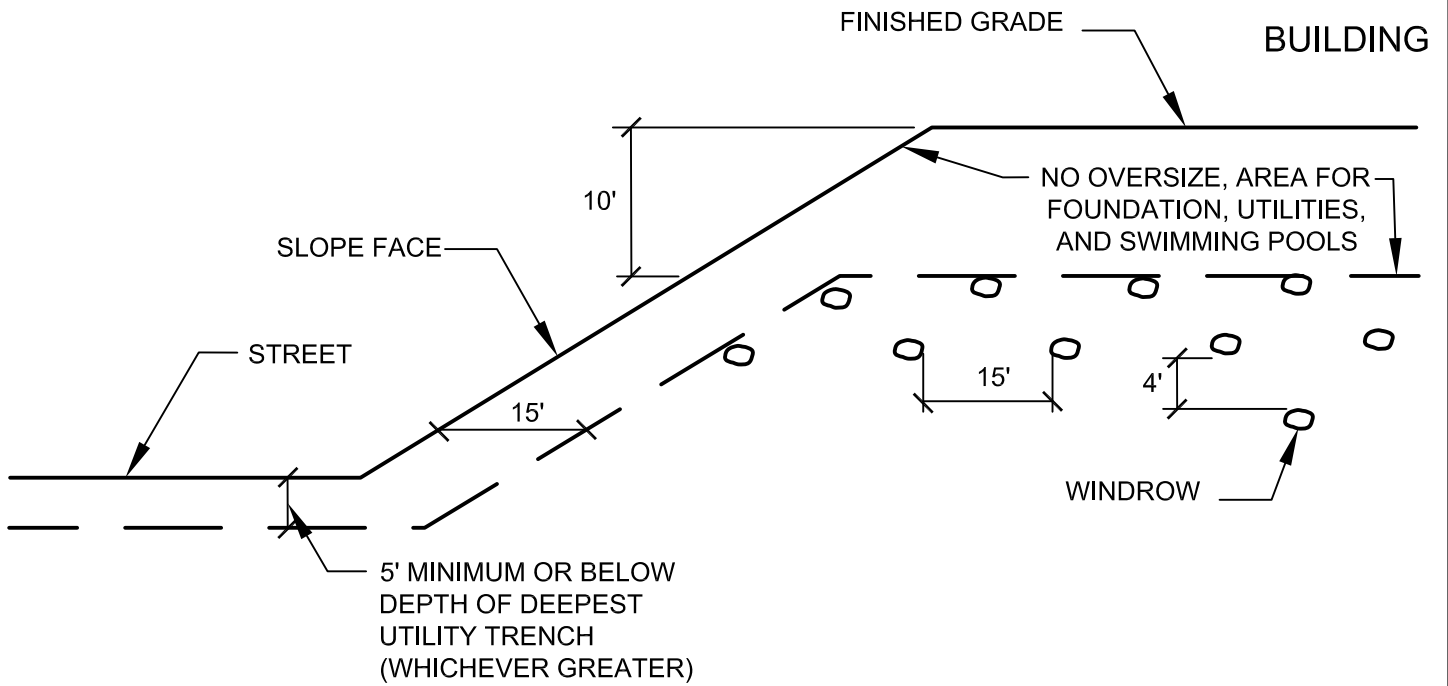
SOIL SHALL BE PUSHED OVER  
ROCKS AND FLOODED INTO  
VOIDS. COMPACT AROUND  
AND OVER EACH WINDROW.



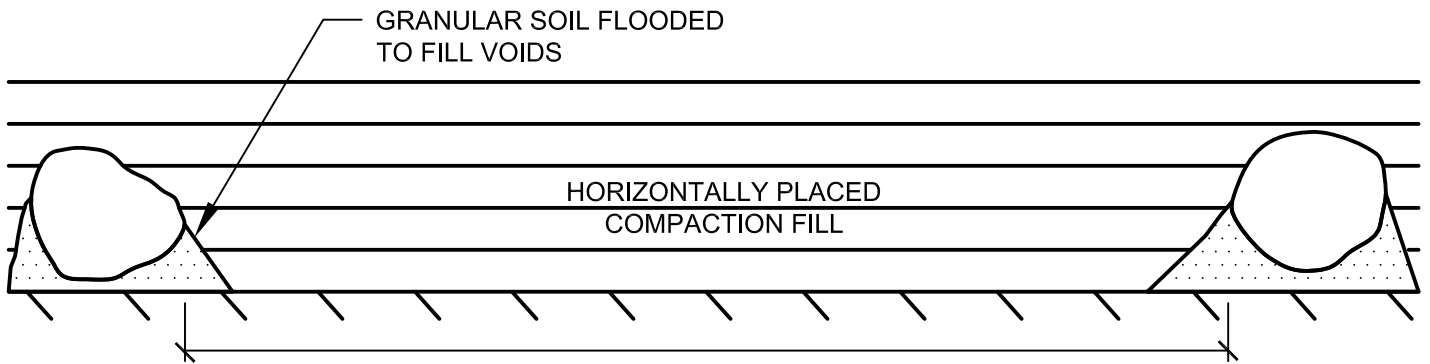
NOT TO SCALE

## ROCK DISPOSAL DETAIL

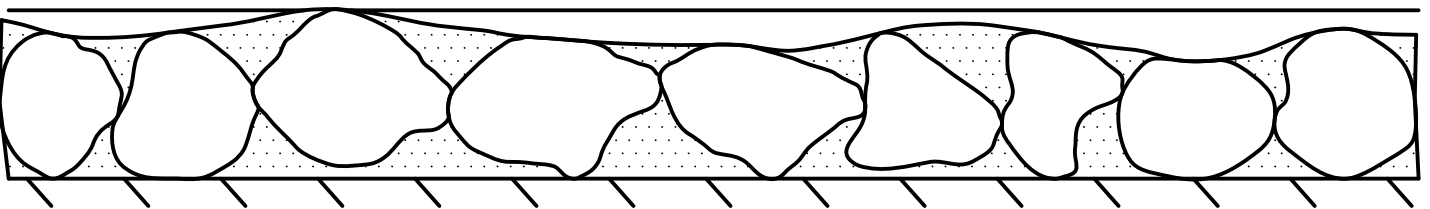
STANDARD SPECIFICATIONS FOR GRADING



TYPICAL WINDROW DETAIL (EDGE VIEW)



PROFILE VIEW



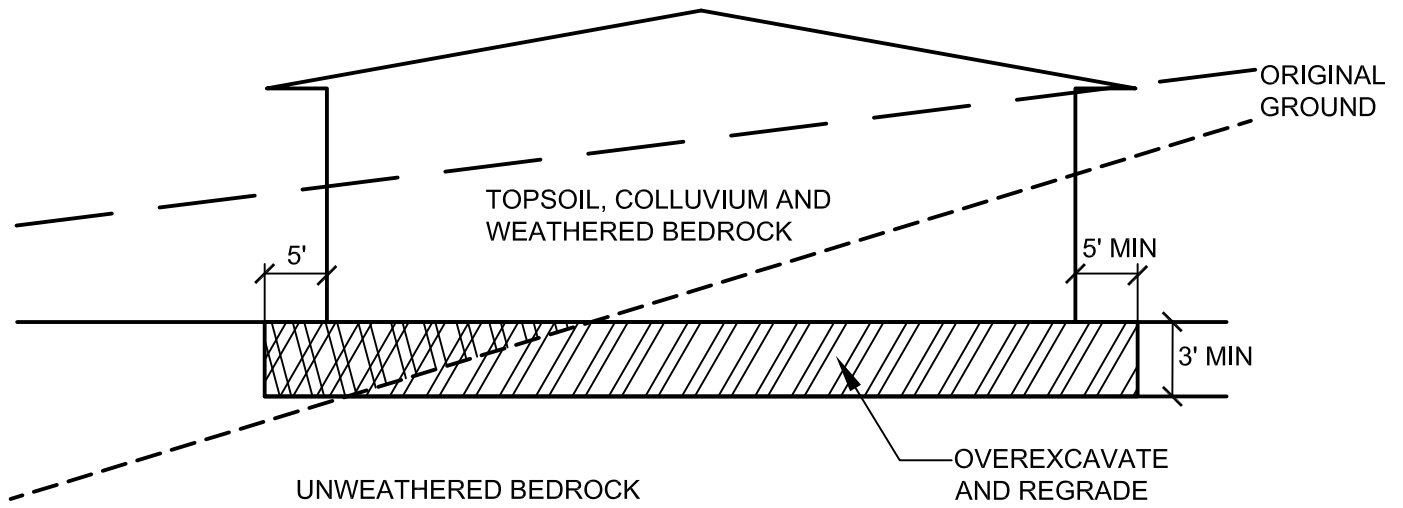
NOT TO SCALE

## ROCK DISPOSAL DETAIL

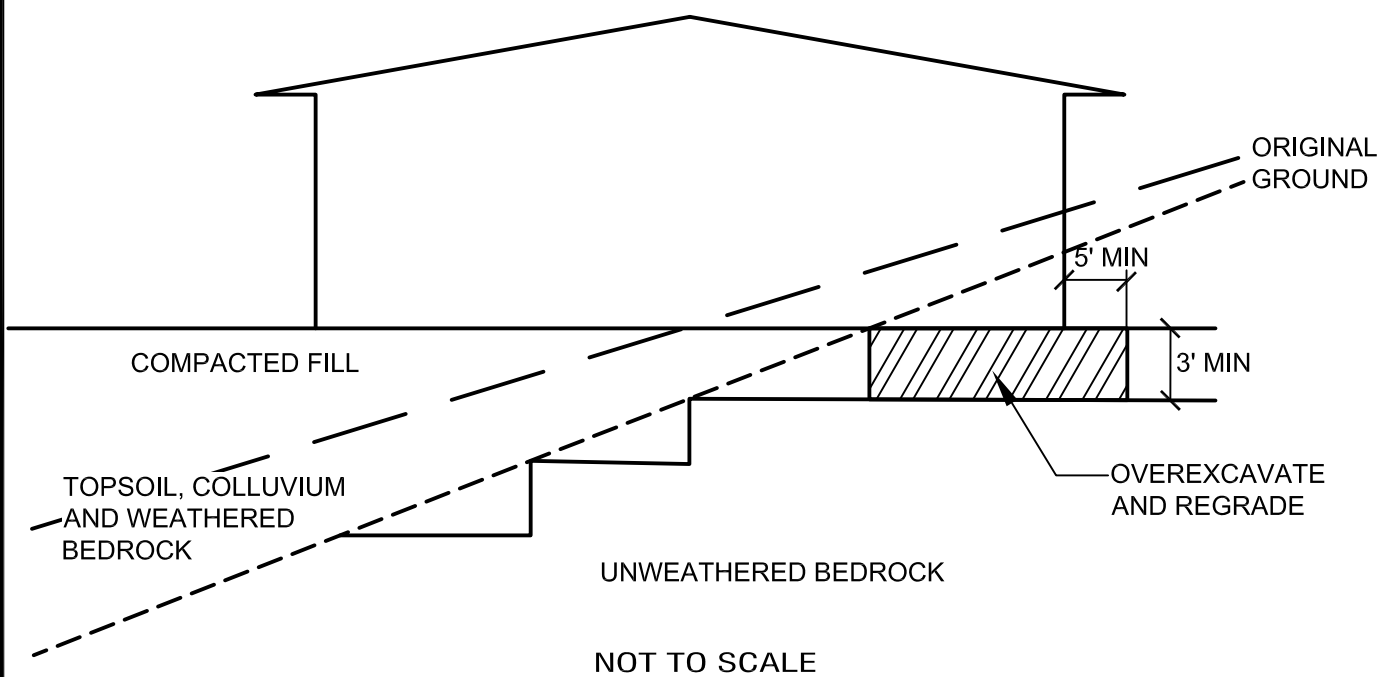
STANDARD SPECIFICATIONS FOR GRADING

# GENERAL GRADING RECOMMENDATIONS

## CUT LOT



## CUT/FILL LOT (TRANSITION)



NOT TO SCALE

## TRANSITION LOT DETAIL

APPENDIX “B”

HAZARDOUS MATERIALS REPORT



**ASBESTOS & LEAD  
INSPECTION REPORT**

**S E P T E M B E R 1 5 , 2 0 2 0**

**BEM PROJECT NO. 20-45397**

Site

**PO #210241  
Osborn Elementary  
210 North Soderquist Road  
Turlock, CA 95380**

Prepared For

**Mr. Scott Richardson  
Turlock Unified School District  
P.O. Box 819013  
Turlock, CA 95380**

Prepared By

**BOVEE ENVIRONMENTAL MANAGEMENT, INC.**  
1900 McHenry Ave., Ste 201, Escalon, CA 95320  
Escalon 209-847-3800 • Fresno 559-264-3800 • Bakersfield 661-246-2110 • Sacramento 916-564-3838

September 15, 2020

Mr. Scott Richardson  
 Turlock Unified School District  
 P.O. Box 819013  
 Turlock, CA 95380

Mr. Richardson:

Bovee Environmental Management, Inc. (BEM) is pleased to provide this Asbestos & Lead Paint Survey Report regarding our asbestos and lead inspection services at the Project Site summarized below.

**PROJECT SUMMARY TABLE**

PROJECT SITE NAME	PROJECT SITE LOCATION	PROJECT SITE NOTE
Osborn Elementary	210 North Soderquist Road, Turlock, CA 95380	Renovation
INSPECTION TYPE	INSPECTED AREAS	INSPECTION DATE
Commercial	North & South End Portables, "I" Building & Admin Building	September 9, 2020

**ASBESTOS INSPECTION SUMMARY**

Samples of building materials considered to be *suspect asbestos containing materials\** were identified and collected from the inspected renovation areas referenced above to determine their asbestos content. Samples collected from specific areas for the purpose of renovation activities are determined by the client. There may be areas within the Subject Site that were not inspected and may contain additional suspect asbestos containing materials that were not sampled. Through proper chain-of-custody the collected samples are sent to Eurofins CEI Laboratories for polarized light microscopy (PLM) analysis. A summary of all materials sampled and corresponding analytical results are listed below. Detailed information regarding sample number, actual sample location and analytical methods can be reviewed in attachments A and B.

**SAMPLE COLLECTION SUMMARY**

\*See definitions on page 5/6.

**South End Portables; 210 N. Soderquist Road, Turlock, CA 95380**

#	MATERIAL SAMPLED	MATERIAL LOCATION	ASBESTOS	CATEGORY	SQ.FT.
45397-01	Linoleum	C3 & C2; Floors Throughout	None Detected	-	-
45397-02	Mastic	C3 & C2; Floors Throughout	None Detected	-	-
45397-03	Linoleum	C4, C5 & C6; Various Floors Throughout	None Detected	-	-
45397-04	Mastic	C4, C5 & C6; Various Floors Throughout	None Detected	-	-
45397-05	Carpet Mastic	Various Floors Throughout	None Detected	-	-

Sample Collection Summary table continued on page 3.



**South End Portables; 210 N. Soderquist Road, Turlock, CA 95380 (Continued...)**

#	MATERIAL SAMPLED	MATERIAL LOCATION	ASBESTOS	CATEGORY	SQ. FT.
45397-06	Carpet Mastic	Various Floors Throughout	None Detected	-	-
45397-07	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-08	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-09	Fiber Board	Walls Throughout	None Detected	-	-
45397-10	Fiber Board	Walls Throughout	None Detected	-	-
45397-11	Wall Panel Mastic	Walls Throughout	None Detected	-	-
45397-12	Wall Panel Mastic	Walls Throughout	None Detected	-	-
45397-13	Sheetrock	Walls Throughout Beneath Wall Panels	None Detected	-	-
45397-14	Sheetrock	Walls Throughout Beneath Wall Panels	None Detected	-	-
45397-15	2' x 4' Ceiling Panels	Ceilings Throughout	None Detected	-	-
45397-16	2' x 4' Ceiling Panels	Ceilings Throughout	None Detected	-	-
45397-17	Concrete	Foundation	None Detected	-	-
45397-18	Concrete	Foundation	None Detected	-	-
45397-19	Paint	Exterior Walls	None Detected	-	-
45397-20	Paint	Exterior Walls	None Detected	-	-

**North End Portables; 210 N. Soderquist Road, Turlock, CA 95380**

#	MATERIAL SAMPLED	MATERIAL LOCATION	ASBESTOS	CATEGORY	SQ. FT.
45397-21	12" x 12" VFT	Various Floors Throughout	None Detected	-	-
45397-22	Mastic	Various Floors Throughout	None Detected	-	-
45397-23	Carpet Mastic	Various Floors Throughout	None Detected	-	-
45397-24	Carpet Mastic	Various Floors Throughout	None Detected	-	-
45397-25	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-26	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-27	Fiber Board	Walls Throughout	None Detected	-	-
45397-28	Fiber Board	Walls Throughout	None Detected	-	-
45397-29	Wall Panel Mastic	Walls Throughout	None Detected	-	-
45397-30	Wall Panel Mastic	Walls Throughout	None Detected	-	-
45397-31	Sheetrock	Walls Throughout Beneath Wall Panels	None Detected	-	-
45397-32	Sheetrock	Walls Throughout Beneath Wall Panels	None Detected	-	-

**Sample Collection Summary table continued on page 4.**

**North End Portables; 210 N. Soderquist Road, Turlock, CA 95380 (Continued...)**

#	MATERIAL SAMPLED	MATERIAL LOCATION	ASBESTOS	CATEGORY	SQ. FT.
45397-33	2' x 4' Ceiling Panels	Ceilings Throughout	None Detected	-	-
45397-34	2' x 4' Ceiling Panels	Ceilings Throughout	None Detected	-	-
45397-35	Concrete	Foundation	None Detected	-	-
45397-36	Concrete	Foundation	None Detected	-	-
45397-37	Paint	Exterior Walls	None Detected	-	-
45397-38	Paint	Exterior Walls	None Detected	-	-

**“I” Building; 210 N. Soderquist Road, Turlock, CA 95380**

#	MATERIAL SAMPLED	MATERIAL LOCATION	ASBESTOS	CATEGORY	SQ. FT.
45397-39	12" x 12" VFT	Various Floors Throughout (Top Layer)	None Detected	-	-
45397-40	Mastic	Various Floors Throughout (Top Layer)	None Detected	-	-
45397-41	Flooring Material	Various Floors Throughout (Bottom Layer)	None Detected	-	-
45397-42	Mastic	Various Floors Throughout (Bottom Layer)	None Detected	-	-
45397-43	Carpet Mastic	Various Floors Throughout	None Detected	-	-
45397-44	Carpet Mastic	Various Floors Throughout	None Detected	-	-
45397-45	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-46	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-47	Fiber Board	Walls Throughout	None Detected	-	-
45397-48	Fiber Board	Walls Throughout	None Detected	-	-
45397-49	Wall Panel Mastic	Walls Throughout	None Detected	-	-
45397-50	Wall Panel Mastic	Walls Throughout	None Detected	-	-
45397-51	Sheetrock	Walls Throughout Beneath Wall Panels	None Detected	-	-
45397-52	Sheetrock	Walls Throughout Beneath Wall Panels	None Detected	-	-
45397-53	2' x 4' Ceiling Panels	Ceilings Throughout	None Detected	-	-
45397-54	2' x 4' Ceiling Panels	Ceilings Throughout	None Detected	-	-
45397-55	Concrete	Foundation	None Detected	-	-
45397-56	Concrete	Foundation	None Detected	-	-
45397-57	Stucco	Exterior Walls	None Detected	-	-
45397-58	Stucco	Exterior Walls	None Detected	-	-

**Sample Collection Summary table continued on page 5.**

Admin Building; 210 N. Soderquist Road, Turlock, CA 95380

#	MATERIAL SAMPLED	MATERIAL LOCATION	ASBESTOS	CATEGORY	SQ. FT.
45397-59	12" x 12" VFT	Office; Various Floors Throughout	None Detected	-	-
45397-60	Mastic	Office; Various Floors Throughout	None Detected	-	-
45397-61	Linoleum	Teachers' Lounge Bathroom; Floor (Top Layer)	None Detected	-	-
45397-62	Mastic	Teachers' Lounge Bathroom; Floor (Top Layer)	None Detected	-	-
45397-63	Linoleum	Teachers' Lounge Bathroom; Floor (Bottom Layer)	None Detected	-	-
<del>45397-64</del>	<b>Mastic</b>	<b>Teachers' Lounge Bathroom; Floor (Bottom Layer)</b>	<b>5% Chrysotile</b>	<b>Category I*</b>	<b>25</b>
45397-65	Carpet Mastic	Floors Throughout	None Detected	-	-
45397-66	Carpet Mastic	Floors Throughout	None Detected	-	-
45397-67	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-68	Cove Base Mastic	Baseboards Throughout	None Detected	-	-
45397-69	Fiber Board	Office; Various Walls Throughout	None Detected	-	-
45397-70	Wall Panel Mastic	Office; Various Walls Throughout	None Detected	-	-
45397-71	Plaster	Walls Throughout	None Detected	-	-
45397-72	Plaster	Walls Throughout	None Detected	-	-
45397-73	1' x 1' Ceiling Tile	Teachers' Lounge; Upper Walls & Ceiling	None Detected	-	-
45397-74	Ceiling Tile Mastic	Teachers' Lounge; Upper Walls & Ceiling	None Detected	-	-
45397-75	2' x 4' Ceiling Panel	Office; Ceiling	None Detected	-	-
45397-76	Concrete	Foundation	None Detected	-	-
45397-77	Concrete	Foundation	None Detected	-	-
45397-78	Concrete	Exterior Walls	None Detected	-	-
45397-79	Concrete	Exterior Walls	None Detected	-	-
45397-80	Stucco	Exterior Upper Walls	None Detected	-	-
45397-81	Stucco	Exterior Upper Walls	None Detected	-	-

**ASBESTOS DEFINITIONS**

Suspect Asbestos Containing Material (ACM) - Local air quality management districts consider a material that is not wood, metal or glass, to be a suspect ACM. All suspect ACMs are assumed to contain asbestos until laboratory analysis confirms that a material has no asbestos content.

Category – ACM's are classified as either "friable", material that can be easily crushed or pulverized by normal hand pressure or as "non-friable", material that cannot be easily crushed or pulverized by normal hand pressure. *Friable ACMs are considered a Regulated Asbestos Containing Material (RACM) requiring Class I work practices and engineering controls. Non-friable ACMs are considered either Category I or Category II Asbestos Containing Material requiring Class II work practices and engineering controls.*

Trace - Analytical result that is equal to or less than 1.0 percent asbestos by weight, but greater than 0.1 percent. Materials with a trace amount of asbestos have to be removed as asbestos containing construction material (ACCM) according to Cal-OSHA, but can be disposed as non-ACM upon point count analyses according to federal and state EPA regulations.

Homogeneous – Multiple samples collected of a suspect material that is similar in general appearance and from areas that appear to have been constructed at the same time are considered homogeneous. If multiple samples are collected from a similar material within a homogeneous area and only one of the multiple samples is found to contain asbestos, regulations mandate that the entirety of that material with the homogeneous area must be considered an ACM.

VFT – Vinyl Floor Tile    TBD – To be determined

#### **ASBESTOS REGULATORY STANDARDS**

##### California Occupational Safety and Health Administration (Cal-OSHA)

- Friable and Non-Friable ACCMs containing more than 0.1 percent asbestos by weight are regulated.
- Enforces regulations pertaining to workers performing ACCM removal and workers in close proximity.
- Contractors who disturb more than 100 square feet or 160 lineal feet of ACCM must be registered by the contractor’s state license board as an asbestos removal contractor.
- Contractors who disturb any amount of ACCM must ensure employee protection by providing accredited training, medical examinations, personal protective equipment and a negative exposure assessment.

##### United States Environmental Protection Agency (EPA)

- Friable and Non-Friable ACMs containing more than 1.0 percent asbestos by weight are regulated.
- Enforces regulations pertaining to protecting the environment, not workers.
- Abatement Contractors who disturb more than 160 square feet or 260 linear feet of ACM must comply with the National Emissions Standards for Hazardous Air Pollutants Asbestos Regulations (40 CFR 61, Subpart M) and all state and federal requirements regarding asbestos.

##### Local Air Quality Control Districts

- Friable and Non-Friable ACM’s containing more than 1.0 percent asbestos by weight are regulated.
- Enforces regulations pertaining to local air quality; “No Visible Air Emissions”.
- Require an asbestos survey prior to renovation or demolition.
- Abatement Contractors who disturb more than 160 square feet or 260 linear feet of ACM must comply with the National Emissions Standards for Hazardous Air Pollutants Asbestos Regulations (40 CFR 61, Subpart M).

#### **ASBESTOS RECOMMENDATIONS**

BEM recommends compliance with all federal, state and local regulations concerning asbestos.

**ASBESTOS WARRANTY**

Samples of suspect asbestos containing building materials, which could be disturbed during construction activities, are collected by BEM. Site inspections and sample collection methodologies are performed to meet regulatory standards and industry protocols. BEM warrants that the findings contained herein have been promulgated in general accordance with accepted professional practices at the time of its preparation as applied by professionals in the community. There is a possibility that conditions may exist in which suspect ACM's could not be identified within the scope of the survey or were not apparent or accessible during the site visit. All scheduled work should cease and additional samples should be collected if unidentified suspect ACM's are discovered during construction activities.

*If quantities of asbestos containing materials are stated in this report, they are supplied for budgetary and regulatory notification purposes only. They should not be relied on for abatement bidding purposes.*

**LEAD INSPECTION SUMMARY**

BEM visually inspected and identified all components and substrates throughout the Subject Site that will be impacted during renovation activities. These surfaces were representatively sampled and analyzed for lead content. Utilizing an X-Ray Fluorescence Spectrometer (XRF), the substrates within the Subject Site's renovation/demolition areas were analyzed for their lead concentration levels. A summary of the substrates sampled and corresponding analytical results are listed below. Detailed information regarding sample numbers, actual sample locations and analytical methods can be reviewed in attachments A & B.

**South End Portables; 210 N. Soderquist Road, Turlock, CA 95380**

#	SAMPLE DESCRIPTION	SAMPLE LOCATION	LEAD mg/cm <sup>2</sup>
45397-L1	Paint (Multi)	Wood Trim Throughout	0
45397-L2	Paint (Multi)	Metal Trim Throughout	0
45397-L3	Paint (Multi)	Metal Doors Throughout	0
45397-L4	Paint (Beige)	Metal T-Bar Ceilings Throughout	0
45397-L5	Paint (White)	2' x 4' Ceiling Panel Ceiling Throughout	0
45397-L6	Paint (Beige)	Exterior Wood Siding	0

(Lead Based =  $\geq 1.0$  mg/cm<sup>2</sup>) (Lead Containing =  $< 1.0$  mg/cm<sup>2</sup>) (No Lead Detected = 0 mg/cm<sup>2</sup>)

**North End Portables; 210 N. Soderquist Road, Turlock, CA 95380**

#	SAMPLE DESCRIPTION	SAMPLE LOCATION	LEAD mg/cm <sup>2</sup>
45397-L7	Paint (Multi)	Wood Trim Throughout	0
45397-L8	Paint (Multi)	Metal Trim Throughout	0
45397-L9	Paint (Multi)	Metal Doors Throughout	0
45397-L10	Paint (Beige)	Metal T-Bar Ceilings Throughout	0
45397-L11	Paint (White)	2' x 4' Ceiling Panel Ceiling Throughout	0
45397-L12	Paint (Beige)	Exterior Wood Siding	0

(Lead Based =  $\geq 1.0$  mg/cm<sup>2</sup>) (Lead Containing =  $< 1.0$  mg/cm<sup>2</sup>) (No Lead Detected = 0 mg/cm<sup>2</sup>)

**Sample Collection Summary table continued on page 8.**

**“I” Building; 210 N. Soderquist Road, Turlock, CA 95380**

#	SAMPLE DESCRIPTION	SAMPLE LOCATION	LEAD mg/cm <sup>2</sup>
45397-L13	Ceramic Tile (Blue)	Men’s, Women’s & Staff Bathrooms; Floors	0
45397-L14	Paint (Multi)	Wood Trim Throughout	0
45397-L15	Paint (Multi)	Metal Trim Throughout	0
45397-L16	Paint (Multi)	Metal Doors Throughout	0
45397-L17	Paint (Beige)	Metal T-Bar Ceilings Throughout	0
45397-L18	Paint (White)	2’ x 4’ Ceiling Panel Ceilings Throughout	0
45397-L19	Paint (Beige)	Exterior Stucco Walls	0

(Lead Based =  $\geq 1.0$  mg/cm<sup>2</sup>) (Lead Containing =  $< 1.0$  mg/cm<sup>2</sup>) (No Lead Detected = 0 mg/cm<sup>2</sup>)

**Admin Building; 210 N. Soderquist Road, Turlock, CA 95380**

#	SAMPLE DESCRIPTION	SAMPLE LOCATION	LEAD mg/cm <sup>2</sup>
45397-L20	Paint (Multi)	Wood Trim Throughout	0
45397-L21	Paint (Multi)	Metal Trim Throughout	0
<b>45397-L22</b>	<b>Paint (Beige)</b>	<b>Door &amp; Window Metal Trim Throughout</b>	<b>4.0</b>
45397-L23	Paint (Multi)	Metal Doors Throughout	0
45397-L24	Paint (Multi)	Plaster Walls Throughout	0
45397-L25	Paint (Beige)	Metal T-Bar Ceilings Throughout	0
45397-L26	Paint (White)	Office; 2’ x 4’ Ceiling Panel Ceiling	0
45397-L27	Paint (White)	Teachers’ Lounge; Ceiling Tile Ceiling	0
45397-L28	Paint (Beige)	Exterior Concrete Walls	0
45397-L29	Paint (Beige)	Upper Exterior Stucco Walls	0

(Lead Based =  $\geq 1.0$  mg/cm<sup>2</sup>) (Lead Containing =  $< 1.0$  mg/cm<sup>2</sup>) (No Lead Detected = 0 mg/cm<sup>2</sup>)

**LEAD RECOMMENDATIONS**

Any substrates listed in the table above having a lead concentration level greater than or equal to 1.0 mg/cm<sup>2</sup> should be considered lead based. If these substrates are to be impacted during renovation activities then proper lead abatement practices, engineering controls and worker protection should meet all regulatory standards mandated by Cal-OSHA Title 8.

Any substrates listed in the table above having a lead concentration level less than 1.0 mg/cm<sup>2</sup> should be considered lead containing. Regulations mandated by Cal-OSHA Title 8 are still in effect for renovation activities.

Any substrates listed in the table above having a lead concentration level of 0 mg/cm<sup>2</sup> should be considered lead free, however regulations mandate that all workers involved in renovation activities shall receive appropriate EPA-RRP lead awareness training so that activities which could potentially create an exposure risk can be avoided.

BEM recommends compliance with all federal, state and local regulations concerning lead paint.

**LEAD WARRANTY**

Site inspections and sample collection methodologies are performed to meet regulatory standards and industry protocols. BEM warrants that the findings contained herein have been promulgated in general accordance with accepted professional practices at the time of its preparation as applied by professionals in the community. There is a possibility that conditions may exist which could not be identified within the scope of the survey or were not apparent or accessible during the site visit.

**DISCLAIMER**

If asbestos containing materials were impacted and/or damaged during a fire loss, then the soft and/or porous building materials and personal contents should be removed and disposed of as Asbestos Containing Building Materials (ACBM). The hard and/or nonporous building materials and personal contents can be cleaned and decontaminated on site. The locations surrounding the damaged areas should be considered contaminated with asbestos. BEM cannot assume these other areas were not impacted with asbestos. BEM recommends to either assume the building materials and/or personal contents within these surrounding locations are contaminated with asbestos; or micro-vac TEM samples can be collected within these surrounding locations to determine if the asbestos contamination migrated to these surrounding locations adjacent to the known contamination.

**CERTIFICATION**

Inspection services relative to the Subject Site were provided by BEM's Mr. Brett L. Bovée & Anthony J. Miller, Certified Asbestos Consultants, No. 95-1643, expiration on 03/08/2021 & Number 19-6474, expiration on 04/17/2021. and a California Department of Public Health Inspector/Assessor, ID# 1494/1493, expiration on 06/29/2021.

BEM looks forward to assisting you in the near future. If you have any questions regarding this report or other BEM services, please do not hesitate to call us at (209) 847-3800 or (559) 264-3800.

Regards,

*Brett L. Bovée*

Brett L. Bovée, CAC, CMC, CDPH  
Certified Asbestos Consultant No. 95-1643  
California DPH Inspector/Assessor, ID# 1494/1493

*Anthony J. Miller*

Anthony J. Miller  
Certified Asbestos Consultant  
No: 19-6474



**ATTACHMENT A**

**BEM**

**SAMPLE FIELD SHEETS**





**Bovee Environmental Management, Inc.**  
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 Email: bem@boveeinc.com • Facsimile: 209-847-3830

BEM PROJECT #	20-45397	TURN-AROUND TIME
SAMPLE DATE:	9/9/20	<input type="radio"/> SAME DAY <input checked="" type="radio"/> 24 HOURS
SURVEY TYPE:	Reno	<input type="radio"/> B206253

**CHAIN OF CUSTODY**

Project Name:		Osborn elementary				B102257-B102337		Point Count Trace Results						
Address:		210 N. Soderquist RD Turlock CA 95320				<input checked="" type="radio"/> YES-400 <input type="radio"/> YES-1000 <input type="radio"/> NO								
Type of Loss:		ASb Reno												
Areas Inspected:		S. END Portables												
Sample#	Sample Description	Surface	T. Time	LPM	Vol./Qua.	PLM	XRF	PCM	DIRECT-101	E-COLI	TEM	AAS		
45397	Mat. Desc.: Lino	W C FL												
-01	Mat. Loc.: C3 & C2 T/O	OOO												
-02	Mat. Desc.: mastic	W C F												
	Mat. Loc.: " "	OOO												
-03	Mat. Desc.: Lino	W C FL												
	Mat. Loc.: C4, C5, & C6 Various T/O	OOO												
-04	Mat. Desc.: mastic	W C F												
	Mat. Loc.: " "	OOO												
-05	Mat. Desc.: Carpet mastic	W C F												
	Mat. Loc.: various T/O	OOO												
-06	Mat. Desc.: ↓	W C FL												
	Mat. Loc.: ↓	OOO												
-07	Mat. Desc.: CBM	W C FL												
	Mat. Loc.: Baseboards T/O	OOO												
-08	Mat. Desc.: ↓	W C FL												
	Mat. Loc.: ↓	OOO												
-09	Mat. Desc.: Fiberboard	W C FL												
	Mat. Loc.: T/O	OOO												
-10	Mat. Desc.: ↓	W C FL												
	Mat. Loc.: ↓	OOO												
-11	Mat. Desc.: wpm	W C FL												
	Mat. Loc.: T/O	OOO												
-12	Mat. Desc.: ↓	W C FL												
	Mat. Loc.: ↓	OOO												
-13	Mat. Desc.: SR	W C FL												
	Mat. Loc.: T/O Beneath wall panels	OOO												
-14	Mat. Desc.: ↓	W C FL												
	Mat. Loc.: ↓	OOO												
-15	Mat. Desc.: 2x4 C.P.	W C FL												
	Mat. Loc.: T/O	OOO												
-16	Mat. Desc.: ↓	W C FL												
	Mat. Loc.: ↓	OOO												
-17	Mat. Desc.: concrete	W C FL												
	Mat. Loc.: Foundation	OOO												
-18	Mat. Desc.: ↓	W C FL												
	Mat. Loc.: ↓	OOO												

Relinquished by: B BOVEE	Received by:	Relinquished by: CEI, INC	Received by: CB
<i>[Signature]</i>	X	SAMPLES ACCEPTED	X
Time/Date: 9/9/20	Time/Date:	Time/Date: CB	Time/Date: 9/14/20





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**CHAIN OF CUSTODY**

BEM PROJECT #	20-45397	TURN-AROUND TIME
SAMPLE DATE:	9/9/20	<input type="radio"/> SAME DAY <input checked="" type="radio"/> 24 HOURS
SURVEY TYPE:	Reno	<input type="radio"/> B2006253

Project Name:		Osborn elementary				Point Count Trace Results						
Address:		210 N. Soderquist RD Turlock CA 95380				<input checked="" type="radio"/> YES-400 <input type="radio"/> YES-1000 <input type="radio"/> NO						
Type of Loss:		AS6 Reno										
Areas Inspected:		N. END Portables										
Sample#	Sample Description	Surface	T. Time	LPM	Vol./Qua.	PLM	XRF	PCM	DIRECT-101	E-COLI	TEM	AAS
45397-21	Mat. Desc.: 12X12 VFT Mat. Loc.: Various T/O	W C FL ○○○										
22	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
23	Mat. Desc.: Carpet mastic Mat. Loc.: various T/O	W C FL ○○○										
24	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
25	Mat. Desc.: CBM Mat. Loc.: Baseboards T/O	W C FL ○○○										
26	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
27	Mat. Desc.: Fiberboard Mat. Loc.: T/O	W C FL ○○○										
28	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
29	Mat. Desc.: wpm Mat. Loc.: T/O	W C FL ○○○										
30	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
31	Mat. Desc.: SR Mat. Loc.: T/O Beneath wall panels	W C FL ○○○										
32	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
33	Mat. Desc.: 2x4 C.P. Mat. Loc.: T/O	W C FL ○○○										
34	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
35	Mat. Desc.: concrete Mat. Loc.: foundation	W C FL ○○○										
36	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
37	Mat. Desc.: paint Mat. Loc.: ext.	W C FL ○○○										
38	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○										
Relinquished by: B BOVEE		Received by:		Relinquished by:		Received by:						
* [Signature]		X		X		X						
Time/Date: 9/9/20		Time/Date:		Time/Date:		Time/Date:						



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**CHAIN OF CUSTODY**

BEM PROJECT #	20-45397	TURN-AROUND TIME
SAMPLE DATE:	9/9/20	<input type="radio"/> SAME DAY <input checked="" type="radio"/> 24HOURS
SURVEY TYPE:	Reno	<input type="radio"/> B206253

Project Name: Osborn elementary		Point Count Trace Results						
Address: 210 N. Soderquist RD Turlock CA 95380		<input checked="" type="radio"/> YES-400 <input type="radio"/> YES-1000 <input type="radio"/> NO						
Type of Loss: ASb Reno		PLM	XRF	PCM	DIRECT-101	E-COLI	TEM	AAS
Areas Inspected: I Building								
Sample#	Sample Description	Surface	T. Time	LPM	Vol./Qua.			
45397	Mat. Desc.: 12X 12 VFT (TOP layer)	W C FL						
- 39	Mat. Loc.: various T/O	OOO						
- 40	Mat. Desc.: mastic " "	W C FL						
	Mat. Loc.: " "	OOO						
- 41	Mat. Desc.: F.M. (Bottom layer)	W C FL						
	Mat. Loc.: " "	OOO						
- 42	Mat. Desc.: mastic " "	W C FL						
	Mat. Loc.: " "	OOO						
- 43	Mat. Desc.: Carpet mastic	W C FL						
	Mat. Loc.: various T/O	OOO						
- 44	Mat. Desc.: ↓	W C FL						
	Mat. Loc.: ↓	OOO						
- 45	Mat. Desc.: CBM	W C FL						
	Mat. Loc.: Baseboards T/O	OOO						
- 46	Mat. Desc.: ↓	W C FL						
	Mat. Loc.: ↓	OOO						
- 47	Mat. Desc.: Fiberboard	W C FL						
	Mat. Loc.: T/O	OOO						
- 48	Mat. Desc.: ↓	W C FL						
	Mat. Loc.: ↓	OOO						
- 49	Mat. Desc.: wpm	W C FL						
	Mat. Loc.: T/O	OOO						
- 50	Mat. Desc.: ↓	W C FL						
	Mat. Loc.: ↓	OOO						
- 51	Mat. Desc.: SR	W C FL						
	Mat. Loc.: T/O beneath wall panels	OOO						
- 52	Mat. Desc.: ↓	W C FL						
	Mat. Loc.: ↓	OOO						
- 53	Mat. Desc.: 2x4 C.P.	W C FL						
	Mat. Loc.: T/O	OOO						
- 54	Mat. Desc.: ↓	W C FL						
	Mat. Loc.: ↓	OOO						
- 55	Mat. Desc.: concrete	W C FL						
	Mat. Loc.: Foundation	OOO						
- 56	Mat. Desc.: ↓	W C FL						
	Mat. Loc.: ↓	OOO						

Relinquished by: B BOVEE	Received by:	Relinquished by:	Received by:
<i>[Signature]</i>	X	X	X
Time/Date: 9/9/20	Time/Date:	Time/Date:	Time/Date:



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**CHAIN OF CUSTODY**

BEM PROJECT #	20-45397	TURN-AROUND TIME
SAMPLE DATE:	9/9/20	<input type="radio"/> SAME DAY <input checked="" type="radio"/> 24HOURS
SURVEY TYPE:	Reno	<input type="radio"/> B206253

Project Name: <b>Osborn elementary</b>						Point Count Trace Results						
Address: <b>210 N. Soderquist RD Turlock CA 95380</b>						<input checked="" type="radio"/> YES-400 <input type="radio"/> YES-1000 <input type="radio"/> NO						
Type of Loss: <b>ASb Reno</b>												
Areas Inspected: <b>I Building</b>												
Sample#	Sample Description	Surface	T. Time	LPM	Vol./Qua.	PLM	XRF	PCM	DIRECT-101	E-COLI	TEM	AAS
45397	Mat. Desc.: <b>Stucco</b>	W C FL										
457	Mat. Loc.: <b>ext</b>	W C FL										
458	Mat. Desc.: <b>↓</b>	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										
	Mat. Desc.:	W C FL										
	Mat. Loc.:	W C FL										

Relinquished by: <b>B BOVEE</b>	Received by:	Relinquished by:	Received by:
<i>[Signature]</i>	X	X	X
Time/Date: <b>9/9/20</b>	Time/Date:	Time/Date:	Time/Date:



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**CHAIN OF CUSTODY**

BEM PROJECT #	20-45397	TURN-AROUND TIME
SAMPLE DATE:	9/9/20	<input type="radio"/> SAME DAY <input checked="" type="radio"/> 24HOURS
SURVEY TYPE:	Reno	<input type="radio"/> B206253

Project Name:		Osborn elementary				Point Count Trace Results						
Address:		210 N. Soderquist RD Turlock CA 95320				<input checked="" type="radio"/> YES-400 <input type="radio"/> YES-1000 <input type="radio"/> NO						
Type of Loss:		ASb Reno										
Areas Inspected:		Admin Building										
Sample#	Sample Description	Surface	T. Time	LPM	Vol./Qua.	PLM	XRF	PCM	DIRECT-101	E-COLI	TEM	AAS
45397-59	Mat. Desc.: 12X12 VFT Mat. Loc.: various T/O OFFICE	W C FL ○○○				○	○	○	○	○	○	○
-60	Mat. Desc.: mastic Mat. Loc.: = =	W C FL ○○○				○	○	○	○	○	○	○
-61	Mat. Desc.: Lino (Top layer) Mat. Loc.: Teachers lounge Bathroom	W C FL ○○○				○	○	○	○	○	○	○
-62	Mat. Desc.: mastic Mat. Loc.: = =	W C FL ○○○				○	○	○	○	○	○	○
-63	Mat. Desc.: Lino (Bottom layer) Mat. Loc.: = "	W C FL ○○○				○	○	○	○	○	○	○
-64	Mat. Desc.: mastic Mat. Loc.: = =	W C FL ○○○				○	○	○	○	○	○	○
-65	Mat. Desc.: Carpet mastic Mat. Loc.: T/O	W C FL ○○○				○	○	○	○	○	○	○
-66	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○				○	○	○	○	○	○	○
-67	Mat. Desc.: CBM Mat. Loc.: Baseboards T/O	W C FL ○○○				○	○	○	○	○	○	○
-68	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○				○	○	○	○	○	○	○
-69	Mat. Desc.: Fiberboard Mat. Loc.: various T/O office	W C FL ○○○				○	○	○	○	○	○	○
-70	Mat. Desc.: Wpm Mat. Loc.: = =	W C FL ○○○				○	○	○	○	○	○	○
-71	Mat. Desc.: plaster Mat. Loc.: T/O	W C FL ○○○				○	○	○	○	○	○	○
-72	Mat. Desc.: ↓ Mat. Loc.: ↓	W C FL ○○○				○	○	○	○	○	○	○
-73	Mat. Desc.: 1X1 CT Mat. Loc.: Teachers lounge; upper walls & ceiling	W C FL ○○○				○	○	○	○	○	○	○
-74	Mat. Desc.: mastic Mat. Loc.: = "	W C FL ○○○				○	○	○	○	○	○	○
-75	Mat. Desc.: 2X4 C.P. Mat. Loc.: OFFICE T/O	W C FL ○○○				○	○	○	○	○	○	○
-76	Mat. Desc.: Concrete Mat. Loc.: Foundation	W C FL ○○●				○	○	○	○	○	○	○
Relinquished by: B BOVEE		Received by:		Relinquished by:		Received by:						
* [Signature]		X		X		X						
Time/Date: 9/9/20		Time/Date:		Time/Date:		Time/Date:						



**Bovee Environmental Management, Inc.**  
 1900 McHenry Ave, Ste 201, Escalon, CA 95320  
 North Valley: 209-847-3800 • South Valley: 559-264-3800  
 Email: bem@boveeinc.com • Facsimile: 209-847-3830

BEM PROJECT #	20-45397	B200253 TURN-AROUND TIME
SAMPLE DATE:	9/9/20	<input type="radio"/> SAME DAY <input checked="" type="radio"/> 24 HOURS
SURVEY TYPE:	Reno	<input type="radio"/>

**CHAIN OF CUSTODY**

Project Name: <b>Osborn elementary</b>						Point Count Trace Results						
Address: <b>210 N. Soderquist RD Turlock CA 95380</b>						<input checked="" type="radio"/> ES-400 <input type="radio"/> YES-1000 <input type="radio"/> NO						
Type of Loss: <b>ASb Reno</b>												
Areas Inspected: <b>Admin building</b>												
Sample#	Sample Description	Surface	T. Time	LPM	Vol./Qua.	PLM	XRF	PCM	DIRECT-101	E-COLI	TEM	AAS
45397 -77	Mat. Desc.: <b>Concrete foundation</b>	W C FL ○○●				○	○	○	○	○	○	○
-78	Mat. Desc.: <b>Concrete ext</b>	W C FL ○○○				○	○	○	○	○	○	○
-79	Mat. Desc.: ↓	W C FL ○○○				○	○	○	○	○	○	○
-80	Mat. Desc.: <b>STUCCO ext upper walls</b>	W C FL ○○○				○	○	○	○	○	○	○
-81	Mat. Desc.: ↓	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Desc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Loc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Desc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Loc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Desc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Loc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Desc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Loc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Desc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Loc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Desc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Loc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Desc.:	W C FL ○○○				○	○	○	○	○	○	○
	Mat. Loc.:	W C FL ○○○				○	○	○	○	○	○	○

Relinquished by: <b>B BOVEE</b>	Received by:	Relinquished by:	Received by:
<i>[Signature]</i>	X	X	X
Time/Date: <b>9/9/20</b>	Time/Date:	Time/Date:	Time/Date:

**ATTACHMENT B**

**LABORATORY  
ANALYTICAL REPORTS**



September 15, 2020

Bovee Environmental Management  
1900 McHenry Ave, Ste 201  
Escalon, CA 95320

**CLIENT PROJECT:** Osborn Elementary, 20-45397  
**CEI LAB CODE:** B206253

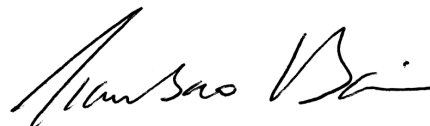
Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on September 14, 2020. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,



Tianbao Bai, Ph.D., CIH  
Laboratory Director



CEI

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# ASBESTOS ANALYTICAL REPORT

## By: Polarized Light Microscopy

Prepared for

**Bovee Environmental Management**

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CLIENT PROJECT: Osborn Elementary, 20-45397

LAB CODE: B206253

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 09/15/20

TOTAL SAMPLES ANALYZED: 81

# SAMPLES >1% ASBESTOS: 1



CEI

# Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

**PROJECT:** Osborn Elementary, 20-45397

**LAB CODE:** B206253

**METHOD:** EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
45397-01		B102257	Gray	Linoleum	None Detected
45397-02		B102258	Yellow	Mastic	None Detected
45397-03		B102259	Gray,White	Linoleum	None Detected
45397-04		B102260	Yellow	Mastic	None Detected
45397-05		B102261	Yellow	Carpet Mastic	None Detected
45397-06		B102262	Yellow	Carpet Mastic	None Detected
45397-07		B102263	Cream	Covebase Mastic	None Detected
45397-08		B102264	Cream	Covebase Mastic	None Detected
45397-09		B102265	White,Tan	Fiberboard	None Detected
45397-10		B102266	White,Tan	Fiberboard	None Detected
45397-11		B102267	Clear	Mastic	None Detected
45397-12		B102268	Clear	Mastic	None Detected
45397-13		B102269	White	Sheetrock	None Detected
45397-14		B102270	White	Sheetrock	None Detected
45397-15		B102271	White	Ceiling Panel	None Detected
45397-16		B102272	White	Ceiling Panel	None Detected
45397-17		B102273	Gray	Concrete Foundation	None Detected
45397-18		B102274	Gray	Concrete Foundation	None Detected
45397-19		B102275	White	Paint	None Detected
45397-20		B102276	White	Paint	None Detected
45397-21		B102277	Blue	Floor Tile	None Detected
45397-22	Layer 1	B102278	Yellow	Mastic	None Detected
	Layer 2	B102278	Gray	Leveling Compound	None Detected
45397-23		B102279	Yellow	Carpet Mastic	None Detected
45397-24		B102280	Yellow	Carpet Mastic	None Detected
45397-25		B102281	Cream	Covebase Mastic	None Detected
45397-26		B102282	Cream	Covebase Mastic	None Detected
45397-27		B102283	White,Tan	Fiberboard	None Detected
45397-28		B102284	White,Tan	Fiberboard	None Detected
45397-29		B102285	Clear	Mastic	None Detected
45397-30		B102286	Clear	Mastic	None Detected



CEI

# Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

**PROJECT:** Osborn Elementary, 20-45397

**LAB CODE:** B206253

**METHOD:** EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
45397-31		B102287	White	Sheetrock	None Detected
45397-32		B102288	White	Sheetrock	None Detected
45397-33		B102289	White,Yellow	Ceiling Panel	None Detected
45397-34		B102290	White,Yellow	Ceiling Panel	None Detected
45397-35		B102291	Gray	Concrete Foundation	None Detected
45397-36		B102292	Gray	Concrete Foundation	None Detected
45397-37		B102293	White	Paint	None Detected
45397-38		B102294	White	Paint	None Detected
45397-39		B102295	Blue	Floor Tile	None Detected
45397-40		B102296	Yellow	Mastic	None Detected
45397-41		B102297	Gray	Floor Material	None Detected
45397-42		B102298	Black	Mastic	None Detected
45397-43		B102299	Yellow	Carpet Mastic	None Detected
45397-44		B102300	Yellow	Carpet Mastic	None Detected
45397-45		B102301	Cream	Covebase Mastic	None Detected
45397-46		B102302	Cream	Covebase Mastic	None Detected
45397-47		B102303	White,Brown	Fiberboard	None Detected
45397-48		B102304	White,Brown	Fiberboard	None Detected
45397-49		B102305	Clear	Mastic	None Detected
45397-50		B102306	Clear	Mastic	None Detected
45397-51		B102307	White	Sheetrock	None Detected
45397-52		B102308	White	Sheetrock	None Detected
45397-53		B102309	White,Yellow	Ceiling Panel	None Detected
45397-54		B102310	White,Yellow	Ceiling Panel	None Detected
45397-55		B102311	Gray	Concrete Foundation	None Detected
45397-56		B102312	Gray	Concrete Foundation	None Detected
45397-57	Layer 1	B102313	White	Stucco Skim Coat	None Detected
	Layer 2	B102313	Gray	Stucco Base Coat	None Detected
45397-58	Layer 1	B102314	White	Stucco Skim Coat	None Detected
	Layer 2	B102314	Gray	Stucco Base Coat	None Detected
45397-59		B102315	Blue	Floor Tile	None Detected



CEI

# Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Osborn Elementary, 20-45397

LAB CODE: B206253

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
45397-60		B102316	Yellow	Mastic	None Detected
45397-61		B102317	Blue	Linoleum	None Detected
45397-62		B102318	Yellow	Mastic	None Detected
45397-63		B102319	White,Green	Linoleum	None Detected
45397-64	Layer 1	B102320	Yellow	Mastic	None Detected
	Layer 2	B102320	Black	Mastic	<b>Chrysotile 5%</b>
45397-65		B102321	Green	Carpet Mastic	None Detected
45397-66		B102322	Green	Carpet Mastic	None Detected
45397-67		B102323	Cream	Covebase Mastic	None Detected
45397-68		B102324	Cream	Covebase Mastic	None Detected
45397-69		B102325	White,Brown	Fiberboard	None Detected
45397-70		B102326	Clear	Mastic	None Detected
45397-71		B102327	Gray	Plaster	None Detected
45397-72		B102328	Gray	Plaster	None Detected
45397-73		B102329	Brown	Ceiling Tile	None Detected
45397-74		B102330	Brown	Mastic	None Detected
45397-75		B102331	White	Ceiling Panel	None Detected
45397-76		B102332	Gray	Concrete Foundation	None Detected
45397-77		B102333	Gray	Concrete Foundation	None Detected
45397-78		B102334	Gray	Concrete	None Detected
45397-79		B102335	Gray	Concrete	None Detected
45397-80	Layer 1	B102336	White	Stucco Skim Coat	None Detected
	Layer 2	B102336	Gray	Stucco Base Coat	None Detected
45397-81	Layer 1	B102337	White	Stucco Skim Coat	None Detected
	Layer 2	B102337	Gray	Stucco Base Coat	None Detected

# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous	Non-Fibrous			
45397-01 B102257	Linoleum	Heterogeneous Gray Fibrous Bound	10%	Synthetic Fiber	90%	Vinyl	None Detected
45397-02 B102258	Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
45397-03 B102259	Linoleum	Heterogeneous Gray,White Fibrous Bound	30%	Cellulose	50%	Vinyl Binder	None Detected
45397-04 B102260	Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
45397-05 B102261	Carpet Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
45397-06 B102262	Carpet Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
45397-07 B102263	Covebase Mastic	Homogeneous Cream Non-fibrous Bound			100%	Mastic	None Detected

# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
<b>45397-08</b> B102264	Covebase Mastic	Homogeneous Cream Non-fibrous Bound	100%		Mastic		None Detected
<b>45397-09</b> B102265	Fiberboard	Heterogeneous White, Tan Fibrous Loosely Bound	90%	Cellulose	10%	Vinyl	None Detected
<b>45397-10</b> B102266	Fiberboard	Heterogeneous White, Tan Fibrous Loosely Bound	90%	Cellulose	10%	Vinyl	None Detected
<b>45397-11</b> B102267	Mastic	Homogeneous Clear Non-fibrous Bound	100%		Mastic		None Detected
<b>45397-12</b> B102268	Mastic	Homogeneous Clear Non-fibrous Bound	100%		Mastic		None Detected
<b>45397-13</b> B102269	Sheetrock	Homogeneous White Fibrous Bound	2%	Cellulose	98%	Gypsum	None Detected
<b>45397-14</b> B102270	Sheetrock	Homogeneous White Fibrous Bound	2%	Cellulose	98%	Gypsum	None Detected

# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
45397-15 B102271	Ceiling Panel	Heterogeneous	40%	Cellulose	5%	Paint	None Detected
		White Fibrous Loosely Bound	30%	Fiberglass	25%	Perlite	
45397-16 B102272	Ceiling Panel	Heterogeneous	40%	Cellulose	5%	Paint	None Detected
		White Fibrous Loosely Bound	30%	Fiberglass	25%	Perlite	
45397-17 B102273	Concrete Foundation	Homogeneous			35%	Binder	None Detected
		Gray Non-fibrous Tightly Bound			65%	Silicates	
45397-18 B102274	Concrete Foundation	Homogeneous			35%	Binder	None Detected
		Gray Non-fibrous Tightly Bound			65%	Silicates	
45397-19 B102275	Paint	Homogeneous			100%	Paint	None Detected
		White Non-fibrous Bound					
45397-20 B102276	Paint	Homogeneous			100%	Paint	None Detected
		White Non-fibrous Bound					
45397-21 B102277	Floor Tile	Homogeneous			80%	Vinyl	None Detected
		Blue Non-fibrous Bound			20%	Calc Carb	



# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
45397-22 Layer 1 B102278	Mastic	Homogeneous			100%	Mastic	None Detected
		Yellow Non-fibrous Bound					
Layer 2 B102278	Leveling Compound	Homogeneous	5%	Cellulose	65%	Binder	None Detected
		Gray Fibrous Bound			30%	Calc Carb	
45397-23 B102279	Carpet Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
45397-24 B102280	Carpet Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
45397-25 B102281	Covebase Mastic	Homogeneous Cream Non-fibrous Bound			100%	Mastic	None Detected
45397-26 B102282	Covebase Mastic	Homogeneous Cream Non-fibrous Bound			100%	Mastic	None Detected
45397-27 B102283	Fiberboard	Heterogeneous White, Tan Fibrous Loosely Bound	90%	Cellulose	10%	Vinyl	None Detected

# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
<b>45397-28</b> B102284	Fiberboard	Heterogeneous White, Tan Fibrous Loosely Bound	90%	Cellulose	10%	Vinyl	None Detected
<b>45397-29</b> B102285	Mastic	Homogeneous Clear Non-fibrous Bound			100%	Mastic	None Detected
<b>45397-30</b> B102286	Mastic	Homogeneous Clear Non-fibrous Bound			100%	Mastic	None Detected
<b>45397-31</b> B102287	Sheetrock	Homogeneous White Fibrous Bound	3%	Cellulose	97%	Gypsum	None Detected
<b>45397-32</b> B102288	Sheetrock	Homogeneous White Fibrous Bound	3%	Cellulose	97%	Gypsum	None Detected
<b>45397-33</b> B102289	Ceiling Panel	Heterogeneous White, Yellow Fibrous Loosely Bound	95%	Fiberglass	5%	Vinyl	None Detected
<b>45397-34</b> B102290	Ceiling Panel	Heterogeneous White, Yellow Fibrous Loosely Bound	95%	Fiberglass	5%	Vinyl	None Detected

# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
45397-35 B102291	Concrete Foundation	Homogeneous	35%	Binder	None Detected
		Gray Non-fibrous Tightly Bound	65%	Silicates	
45397-36 B102292	Concrete Foundation	Homogeneous	35%	Binder	None Detected
		Gray Non-fibrous Tightly Bound	65%	Silicates	
45397-37 B102293	Paint	Homogeneous	100%	Paint	None Detected
		White Non-fibrous Bound			
45397-38 B102294	Paint	Homogeneous	100%	Paint	None Detected
		White Non-fibrous Bound			
45397-39 B102295	Floor Tile	Homogeneous	80%	Vinyl	None Detected
		Blue Non-fibrous Bound	20%	Calc Carb	
45397-40 B102296	Mastic	Homogeneous	100%	Mastic	None Detected
		Yellow Non-fibrous Bound			
45397-41 B102297	Floor Material	Homogeneous	<1%	Cellulose	None Detected
		Gray Non-fibrous Bound	100%	Binder	

# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
<b>45397-42</b> B102298	Mastic	Homogeneous Black Non-fibrous Bound	100%	Mastic			None Detected
<b>45397-43</b> B102299	Carpet Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
<b>45397-44</b> B102300	Carpet Mastic	Homogeneous Yellow Fibrous Bound	5%	Cellulose	95%	Mastic	None Detected
<b>45397-45</b> B102301	Covebase Mastic	Homogeneous Cream Non-fibrous Bound	100%	Mastic			None Detected
<b>45397-46</b> B102302	Covebase Mastic	Homogeneous Cream Non-fibrous Bound	100%	Mastic			None Detected
<b>45397-47</b> B102303	Fiberboard	Heterogeneous White,Brown Fibrous Loosely Bound	90%	Cellulose	10%	Vinyl	None Detected
<b>45397-48</b> B102304	Fiberboard	Heterogeneous White,Brown Fibrous Loosely Bound	90%	Cellulose	10%	Vinyl	None Detected

# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

**Client:** Bovee Environmental Management  
 1900 McHenry Ave, Ste 201  
 Escalon, CA 95320

**Lab Code:** B206253  
**Date Received:** 09-14-20  
**Date Analyzed:** 09-14-20  
**Date Reported:** 09-15-20

**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS			ASBESTOS %	
			Fibrous	Non-Fibrous			
<b>45397-49</b> B102305	Mastic	Homogeneous Clear Non-fibrous Bound	100%	Mastic		None Detected	
<b>45397-50</b> B102306	Mastic	Homogeneous Clear Non-fibrous Bound	100%	Mastic		None Detected	
<b>45397-51</b> B102307	Sheetrock	Homogeneous White Fibrous Bound	2%	Cellulose	98%	Gypsum	None Detected
<b>45397-52</b> B102308	Sheetrock	Homogeneous White Fibrous Bound	2%	Cellulose	98%	Gypsum	None Detected
<b>45397-53</b> B102309	Ceiling Panel	Heterogeneous White, Yellow Fibrous Loosely Bound	95%	Cellulose	5%	Vinyl	None Detected
<b>45397-54</b> B102310	Ceiling Panel	Heterogeneous White, Yellow Fibrous Loosely Bound	95%	Cellulose	5%	Vinyl	None Detected
<b>45397-55</b> B102311	Concrete Foundation	Homogeneous Gray Non-fibrous Tightly Bound	35%	Binder	65%	Silicates	None Detected

# ASBESTOS BULK ANALYSIS

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**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
<b>45397-56</b> B102312	Concrete Foundation	Homogeneous	35%	Binder	None Detected
		Gray Non-fibrous Tightly Bound	65%	Silicates	
<b>45397-57</b> Layer 1 B102313	Stucco Skim Coat	Heterogeneous	10%	Paint	None Detected
		White Non-fibrous Bound	40%	Silicates	
Layer 2 B102313	Stucco Base Coat	Heterogeneous	35%	Binder	None Detected
		Gray Non-fibrous Tightly Bound	65%	Silicates	
<b>45397-58</b> Layer 1 B102314	Stucco Skim Coat	Heterogeneous	10%	Paint	None Detected
		White Non-fibrous Bound	40%	Silicates	
Layer 2 B102314	Stucco Base Coat	Heterogeneous	35%	Binder	None Detected
		Gray Non-fibrous Tightly Bound	65%	Silicates	
<b>45397-59</b> B102315	Floor Tile	Homogeneous	80%	Vinyl	None Detected
		Blue Non-fibrous Bound	20%	Calc Carb	
<b>45397-60</b> B102316	Mastic	Homogeneous	100%	Mastic	None Detected
		Yellow Non-fibrous Bound			

# ASBESTOS BULK ANALYSIS

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**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
45397-61 B102317	Linoleum	Heterogeneous	10%	Cellulose	80%	Vinyl	None Detected
		Blue Fibrous Bound	<1%	Fiberglass	10%	Binder	
45397-62 B102318	Mastic	Homogeneous	<1%	Cellulose	100%	Mastic	None Detected
		Yellow Non-fibrous Bound					
45397-63 B102319	Linoleum	Heterogeneous	15%	Cellulose	70%	Vinyl	None Detected
		White, Green Fibrous Bound	<1%	Fiberglass	15%	Binder	
45397-64 Layer 1 B102320	Mastic	Homogeneous	<1%	Cellulose	100%	Mastic	None Detected
		Yellow Non-fibrous Bound					
Layer 2 B102320	Mastic	Homogeneous			95%	Mastic	<b>5% Chrysotile</b>
45397-65 B102321	Carpet Mastic	Homogeneous			100%	Mastic	None Detected
		Green Non-fibrous Bound					
45397-66 B102322	Carpet Mastic	Homogeneous			100%	Mastic	None Detected
		Green Non-fibrous Bound					

# ASBESTOS BULK ANALYSIS

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**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS			ASBESTOS %
			Fibrous	Non-Fibrous		
<b>45397-67</b> B102323	Covebase Mastic	Homogeneous Cream Non-fibrous Bound	100%	Mastic		None Detected
<b>45397-68</b> B102324	Covebase Mastic	Homogeneous Cream Non-fibrous Bound	100%	Mastic		None Detected
<b>45397-69</b> B102325	Fiberboard	Heterogeneous White,Brown Fibrous Loosely Bound	95%	Cellulose	5% Vinyl	None Detected
<b>45397-70</b> B102326	Mastic	Homogeneous Clear Non-fibrous Bound	100%	Mastic		None Detected
<b>45397-71</b> B102327	Plaster	Homogeneous Gray Non-fibrous Bound	40%	Binder	60% Silicates	None Detected
<b>45397-72</b> B102328	Plaster	Homogeneous Gray Non-fibrous Bound	40%	Binder	60% Silicates	None Detected
<b>45397-73</b> B102329	Ceiling Tile	Heterogeneous Brown Fibrous Loosely Bound	100%	Cellulose	<1% Paint	None Detected



# ASBESTOS BULK ANALYSIS

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**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS			ASBESTOS %	
			Fibrous	Non-Fibrous			
<b>45397-74</b> B102330	Mastic	Homogeneous Brown Non-fibrous Bound	<1%	Cellulose	100%	Mastic	None Detected
<b>45397-75</b> B102331	Ceiling Panel	Heterogeneous White Fibrous Loosely Bound	35%	Cellulose	5%	Paint	None Detected
<b>45397-76</b> B102332	Concrete Foundation	Homogeneous Gray Non-fibrous Tightly Bound			35%	Binder	None Detected
<b>45397-77</b> B102333	Concrete Foundation	Homogeneous Gray Non-fibrous Tightly Bound			65%	Silicates	None Detected
<b>45397-78</b> B102334	Concrete	Homogeneous Gray Non-fibrous Tightly Bound			65%	Silicates	None Detected
<b>45397-79</b> B102335	Concrete	Homogeneous Gray Non-fibrous Tightly Bound			65%	Silicates	None Detected
<b>45397-80</b> Layer 1 B102336	Stucco Skim Coat	Homogeneous White Non-fibrous Bound			10%	Paint	None Detected
					40%	Silicates	
					50%	Calc Carb	



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# ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

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1900 McHenry Ave, Ste 201  
Escalon, CA 95320

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**Project:** Osborn Elementary, 20-45397

## ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
Layer 2 B102336	Stucco Base Coat	Homogeneous Gray Non-fibrous Tightly Bound	35%	Binder 65% Silicates	None Detected
<b>45397-81</b> Layer 1 B102337	Stucco Skim Coat	Homogeneous White Non-fibrous Bound	10% 40% 50%	Paint Silicates Calc Carb	None Detected
Layer 2 B102337	Stucco Base Coat	Homogeneous Gray Non-fibrous Tightly Bound	35% 65%	Binder Silicates	None Detected

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**LEGEND:**    Non-Anth        = Non-Asbestiform Anthophyllite  
                 Non-Trem        = Non-Asbestiform Tremolite  
                 Calc Carb        = Calcium Carbonate

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**METHOD:** EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

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**REPORTING LIMIT:** <1% by visual estimation

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**REPORTING LIMIT FOR POINT COUNTS:** 0.25% by 400 Points or 0.1% by 1,000 Points

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**REGULATORY LIMIT:** >1% by weight

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Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*

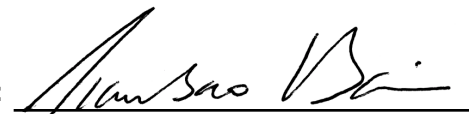
This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Information provided by customer includes customer sample ID and sample description.

**ANALYST:** \_\_\_\_\_

  
Greg Ruff

**APPROVED BY:** \_\_\_\_\_

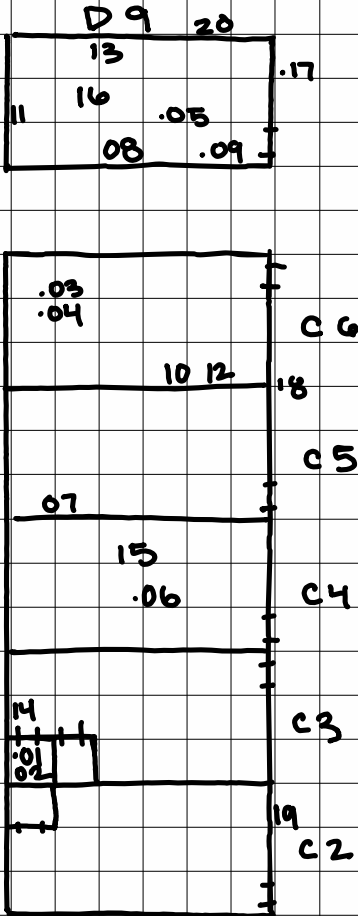
  
Tianbao Bai, Ph.D., CIH  
Laboratory Director

# **ATTACHMENT C**

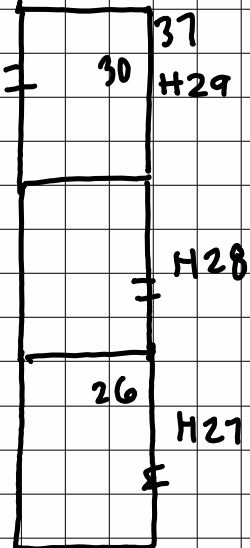
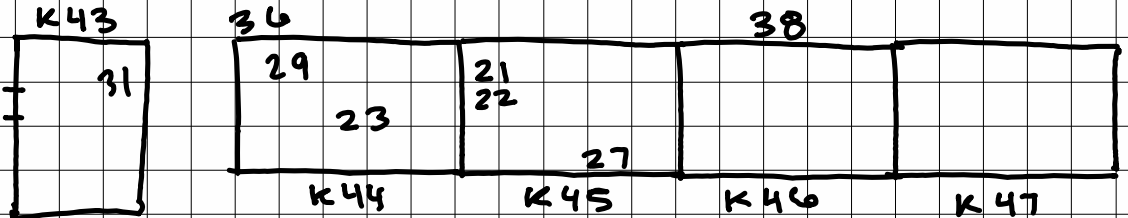
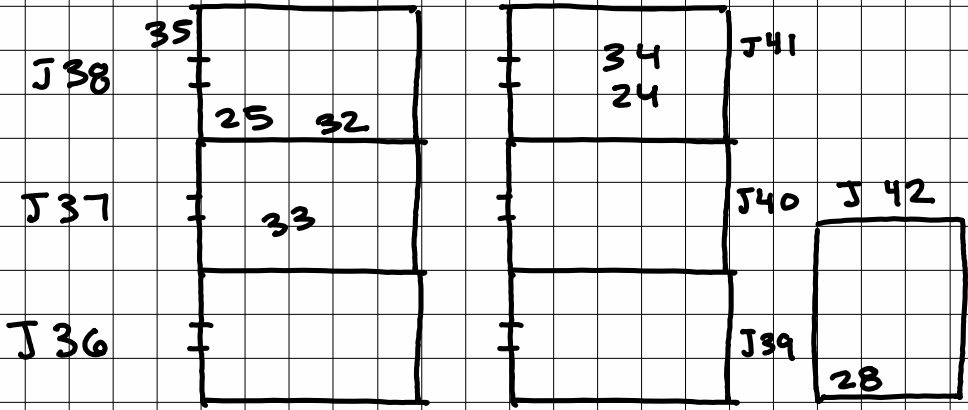
## **SITE DRAWING**

20-45397  
Site diagram

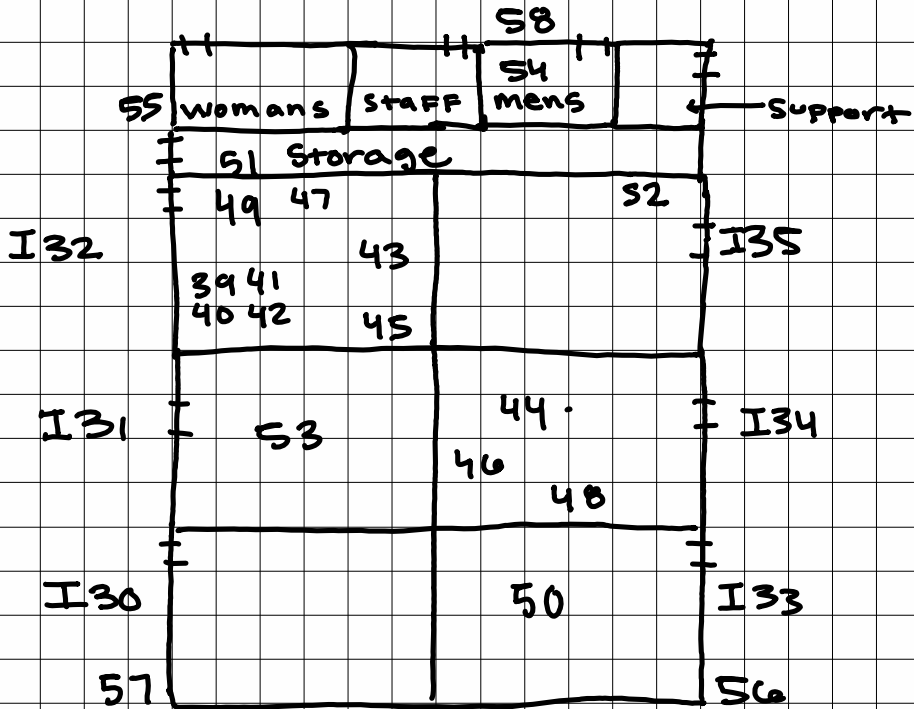
S. END portables



# N. END Portables



# I Building



# Admin Building

