Jonathan Gish, AIA
Principal Architect

Jeff Morris, AIA
Mike Clark, AIA
Associate Architects

Andrew Huff, PE, AIA
Structural Engineering

PROJECT MANUAL

FOR

VON RENNER ELEMENTARY SCHOOL: CLASSROOM BUILDING

For Newman-Crows Landing Unified School District

OWNER:
Newman-Crows Landing Unified School District
1223 Main Street
Newman, CA 95360
(209) 862-2933

ARCHITECT:
TPH Architects
519 McHenry Avenue
Modesto, CA 95354
(209) 571-2232

BID SET

F:50-32 A:02-123751

TPH Architects
519 McHenry Ave
Modesto, CA 95354
(209) 571-2232

LICENSED ARCHITECT
JONATHAN E. GISH
No. C 36244
REN. 1/27
STATE OF CALIFORNIA

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 02-123751 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 07/15/26

Jonathan Gish , AIA
Principal Architect

Nexus Engineering
1400 Lone Palm Avenue, Suite A
Modesto, CA 95351
(209) 572-7399

REGISTERED PROFESSIONAL ENGINEER
ALLEN LAYMAN
M30029
June 30, 2026
MECHANICAL
STATE OF CALIFORNIA

Allen Layman
Mechanical Engineer

Associated Engineering Group
4206 Technology Drive, #1
Modesto, CA 95356
(209) 545-3390

REGISTERED PROFESSIONAL ENGINEER
RYAN D. CARREL
No. 61619
CIVIL
STATE OF CALIFORNIA

Ryan Carrel, P.E.
Civil Engineer

H.C.S. Engineering
4512 Feather River Drive, Suite F
Stockton, CA 95219
(209) 478-8270

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. SMITH
No. E14303
Exp. 6-30-27
ELECTRICAL
STATE OF CALIFORNIA

Richard Smith
Electrical Engineer

Sam Harned Landscape Architect
P.O. Box 2275
Oakdale, CA 95361
(209) 380-7376

LICENSED LANDSCAPE ARCHITECT
R. Samuel Harned, Lic. 6331
Signature
12/31/26
Renewal Date
12/04/2025
Date
STATE OF CALIFORNIA

Sam Harned
Landscape Architect

VON RENNER ELEMENTARY SCHOOL:
CLASSROOM BUILDING

FOR
NEWMAN CROWS-LANDING UNIFIED SCHOOL DISTRICT

TABLE OF CONTENTS

DIVISION 0 - CONDITIONS OF THE CONTRACT

Signature Page . . . . . 1 page
Notice to Bidders . . . . . 2 pages
Instructions to Bidders . . . . . 7 pages
Bid Bond . . . . . 2 pages
Payment Bond . . . . . 2 pages
Performance Bond . . . . . 2 pages
Form of Proposal . . . . . 6 pages
General Conditions . . . . . 39 pages
Supplemental General Conditions . . . . . 1 page
Contract Form . . . . . 4 pages

SPECIFICATIONS
DIVISION 1 - GENERAL REQUIREMENTS

	Asbestos Sampling Report	18 pages
	Bulk Paint Sampling Report (Lead)	9 pages
01 4021	DVBE Requirements Declaration of Good Faith to use DVBE Prime Bidder Certification Primer Bidder Good Faith Effort	3 pages
01 2300	Alternate Bids	1 pages
01 2500	Substitutions	6 pages
01 2613	Contractor's Request for Information	3 pages
01 2900	Application and Certificate for Payment	6 pages
01 3113	Project Coordination	3 pages
01 3119	Project Meetings	4 pages
01 3200	Construction Schedules	3 pages
01 3300	Submittals	7 pages
01 4200	Definitions and Standards	2 pages
01 4500	Contractor Quality Control	4 pages
01 4520	Testing and Inspection	2 pages
01 5000	Temporary Facilities	5 pages

SEPTEMBER 2026

01 5240	Construction Waste Management	5 pages
	Construction Waste Management Plan	3 pages
	Construction Waste Management Acknowledgment	1 page
01 7123	Field Engineering	2 pages
01 7329	Cutting and Patching	5 pages
01 7423	Cleaning	3 pages
01 7700	Project Closeout	4 pages
01 7800	Operating and Maintenance Manuals	5 pages
01 7823	Project Record Documents	3 pages
01 7833	Warranties and Bonds	4 pages

DIVISION 2 - SITEWORK

02 2600	Geotechnical Investigation Report	72 pages
02 4100	Demolition	3 pages

DIVISION 3 - CONCRETE

03 1000	Concrete Formwork	4 pages
03 2000	Concrete Reinforcing	4 pages
03 3000	Cast-In-Place Concrete	11 pages
03 3500	Concrete Finishing	8 pages
03 3543	Polished Concrete	4 pages

DIVISION 4 - MASONRY

04 2200	Concrete Masonry Unit	6 pages

DIVISION 5 - METALS

05 1200	Structural Steel	9 pages
05 3100	Steel Decking	6 pages
05 5000	Metal Fabrications	12 pages

DIVISION 6 - WOOD, PLASTIC, AND COMPOSITES

06 1000	Rough Carpentry	9 pages
06 1713	Laminated Veneer Lumber	4 pages
06 1813	Glue Laminated Beams	5 pages
06 2000	Finished Carpentry	4 pages
06 4023	Interior Architectural Woodwork	4 pages

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07 2100	Building Insulation	3 pages
07 2613	Underslab Vapor Barrier	3 pages
07 2700	Self-Adhering Water Resistive Air Barrier Membrane	10 pages
07 5440	Thermoplastic-Polyolefin Roofing (TPO)	12 pages
07 6000	Metal Flashings and Sheet Metalwork	7 pages
07 7233.01	Roof Hatch Guard	6 pages
07 7233	Roof Hatch	3 pages
07 9200	Joint Sealers	9 pages

DIVISION 8 - OPENINGS

08 1113	Hollow Metal Doors and Frames	7 pages
08 3116	Access Panels and Frames	5 pages
08 5113	Aluminum Windows	8 pages
08 6223	Tubular Daylighting Devices	8 pages
08 7100	Finish Hardware	9 pages
08 8000	Glass and Glazing	6 pages
08 9000	Louvers and Vents	4 pages

DIVISION 9 - FINISHES

09 2000	Gypsum Board	7 pages
09 2400	Lath and Portland Cement Plaster	10 pages
09 2813	Cementitious Backing Boards	2 pages
09 3013	Ceramic Tile	8 pages
09 5113	Acoustical Ceilings	7 pages
09 6513	Rubber Topset Base	3 pages
09 6800	Carpeting	9 pages
09 7200	Vinyl Covered Tackboard	3 pages
09 8100	Acoustical Insulation and Sealants	3 pages
09 9000	Painting	7 pages
09 9723	Interior Concrete Floor Sealer	5 pages
09 9850	Fiberglass Reinforced Plastic (F.R.P.) Wall Finish	2 pages

DIVISION 10 - SPECIALTIES

10 1116	Marker Boards	2 pages
10 1400	Identifying Devices	6 pages
10 2800	Toilet Accessories	2 pages
10 2813	Fire Extinguishers and Cabinets	2 pages
10 4116	Key Storage Vault	2 pages

DIVISION 11 - EQUIPMENT

11 5213 Projection Screens . . . . . 3 pages

DIVISION 21 - FIRE SUPPRESSION

21 1300 Fire Suppression Sprinkler Systems . . . . . 7 pages

DIVISION 22 - PLUMBING

22 0500 Basic Mechanical Materials and Methods . . . . . 21 pages
22 4000 Plumbing . . . . . 10 pages

DIVISION 23 - HEATING, VENTILATION AND AIR CONDITIONING

23 0800 Heating, Ventilating and Air Conditioning . . . . . 6 pages

DIVISION 26 - ELECTRICAL

26 0000 Electrical General Requirements . . . . . 7 pages
26 0526 Grounding and Bonding for Electrical Systems . . . . . 2 pages
26 0533 Raceways and Boxes for Electrical Systems . . . . . 4 pages
26 0943 Lighting Controls . . . . . 4 pages
26 2726 Wiring Controls . . . . . 4 pages
26 5100 Interior Lighting . . . . . 1 page
26 5600 Exterior Lighting . . . . . 2 pages

DIVISION 27 - COMMUNICATIONS

27 0120 IT Systems Components and Cabling . . . . . 5 pages
27 1000 Data/Telephone Structured Cabling System . . . . . 14 pages
27 5300 Communication, Paging, Clock Signal Control . . . . . 8 pages

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 2000 Video Surveillance . . . . . 6 pages
28 3100 Fire Alarm System . . . . . 5 pages

DIVISION 31 - EARTHWORK

31 0000 Earthwork . . . . . 13 pages
31 0505 Site Clearing and Removal . . . . . 5 pages
31 2219 Finish Grading . . . . . 6 pages

31 2333 Trenching and Backfilling . . . . . 7 pages
31 2500 Erosion Control . . . . . 1 page

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 0190 Landscape Maintenance . . . . . 5 pages
32 1200 Hot-Mix Asphalt . . . . . 6 pages
32 1236 Pavement Sealer and Striping . . . . . 4 pages
32 3113 Chain Link Fences and Gates . . . . . 5 pages
32 8000 Irrigation . . . . . 17 pages
32 9000 Planting . . . . . 12 pages

DIVISION 33 - UTILITIES

33 1100 Piped Utilities . . . . . 14 pages
33 1116 Water Distribution System . . . . . 8 pages
33 3100 Sanitary Sewer System . . . . . 5 pages
33 4000 Site Drainage . . . . . 7 pages

END OF SECTION

NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT
1223 Main St., Newman, CA 95360
NOTICE TO BIDDERS

Sealed bids for VON RENNER ELEMENTARY SCHOOL: CLASSROOM BUILDING, for NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT will be received in the District office of NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, 1223 Main St., Newman, CA 95360 until **October 21, 2026 at 3:00 p.m.**, at which time they will be opened and read.

Plans and Specifications are on file and may be viewed or downloaded from the website of TPH Architects, at http://tpharchitects.com/bidding/

A mandatory pre-bid job walk is scheduled for **October 7, 2026, at 3:00 p.m. at 1388 Patchett Drive, Newman, CA 95360. We will meet at the flagpole** The pre-bid job walk must be attended by a Principal of the company proposing to submit a bid or an employee of the company who is a Construction Superintendent or a Project Manager. The bid of any Contractor not in attendance at the pre-bid job walk will not be accepted.

If further information is needed, call Jonathan Gish, AIA, at (209) 571-2232.

Bids shall be submitted on forms prepared by the Architect. A 3% Disabled Veteran Business Enterprise (DVBE) participation has been established for this project. All bidders must submit the required DVBE forms supplied in this project manual. Failure to submit DVBE documentation will deem the Bidder non-responsive.

Prequalification Required: **All** prospective general contractors, and mechanical, electrical, and/or plumbing subcontractors must be prequalified in order to be submit or be included on a bid for this project. The District has contracted with Quality Bidders for prequalification administration**. General contractors and prospective mechanical, electrical, and/or plumbing subcontractors** must submit prequalification applications through www.qualitybidders.com. Any bids received from contractors who have not been prequalified will be returned unopened. Any bids that include prospective mechanical, electrical, and/or plumbing subcontractors who have not been prequalified will be deemed non-responsive.

The District has determined the general prevailing rate to be the per diem wages for each craft or type of workman or mechanic needed to execute this contract as set forth in the collective bargaining agreements for Stanislaus, San Joaquin, Merced, Mariposa and Tuolumne Counties, California. Copies of all collective bargaining agreements relating to the work are on file and available for inspection in the office of the California Department of Industrial Relations, Division of Labor Statistics and Research, 455 Golden Gate Avenue, San Francisco, CA, 94102, (415-703-4780), http://www.dir.ca.gov/dlsr/ .

In compliance with SB 854, no contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

In addition, no contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

A valid B contractor's license will be required.

NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT reserves the right to waive any irregularity or informality in the bidding.

Published: September 16, 2026
September 23, 2026

INSTRUCTIONS TO BIDDERS

Securing Documents:

Drawings and Specifications are available at: http://www.timhuffaia.com/outtobid.php.

Proposals:

Proposals to receive consideration shall be made in accordance with the following instructions:

1. Proposals shall be made on a form obtained from the Architect or Owner. All items on the form must be filled out. Numbers must be stated in figures, and the signatures of all individuals must be in longhand. The completed form must be without interlineation, alterations, or erasures.

2. No proposal will be considered which makes exceptions, changes, or in any manner makes reservations to the terms of the Contract Documents.

3. Questions regarding documents, discrepancies, omissions, or doubt as to meanings shall be referred immediately to the Architect who will send written instructions clarifying such questions to each bidder in the form of an Addendum or Clarification. No contact with the Owner or District Staff is permitted.
   A. Questions regarding the project will be accepted until 5:00 p.m., October 12, 2026.

4. Each bid must give the full business address of the bidder and be signed by him and his usual signature. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by one of the members of the partnership, or by an authorized representative, followed by the signature and designation of the person signing.

   Bids by corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signing shall also be typed or printed below the signature. When requested by the Owner, satisfactory evidence of the authority of the officer signing in behalf of the corporation shall be furnished.

5. Contractor Registration: In compliance with SB 854, no contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
   In addition, no contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

6. Compliance Monitoring: This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, Office of the Labor Commissioner.

7. Pursuant to the provisions of Sections 4100 to 4114, inclusive, of the Public Contract Code of the State of California, every Bidder shall, in his bid, set forth:
   A. The name, location of the place of business, Contractor's License Number, and DIR Registration Number of each subcontractor who will perform work or labor or render service to the bidder in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the bidder, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in plans and specifications, in an amount in excess of one-half (1/2) of one percent (1%) of the bidder's total bid.

   B. The portion of the work which will be done by each such subcontractor. Only one subcontractor shall be listed for each such portion of the work as defined in the bid. If the bidder fails to specify a subcontractor for each portion of the work to be performed under the contract in excess of one-half (1/2) of one percent (1%) of the bidder's total bid, he agrees to perform that portion himself. The successful bidder shall not, without the consent of the Owner either:
      1) Substitute any person as subcontractor in place of the subcontractor designated in the original bid.

      2) Permit any subcontractor to be assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the bid.

      3) Sublet or subcontract any portion of the work in excess of one-half (1/2) of one percent (1%) of the total bid as to which his original bid did not designate a subcontractor.

8. California Nonresident Vendors
   A. California nonresident vendors may be subject to a 7% withholding on payments over $1500 annually who are paid for:
      1) Performing services in California,

      2) A rental/lease of property located in California,

      3) Rental/lease of machinery and equipment,

      4) Royalties.

   B. California nonresident vendors will be required to fully complete and provide the appropriate tax forms as required by the State of California Franchise Tax Board.

C. All vendors will be required to fully complete and provide a Form W-9.

9. Prequalification Required:

A. **All** prospective general contractors, and mechanical, electrical, and/or plumbing subcontractors must be prequalified in order to be submit or be included on a bid for this project. The District has contracted with Quality Bidders for prequalification administration**. General contractors and prospective mechanical, electrical, and/or plumbing subcontractors** must submit prequalification applications through www.qualitybidders.com. Any bids received from contractors who have not been prequalified will be returned unopened. Any bids that include prospective mechanical, electrical, and/or plumbing subcontractors who have not been prequalified will be deemed non-responsive.

B. Any contractor with questions about the application process can reach the Quality Bidders Team at qbsupport@colbitech.com for help with walking through the process. See attached 'Attachment A' for further instructions.

C. Bidders should note:

1) Prospective Contractors for publicly bid projects shall submit the questionnaire and financial statement at least ten (10) business days before the date fixed for public opening of sealed bids. Contractors must be deemed prequalified by the District at least five (5) business days before the fixed bid opening date. (Public Contract Code 20111.6.f)

2) Prospective electrical, mechanical and plumbing subcontractors for publicly bid projects shall submit the questionnaire and financial statement at least ten (10) business days before the date fixed for public opening of sealed bids. Prospective electrical, mechanical and plumbing subcontractors must be deemed prequalified by the District at least five (5) business days before the fixed bid opening date.

D. **All** general contractors and prospective mechanical, electrical, and/or plumbing subcontractors must prequalify through Quality Bidders at www.qualitybidders.com. Any bids received from contractors who have not been prequalified will be returned unopened. Any bids that include prospective mechanical, electrical, and/or plumbing subcontractors who have not been prequalified will be deemed non-responsive.

10. Proposals must be accompanied with a certified cashier's check, bank issued official check, or bidder's bond, for an amount not less than ten percent (10%) of the amount of the base bid. The certified cashier's check, bank issued official check, or bidder's bond shall be made payable to the order of NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT. If a bidder's bond accompanied the proposal, said bond shall be secured by a California based surety company satisfactory to NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT.

Said check or bond shall be given as a guarantee that the bidder will enter into the contract and furnish the necessary bonds and insurance if awarded the work, and in case of refusal or failure to enter into said contract, the check or bond, as the case may be, shall be payable to NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT and retained as liquidated damages.

11. **Proposals shall be sealed and filed in the Purchasing Office, NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, 1223 Main St., Newman, CA 95360 no later than October 21, 2026 at 3:00 p.m.. The following DVBE documentation are to be submitted no later than (**October 22, 2026 at 3:00 p.m.) **at the location noted above. including:**

    A. Prime Bidder Certification of Disabled Veteran Business Enterprise Participation;
    B. Prime Bidder Good Faith Effort Work Sheet;
    C. As well as DVBE letters from the office of Small Minority Business (OSMB) as applicable,

    Disabled Veteran Business Enterprises. In Accordance with education Code section 17076.11 the District has a DVBE participation goal of 3% per year of the overall dollar amount of state funds allocated to the District pursuant to the Leroy F. Greene School Facilities Act of 1998, and expended each year by the District. Bidders must make a good faith effort to contact and utilize DVBE subcontractors and suppliers in securing bids for performance of the contract and certify, under penalty of prejury, that a good faith effort was made to include DVBE subcontractors and suppliers in the bid. Information regarding certified DVBE firms cal be obtained from the Office of Small Business Certification and Resources (OSBCR) at https://caleprocure.ca.gov/pages/PublicSearch/supplier-search.aspx?psNewWin=true. Verification of DVBE status must be obtained from the OSBCR by receiving an approved certification letter and reference number from that office. Bidders are encouraged to retain documentation of their good faith efforts, in the event such documentation is requested by the District. If a Bidder is certified DVBE Certification Letter issued by OSBCR. In addition, bidders must indicate on the Designation of Subcontractors form whether a subcontractor is DVBE Certified, and provide the District a copy of the DVBE Certification Letter issued by OSBCR. Failure to comply with the requirements set forth in this paragraph shall render a bid non-responsive.

    Prior to, and as condition precedent for final payment under the Contract, the successful bidder shall provide the District with written documentation identifying the amount paid (if applicable) to certified DVBE subcontractors and suppliers in performance of the contract and provide a copy of the DVBE Certification Letter issued by OSBCR for each DVBE. This documentation will be used by the District to evaluate its success in meeting its DVBE participation goals.

Withdrawal of Proposals:

Proposals may be withdrawn by the bidder prior to the time fixed for the opening of bids.

Opening of Proposals:

Opening of proposals shall be as soon after the hour set as will be possible. Any and all bidders will be permitted to attend. The Board of Trustees is allowed sixty (60) days from that date in which to determine low bidder.

Examination of Contract Documents and Site:

Before submitting a proposal, bidders shall examine the contract documents. They shall visit the site of the proposed work, examine the building, or buildings, if any, and any work that may have been done thereon. They shall fully inform themselves of all conditions, in, at, and about the site, the building or buildings, if any, and any work that may have been done thereon.

Form of Contract:

The form of contract which the successful bidder will be required to execute, if awarded the work, is attached hereto and is made a part hereof. Such contract contains, among other things, matters required by State Law to be inserted in contracts for public work, including wage scale, hours of work per day, etc.

Addenda:

Any addenda or bulletins, issued during the time of bidding, shall form a part of the contract documents loaned to the bidder for the preparation of his proposal, shall be covered in the proposal, and shall be made a part of the contract.

Award of Contract:

Rejection of any or all proposals, to abandon work entirely or waiver of any informality in receiving of bids is reserved as the right of the Owner. Before the contract is awarded, the Board of Trustees may at his sole discretion, require from the proposed Contractor further evidence of the reasonably qualifications of such contractor to faithfully, capable, and reasonable perform such proposed contract and may consider such evidence before making its decision on the award of such proposed contract.

The contract shall be awarded to the lowest responsible bidder as interpreted by the Owner and specified herein and shall be entered into by the successful bidder within the (10) days after being notified by the Owner. Identity of lowest bidder will be determined by adding to or subtracting from the base bid the cost of such alternatives as Owner decided to include in the work and contract. The award, if made, will be made within sixty (60) days after the opening of the proposal.

Public Works Project Award Notification:

The PWC 100 form should be completed on-line by the Awarding Body (SCOE). The completion and the submission of this form fulfills the required public works project award notification to both the Division of Apprenticeship Standards [Labor Code sec. 1773.3 (replacing former DAS-13 notification) and the Division of Labor Standards Enforcement Public Works Compliance Monitoring Unit [8 Cal. Code Reg. sec. 16451(a)].

Execution of Contract:

The Contract shall be signed by the successful bidder in duplicate counterpart and returned, together with the contract bonds and required insurance certificates, policies and endorsements within ten (10) days after the bidder has received notice that the contract has been awarded. Contractor and Owner shall sign a set of the contract documents for filing with the contract.

Contract Bonds:

Two bonds, as itemized below and in the forms presented in these contract documents, shall be furnished by the successful bidder at the time of entering into contract and filed with the Board of Trustees. They shall be in the form of surety bonds issued by corporations duly and legally licensed to transact business in the State of California, satisfactory to the Owner.

Performance Bond in the amount of one hundred percent (100%) of the contract sum to insure Owner during construction and for one year after completion against faulty or improper materials or workmanship and to assure Owner of full and prompt performance of contract and shall be secured from a California based surety or sureties satisfactory to the Owner.

Contractor's Bond (Labor and Material) in the amount of one hundred percent (100%) of the contract sum in accordance with the laws of the State of California to secure payment of any and all claims for labor and materials used or consumed in performance of this contract and shall be secured from a California based surety or sureties satisfactory to the Owner.

Payments:

Payments to the Contractor on account of the contract shall be made in accordance with the terms of the contract.

Certified Payroll:

All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement).

These new requirements will apply to all public works that are subject to the prevailing wage requirements of the Labor Code, without regard to funding source.

Time of Completion and Liquidated Damages:

Time is of the essence in this contract, and all work called for herein and all requirements shall be completed within (365) three hundred sixty-five calendar days.

Should said work not be completed within the time limit as may be extended as herein provided, damages will be sustained by the Owner. It is understood and agreed that it is and will be impracticable or extremely difficult to determine the actual amount of damages which the Owner will sustain in the event of and by reason of such delay, and it is therefore agreed that the contractor will pay the Owner liquidated damages as specified in Article 8 of the General Conditions.

Partial Payments:

Once each month during the progress of the work, Contractor shall submit to Architect a progress payment request. The progress payment request shall be based on the approved bid breakdown for the cost of the work completed plus the acceptable materials delivered to the site or stored subject to the control of Contractor and not yet installed. The progress payment request shall be submitted on the monthly anniversary of the day selected by the Owner at job start meeting. Architect shall review and may certify as to the validity of the request. No progress payment shall be made without the certification of Architect. Progress payment requests shall be processed with a minimum of a five percent (5%) retention. This retention is part security for the fulfillment of the contract by Contractor. Progress payments shall not be construed as acceptance of any work which is not in accordance with the requirements of the contract.

END OF SECTION

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____ _____ as principal, and _____ _____as Surety, are hereby held and firmly bound unto NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, hereinafter called the "Owner", in the sum of:

_____ Dollars

($ _____)

for payment of which sum, well and truly to be made, we hereby jointly and severally find ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Owner a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing for the:

VON RENNER ELEMENTARY SCHOOL: CLASSROOM BUILDING
for
NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT

in strict accordance with Contract Documents.

NOW, THEREFORE,

a. If said bid shall be rejected, or, in the alternate;

b. If said bid shall be accepted and the Principal shall execute and deliver a contract in the form of agreement attached hereto and shall execute and deliver Performance and Contractor's Bonds in the forms attached hereto (all property completed in accordance with said bid), and shall in all other respects perform the agreement created by the acceptance of said bid;

Then this obligation shall be void, otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereunder shall be the amount of this obligation as herein stated. Surety, for value received, thereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract on the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in anyway affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or to the work, or to the specifications.

In the event suit is brought upon this bond by the Owner and judgment is recovered the Surety shall pay all costs incurred by the Owner in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF, the above-bounden parties have executed this Instrument under their several seals this _____ day of_____, 2026 the name and corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In presence of:

_____(Seal)

_____ _____
(Address) (Business Address)

_____ _____(Seal)
(Individual Principal)

_____ _____
(Address) (Business Address)

Attest: _____
(Corporate Principal)

_____
(Business Address)

_____ By:_____
(Affix Corporate Seal)

_____

The rate or premium on this bond is _____
per thousand. Total amount of premium charged, $_____ .

(This bond must be signed and acknowledged by both Principal and Surety before a Notary Public, and acknowledgments with Notarial Seals attached hereto.)

_____
Surety

By: _____
Attorney-in-fact

(The above must be filled in by Corporate Surety. Surety company must be California admitted insured.)

END OF SECTION

PAYMENT BOND
(Labor & Material)

KNOW ALL MEN BY THESE PRESENTS:

That WHEREAS,

_____

and _____

Hereinafter designated as the "Principal," have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to:

VON RENNER ELEMENTARY SCHOOL: CLASSROOM BUILDING
for
NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT
1388 Patchett Dr, Newman, CA 95360

Which said agreement dated _____, 2026, and all of the contract documents attached to or forming a part of said agreement, are hereby referred to and made a part hereof; and

WHEREAS, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by whom the contract is awarded to secure the claims arising under said agreement.

NOW, THEREFORE, THESE PRESENTS WITNESSETH:

That the said Principal and the undersigned _____ _____ as Corporate Surety, are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of _____ Dollars which sum well and truly be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The conditions of this obligation is that if the said Principal or any of his or its subcontractors, or the heirs, executors, administrators successors, or assigns of any, all, or either of them, shall fail to pay for any materials, provisions, provender or other supplies, or teams, used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, that said Surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporation entitled to file claims so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

And the said Surety, for value received, hereby stipulates and agrees that no charge, extension of time, alteration, or addition to the terms of said contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety this _____ day of_____, 2026.

(To be signed by)
(Principal and Surety,)
(and acknowledged and)
(Notarial Seal Attached.)_____
Principal

_____

_____
Surety

_____

_____

By _____
(Attorney-in-fact)

_____

The above bond is accepted and approved this_____day of_____, 2026.

END OF SECTION

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____ _____, as Principal, and _____ _____, as Surety, are held and firmly bound unto NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, in the County of_____ , State of California, hereinafter called the "Owner", in the sum of

_____ Dollars

($_____)

for the payment of which sum well and truly made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such, that whereas the Principal entered into a certain contract with the Owner, date _____, 2026 for:

VON RENNER ELEMENTARY SCHOOL: CLASSROOM BUILDING
for
NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT
1388 Patchett Dr, Newman, CA 95360

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extension thereof that may be granted by the Owner, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, then, this obligation to be void, otherwise to remain in full force and virtue.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alternation or addition to the terms of the contract or to the work to be performed thereunder, or the specifications accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract, or to the work, or to the specifications.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals this _____ day of_____, 2026 , the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In presence of:

_____ _____ _____

(Individual Principal) (Seal)

_____ _____

(Address) (Business Address)

_____ _____

_____ _____

_____ _____

Attest: _____

(Corporate Principal)

_____

(Business Address)

_____ By: _____

(Affix Corporate Seal)

_____

Attest: _____

(Corporate Surety)

_____

(Business Address)

_____ By: _____

(Affix Corporate Seal)

_____

The rate or premium on this bond is _____ per thousand.

Total amount of premium charged, $ _____ .

(The above must be filled in by Corporate Surety.)

END OF SECTION

FORM OF PROPOSAL

_____, California

_____, 2026

Board of Trustees
Newman-Crows Landing Unified School District
1223 Main St., Newman, CA 95360

Members of the Board:

The undersigned doing business under the firm name of_____

_____

understands that the District may select from any line item(s) or combination of line items listed on the Base Bid. Furthermore, the undersigned, having carefully examined the Contract Documents, titled,

VON RENNER ELEMENTARY SCHOOL: CLASSROOM BUILDING

for
NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT

proposes to furnish all materials and labor called for by them for the entire work, including all taxes for the following amounts:

Base Bid: The undersigned proposes to perform **all** work as defined in the Plans and Specifications to construct the project and all appurtenant work thereto for the sum of:
_____ Dollars
($_____).

If written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned within sixty (60) days after the date of opening of the bids, or any time thereafter before the bid is withdrawn, the undersigned will, within ten (10) days after the date of such mailing, telegraphing, or delivering of such notice, execute and deliver a contract in the form of agreement present in these contract documents and give Performance and Contractor's Bonds and insurance certificates, endorsements, and/or policies in accordance with the Contract Documents.

The Undersigned hereby designates as his office to which such notice of acceptance may be mailed, telegraphed, or delivered:

Our Public Liability and Property Damage Insurance is placed with:

_____

Our Worker's Compensation Insurance is placed with:

_____

Circular letters, addenda, etc., bound with specifications or issued during the time of bidding are included in the proposal, and, in completing the contract, they are to become part thereof.

The receipt of the following addenda to the specifications is acknowledged:

Addendum No. _____ Date _____
Addendum No. _____ Date _____
Addendum No. _____ Date _____

This bid may be withdrawn by the bidder at any time prior to the scheduled time for the opening of bids. The representations made herein are made under penalty of perjury.

Dated_____ ,

License No._____

Expiration Date of License_____

By (please print)_____

Signed_____
_____

Business Address_____

Telephone_____

Fax_____

Federal I.D# or Social Security #:_____

Department of Industrial Relations #: _____

Note: If Bidder is a corporation, write state of incorporation under signature, attach notarized proof of authority to bind corporation and list corporation officers; and, if a partnership, give full names of all partners. Use space below to record this information.

Do not include in the envelope any bids for other work.

DESIGNATION OF SUBCONTRACTORS

Contractor's Name:_____

In accordance with the provisions of Division 1, Chapter 4 of the Public Contract Code, known as the "Subletting and Subcontracting Fair Practices Act," the contractor signatory to this agreement shall be known as the prime contractor of the work herein specified, and he shall set forth in his bid the complete name, location of the place of business and license number of each subcontractor who will perform work or labor, or render service to the prime contractor in or about the construction of the work in an amount in excess of one-half (1/2) of one (1) percent of the prime contractor's total bid, and the portion of the work which will be done by each subcontractor if the contract for said work is awarded to said bidder. The prime contractor shall list only one subcontractor for each such portion of the work as is defined by the prime contractor in his bid.

If the prime contractor fails to specify a subcontractor or if he specified more than one subcontractor for any portion of work to be performed under the contract, in excess of one-half (1/2) of one (1) percent of the prime contractor's total bid, he agrees that he is fully qualified to perform that portion himself, and that he shall perform that portion himself. If, after the award of the contract, the prime contractor shall, except as provided for in said Chapter herein above referred to, subcontract any such portion of the work, the prime contractor shall be subject to the penalties provided.

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
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Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

"NONCOLLUSION AFFIDAVIT"

(TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID)

_____, being first duly sworn, deposes and says that he or she is

_____ of _____
is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid."
Added Stats 1988 ch 1548 sec 1.

_____ _____
Signature Date

_____ _____
Notary

END OF SECTION

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1 - CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 The Contract Documents - The Contract Documents consist of the Contract, the Instructions to Bidders, the Bid Bond, Performance and Payment Bond, the Conditions of the Contract (General, Supplemental, and other Conditions), the Drawings, the Specifications, all Addenda, issued prior to execution of the Contract, and all Modifications thereto. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Architect pursuant to Subparagraph 1.2.5., or (4) a written order for a minor change in the work issued by the Architect pursuant to Paragraph 12.4. A Modification may be made only after execution of the Contract.

1.1.2 The Contract - The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto, and supersedes all prior negotiation, representations, or agreements, either written or oral, including the bidding documents. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1.

1.1.3 The Work - The term work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

1.1.4 The Project - The Project is the total construction designed by the Architect of which the work performed under the Contract Documents may be the whole or a part.

1.1.5 Owner - The Owner is NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, of Stanislaus County, California, and named as such in the Agreement.

1.1.6 District - The District shall mean NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, Stanislaus County, California.

1.1.7 Estimated Completion Date - The Estimated Completion Date shall be the date set forth as such in the Supplemental General Conditions.

1.1.8 Fixed Completion Date - The fixed Completion Date shall be the date set forth as such in the Supplemental General Conditions.

1.2 EXECUTION, CORRELATION, INTENT AND INTERPRETATIONS

1.2.1 The Contract Documents, including the Contract in the forms furnished the bidder prior to his bid, shall be signed in not less than triplicate by the Owner and Contractor.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. The intention of the Documents is to include all labor, materials, equipment, and other items as provided in Subparagraph 4.4.1 necessary for the proper execution and completion of the work. It is not intended that work not covered under any heading, section, branch, class, or trade of the Specifications shall be supplied unless it is required elsewhere in the Contract Documents or is reasonable inferable therefrom as being necessary to produce the intended results. Words which have well-known technical or trade meanings are used herein in accordance with such recognized meanings.

1.2.4 The organization of the Specifications into divisions, sections, and articles, and the 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.

1.2.5 Written interpretations necessary for the proper execution of progress of the work, in the form of drawings or otherwise, will be issued with reasonable promptness by the Architect and in accordance with any schedule agreed upon. Such interpretations shall be consistent with and reasonable inferable from the Contract Documents, and may be effected by Field Order.

1.3 COPIES FURNISHED AND OWNERSHIP

1.3.1 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, six (6) copies of Drawings and Specifications.

ARTICLE 2 - ARCHITECT

2.1 DEFINITION

2.1.1 The Architect is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect means the Architect or his authorized representative.

2.1.2 Nothing contained in the Contract Documents shall create any contractual

relationship between the Architect and the Contractor.

2.2 ADMINISTRATION OF THE CONTRACT

2.2.1 The Architect will provide general Administration of the Construction Contract, including performance of the functions hereinafter described.

2.2.2 The Architect will be the Owner's representative during construction and until final payment. The Architect will have authority to act on behalf of the Owner to the extent provided in the Contract Documents, unless otherwise modified by written instrument which will be shown to the Contractor. The Architect will advise and consult with the Owner, and all of the Owner's instructions to the Contractor shall be issued through the Architect.

2.2.3 The Owner will provide one or more full time inspectors to assist the Architect in providing competent and adequate inspection during all normal working periods. The Inspector is to be approved by the Architect and The Division of the State Architect.

2.2.4 The Architect, his representatives, including the inspectors and owner, shall at all times have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the architect may perform his functions under the Contract Documents.

2.2.5 The Architect will make periodic visits to the site to familiarize himself generally with the progress and quality of the work and to determine, in general, if the work is proceeding in accordance with the Contract Document. On the basis of his on-site observations as an Architect, he will keep the Owner informed of the progress of the work, and will endeavor to guard the Owner against defects and deficiencies in the work of the Contractor. The Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work. The Architect will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connections with the work, and he will not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents.

2.2.6 Based on such observations and the Contractor's Applications for Payment, the Architect will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.

2.2.7 The Architect will be, in the first instance, the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by both the Owner and Contractor. The Architect will, within a reasonable time, render such interpretations as he may deem necessary for the proper execution of progress of the

work.

2.2.8. Claims, disputes and other matters in question between the Contractor and the Owner relating to the execution or progress of the work or the interpretation of the Contract Documents shall be referred initially to the Architect for decision which he will render in writing within a reasonable time.

2.2.9 All interpretations and decisions of the Architect shall be consistent with the intent of the Contract Documents.

2.2.10 The Architect's decision in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

2.2.11 The Architect will have authority to reject work which does not conform to the Contract Documents. Whenever he considers it necessary or advisable to insure the proper implementation of the Contract Documents, he will have authority to require the contractor to stop the work or any portion thereof, or to require special inspection or testing of the work as provided in Subparagraph 7.8.2 whether or not such work be then fabricated, installed or completed. However, neither the Architect's authority to act under this Subparagraph 2.2.11, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect to the Contractor, any subcontractor, any of their agents or employees, or any other person performing any of the work.

2.2.12 The Architect will review Shop Drawings and Samples as provided in Subparagraph 4.12.1 through 4.12.8 inclusive.

2.2.13 The Architect will prepare Change Orders in accordance with Article 12, and will have authority to order minor changes in the work as provided in Subparagraph 12.5.1.

2.2.14 The Architect will conduct inspections to determine the dates of the Substantial Completion and final completion, will review written guarantees and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment.

2.2.15 The Architect will not be responsible for the acts or omissions of the Contractor, or any Subcontractors, or any of his or their agents or employees, or any other persons performing any of the work.

2.2.16 In case of the termination of the employment of the Architect, the Owner shall appoint an architect whose status under the Contract Documents shall be that of the former architect.

ARTICLE 3 - OWNER

3.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

3.1.1 The Owner shall furnish all surveys describing the physical characteristics, legal limits and utility locations for the site of the project.

3.1.2 The Owner shall secure and pay for easements for permanent structures or permanent changes in existing facilities.

3.1.3 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the work.

3.1.4 The Owner shall issue all instructions to the Contractor through the Architect.

3.1.5 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Payment and Insurance in Article 9 and 11 respectively.

3.2 OWNER'S RIGHT TO STOP THE WORK

3.2.1 If the Contractor fails to correct defective work as required by Paragraph 13.2 or persistently fails to carry out the work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

ARTICLE 4 - CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or organization identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Architect any error, inconsistency or omission he may discover; but the Contractor shall not be liable to the Owner or the Architect for any damage

resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the work at any time without Contract Documents or where required, approved Shop Drawings, Product Data or Samples for such portion of the work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the Contract.

4.3.2 The Contractor shall be responsible to the owner for the acts and omissions of his employees, Subcontractors, and their agents and employees, and other persons performing any of the work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the work in accordance with the Contract Documents either by the activities or duties of the Architect in his administration of the Contract, or by inspections, tests or approvals required or performed under Paragraph 7.8 by persons other than the Contractor.

4.4 LABOR AND MATERIALS

4.4.1 Unless otherwise specifically provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the work, whether temporary or permanent and whether or not incorporated or to be incorporated in the work.

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the task assigned to him.

4.5 WARRANTY

4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects, and in conformance with the Contract Documents. All work not so conforming to these standards may be considered defective.

4.5.2 The warranty provided in this Paragraph 4.5 shall be in addition to and not in limitation of any other warranty or remedy required by law or by the Contract

Documents.

4.6 TAXES

4.6.1 The Contractor shall pay all sales, consumer, use, and other similar taxes required by law.

4.7 PERMITS, FEES, AND NOTICES

4.7.1 The Contractor shall secure and pay for all permits and licenses necessary for the prosecution of the work, including utility fees. District will reimburse Contractor the actual documented cost of such permits, licenses and fees, with no overhead or profit added.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the performance of the work. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Architect in writing, and any necessary changes shall be adjusted by appropriate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the Architect, he shall assume full responsibility therefore, and shall bear all costs attributable thereto.

4.7.3 All materials and workmanship shall conform to the California Code of Regulations and Title 24, Parts 1 to 5, Part 9, and Part 12, Division of the State Architect, and the Contractor shall keep a copy of Title 24 on the job at all times. All work and materials shall be in full accordance with the latest Rules and Regulations of the State Fire Marshal, National Board of Fire Underwriters, California Electric Code, Safety Orders of Division of Industrial Safety, California Plumbing Code, and other applicable federal and state laws and regulations. Such laws and regulations shall be considered a part of these specifications, as if set forth herein in full and all work hereunder shall be executed in accordance therewith. Nothing in these plans or specifications is to be construed to permit work not conforming to the Codes.

4.7.4 All materials furnished and all work done under these specifications shall be subject to rigid inspection by the Architect and Owner who shall furnish competent and adequate inspection during normal working periods. When specific inspection is required as called for in plans and specifications, the Contractor shall inform the Architect and Inspector of the schedule of such work. Failure to do so may require such work to be torn out and replaced under proper inspection, and the entire cost of tearing out and replacement including cost of any materials furnished by the Owner and used in the work torn out, shall be borne by the Contractor. Work covered up without the approval of the Architect or the Owner shall be uncovered to the extent required and the Contractor shall similarly bear the cost of performing all the work

and furnishing all the materials necessary for the removal of the covering and its subsequent replacement.

4.7.5 Whenever the Contractor arranges to work at night, or at any time when work is not usually in progress, or to vary the period during which work is carried out each day, he shall give the Owner due notice so that inspection may be provided. Such work shall be done without extra compensation to the Contractor and such additional inspection costs shall be chargeable to the Contractor providing such work is not performed at the request of the Owner to meet earlier completion time than that established in the Contract, or for a cause not under control of the Contractor.

4.8 ALLOWANCES (not used)

4.9 SUPERINTENDENT

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the project site during the progress of the work. The superintendent shall be satisfactory to the Architect, and shall not be changed except with the consent of the Architect, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the contractor. Important communications will be confirmed in writing. Other communications will be so confirmed on written request in each case.

4.10 PROGRESS SCHEDULE

4.10.1 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Architect's approval an estimated progress schedule for the work. The progress schedule shall be related to the entire Project to the extent required by the Contract Documents. This schedule shall indicate the dates for the starting and completion of the various stages of construction and shall be revised as required by the conditions of the work, subject to the Architect's approval.

4.11 DRAWINGS AND SPECIFICATIONS AT THE SITE

4.11.1 The Contractor shall maintain at the site for the Owner one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders, and other modifications, in good order and marked to record all changes made during construction. these shall be available to the Architect. The Drawings, marked to record all changes made during construction, shall be delivered to the Architect for the Owner upon completion of the work.

4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

4.12.1 Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any Subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the work.

4.12.2 Product Data 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.

4.12.3 Samples are physical examples furnished by the Contractor to illustrate materials, equipment, or workmanship, and to establish standards by which the work will be judged.

4.12.4 The Contractor shall review, stamp with his approval and submit, with reasonable promptness and in orderly sequence so as to cause no delay in the work or in the work of any other contractor, all Shop Drawings and Samples required by the Contract Documents or subsequently by the Architect as covered by modifications. Shop Drawings and Samples shall be properly identified as specified, or as the Architect may require. At the time of submission the Contractor shall inform the Architect in Writing of any deviation in the Shop Drawings or Samples from the requirements of the Contract Documents.

4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar date, or will do so, and that he has checked and coordinated the information contained within such submittal with the requirements of the work and of the Contract Documents.

4.12.6 The Architect will review and approve Shop Drawings, Product Data and Samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. The Architect's approval of a separate item shall not indicate approval of an assembly in which the item functions.

4.12.7 The Contractor shall make any corrections required by the Architect and shall resubmit the required number of corrected copies of Shop Drawings, Product Data or new Samples until approved. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Architect on previous submissions.

4.12.8 The Architect's approval of Shop Drawings, Product Data or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of

the Contract Documents unless the Contractor has informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation, nor shall the Architect's approval relieve the Contractor from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples.

4.12.9 No portion of the work requiring a Shop Drawing, Product Data, or Sample submission shall be commenced until the submission has been approved by the Architect. All such work shall be in accordance with approval submittal.

4.12.10 The Contractor shall submit to the Architect and Owner for approval, within thirty-five(35) days after the signing of the Contract, a complete list setting forth the brand name and manufacturer of all materials and/or equipment proposed for use under this Contract. The list shall include all items required under the Contract, although the brand name or manufacturer may not be specifically included in the specifications. Where specific brands are specified, substitutions therefore shall be clearly indicated on the material equipment list.

4.12.11 Wherever samples are called for in the specifications, or where it is desired to substitute another material or article for the specified, the Contractor shall submit samples in triplicate to the Architect with all freight charges prepaid. One sample will be returned to him at his expense, with letter stating that it is approved or rejected, and one sample will be returned to the Owner for his records. All materials delivered on the site or placed in the building shall be equal to the sample in every respect.

4.12.12 Where special makes or brands are called for, they are mentioned as a "Standard." Others of equal quality may be used, provided approval is first obtained in writing from the Architect. Unless substitutions are requested, no deviation from the plans and specifications will be allowed. Substitutions shall be requested or offered for investigation in ample time, as no delay or extra time will be allowed on account thereof.

Requests for substitution will only be considered when offered by the General Contractor and such requests must be made within thirty-five (35) days after the award of the Contract.

4.12.13 All materials shall be delivered as to insure a speedy and uninterrupted progress of the work. All materials shall be stored so as to cause no obstruction and so as to prevent overloading of any portion of the structure, and the Contractor shall be entirely responsible for damage or loss by weather or other cause.

4.13 USE OF SITE

4.13.1 The Contractor shall confine operations at the site to areas permitted by law,

ordinances, permits and the Contract Documents and shall not unreasonable encumber the site with any materials or equipment.

4.14 CRIMINAL HISTORY CLEARANCE/SITE PROTECTION CERTIFICATION

4.14.1 The Criminal History Clearance/Site Protection Certification form, see Article 21 of the General Conditions, is required from all successful bidders pursuant to the requirements mandated by California Education Code Sections 33192 and 45124.1 et seq., the Michelle Montoya School Safety Act of 1997. This provides that a school district may require a construction contractor that has a contract with the district to obtain a criminal history clearance from the Department of Justice of all employees working on a school site under that contract.

4.15 CUTTING AND PATCHING OF WORK

4.15.1 The Contractor shall be responsible for all cutting, fitting, or patching that may be required to complete the work or to make its several parts fit together properly.

4.15.2 The Contractor shall not damage or endanger any portion of the work or the work of the Owner or any separate contractors by cutting, patching, or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Owner shall not unreasonably withhold from the Contractor or any separate contractor his consent to cutting or otherwise altering the work.

4.16 CLEANING UP

4.16.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations.

At the completion and during the work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials, and shall clean all glass surfaces and leave the work "broom clean" or its equivalent, except as otherwise specified. The Contractor cannot use the Owner's trash bins.

4.16.2 If the Contractor fails to clean up, the Owner may do so and the cost thereof shall be charged to the Contractor as provided in Paragraph 7.6.

4.17 COMMUNICATIONS

4.17.1 The Contractor shall forward all communications to the Owner through the Architect.

4.18 INDEMNIFICATION

4.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the work, or the failure, neglect or refusal of the Contractor to perform the work provided that any such claim, damage, loss or expenses (a) is attributable to bodily injury, sickness, disease or death, or in injury to or destruction of tangible property (other than the work itself) including the loss of use resulting there from, and (b) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless or whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party described in this Paragraph 4.18.

4.18.2 In any and all claims against the Owner or the Architect or any of their agents or employees by an employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the contractor or any Subcontractor under worker's compensation acts disability benefits acts or other employee benefit acts.

ARTICLE 5 - SUBCONTRACTORS

5.1 DEFINITION

5.1. A Subcontractor is a person or organization who has a direct contract with the Contractor to perform any of the work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender, and means a Subcontractor or his authorized representatives. The term Subcontractor does not include any separate contractor or his subcontractors.

5.1.2 A Sub-subcontractor is a person or organization who has a direct or indirect contract with the Subcontractor to perform any of the work at the site. The term Sub-subcontractor is referred to throughout the contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.1.3 Nothing contained in the Contract Documents shall create any contractual relation between the Owner or the Architect and any Subcontractor or Sub-subcontractor.

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

5.2.1 The Contractor shall include with his Bid Proposal the names of each Subcontractor who will perform work or labor or render service to the Contractor in or about the work in an amount in excess of 1/2 of 1% of the bidder's total bid. The Contractor shall not, without written consent of the Owners, make any substitution thereto, or permit any subcontract to be assigned or transferred or performed by anyone other than the original Subcontractor listed in the Bid Proposal. The Contractor agrees that he is as fully responsible to the Owners for the acts and omissions of his Subcontractors and for the persons directly employed by him. The Owner will deal only through the General Contractor, who shall be responsible for the proper execution of the entire work.

Subletting the whole or any part of the Contract, if approved, shall be done only in accordance with the provisions of Sections 4100 to 4114 inclusive of the public Contract Code of the State of California, which are hereby incorporated by reference and made a part hereof.

5.2.2 If, prior to the award of the Contract, the Owner or Architect has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the successful bidder may, prior to the award, withdraw his bid without forfeiture of bid security. If the successful bidder submits an acceptable substitute, the Owner shall accept such substitute without any increase in bid price. If no satisfactory substitute is submitted, the Owner may disqualify the bid. If, after the award, the Owner or Architect refuses to accept any person or organization on such list, the Contractor shall submit an acceptable substitute and the Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued; however, no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting a name with respect thereto prior to the award.

5.2.3 The Contractor shall not contract with any Subcontractor or any person or organization proposed for portions of the work designated in the bidding requirements or, if none is so designated, with any Subcontractor proposed for the principal portions of the work who has not been accepted by the Owner and the Architect. The Contractor will not be required to contract with any subcontractor or person or organization against whom he has a reasonable objection.

5.2.4 If the Owner and the Architect requires a change of any proposed Subcontractor or person or organization previously accepted by them, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an

appropriate Change Order shall be issued.

5.2.5 The Contractor shall not make any substitution for any Subcontractor or person or organization who has been accepted by the Owner and Architect, unless the substitution is acceptable to the Owner and the Architect.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

1. Preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;

2. Require that such work be performed in accordance with the requirements of the Contact Documents;

3. Require submission to the Contractor of applications for payment under such subcontract to which the contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with Article 9;

4. Require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the work shall be submitted to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in the manner provided in the Contract Documents for like claims by the Contractor upon the Owner;

5. Waive all right the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance described in Paragraph 11.2, except such rights as they may have to the proceeds of such insurance help; and

6. Obligate such Subcontractor specifically to consent to the provisions of this Paragraph 5.3, and identify to each Subcontractor any terms and conditions of each proposed Subcontract which may be a variance with the Contract Documents.

5.4 CLAIMS FOR EXTRA WORK / FOR EXTENSIONS OF TIME

5.4.1 The Contractor shall not be entitled to the payment of any additional compensation or any extension of time for any cause, including any act, or failure to act by the Architect, or happening of any event, thing or occurrence, unless the Contractor shall

have given the Architect due written notice of potential claims as hereinafter specified. It is the intention of this Section 5.4 that the differences between the parties, arising under and by virtue of the Contract be brought to the attention of the Architect at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. it is also the intention of this Section 5.4 to implement the provisions of Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3 of the Public Contract Code of California. the Contractor hereby agrees that he or she shall have no right to additional compensation or an extension of item for any claim that may be based on any act, failure to act, event, thing or occurrence for which no written notice of potential claim as hereby required was filed.

All claims shall be filed in writing on or before the times prescribed herein, but in no event later than the date of final payment. Claims shall be filed with the Architect prior to the time that the Contractor commences performance of the work giving rise to the potential claim for additional compensation, if based on any act or failure to act by the Architect, or in all other cases within ten (10) days after the happening of event, think or occurrence giving rise to the potential claim. All claims shall set forth clearly and in detail, for each item of additional compensation or extension of time claimed, the reasons for the specifications, the nature and the amount of the cost involved, the computations used in determining such costs, and all pertinent factual data necessary to substantiate the claim.

ARTICLE 6 - WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.

6.1.2 When separate contracts are awarded for different portions of the Project, "the Contractor" in the Contract Documents in each case shall be the contractor who signs each separate contract.

6.2 MUTUAL RESPONSIBILITY OF CONTRACTORS

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate his work with theirs.

6.2.2 If any part of the Contractor's work depends for proper executioner results upon the work of the Owner or any separate contractor, the Contractor shall inspect and promptly report to the Architect and Inspector any discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the Owner's or the separate Contractor's work as fit and proper to receive his work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's work.

6.2.3 Should the Contractor cause damage to the work or property of any separate contractor on the Project, the Contractor shall, upon due notice, settle with such other contractor by agreement or arbitration, if he will so settle. If such separate contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor and the Contractor shall defend such proceedings at the Contractor's expense and, if any judgment against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys fees and court cost which the Owner has incurred.

6.2.4 Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises between the separate contractors as to their responsibility for cleaning up as required by paragraph 4.15, the Owner may clean up and charge the cost thereof to the several contractors as the Architect shall determine to be just.

ARTICLE 7 - MISCELLANEOUS PROVISIONS

7.1 LAW OF THE PLACE

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

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due or to become due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

7.4 CLAIMS FOR DAMAGES

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or if any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.5.1 The Owner shall require the Contractor to furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder in such form and amount as the Owner may prescribe and with such sureties as may be agreeable to the parties. If such bonds are stipulated in the bidding requirements, the premiums shall be paid by the Contractor; if required subsequent to the submission of quotations or bids, the cost shall be reimbursed by the Owner. The Contractor shall deliver the required bonds to the Owner not later than the date of execution of the Contract, or if the work is commenced prior thereto in response to a notice to proceed, the Contractor shall, prior to commencement of the work, submit evidence satisfactory to the Owner that such bonds will be issued.

7.6 OWNER'S RIGHT TO CARRY OUT THE WORK

7.6.1 If the Contractor defaults or neglects to carry out the work in accordance with the Contract Documents or fails to perform any provision of the Contract, the Owner may, after seven days written notice to the Contractor and without prejudice to any other remedy he may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor, the cost of correcting such deficiencies, including the cost of the Architect's and the Owner's inspectors, additional services made necessary by such default, neglect or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

7.7 ROYALTIES AND PATENTS

7.7.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or

claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Architect.

7.8 TESTS

7.8.1 If the Contract Documents, Laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any work to be inspected, tested, or approved, the Contractor shall give the Architect timely notice of its readiness and of the date arranged so the Architect may observe such inspection, testing or approval. The Owner shall bear all costs of such inspection, tests, and approvals unless otherwise provided.

7.8.2 If, after the commencement of the work, the Architect determines that any work requires special inspection, testing, or approval which Subparagraph 7.8.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing, or approval, and the Contractor shall give notice as in Subparagraph 7.8.1. If such special inspection or testing reveals a failure of the work to comply (1) with the requirements of the Contract Documents or, (2) with respect to the performance of the work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all cost thereof, including the Architect's and the Owner's inspectors, additional service made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order will be issued.

7.8.3 All sampling and tests shall be made by a properly qualified person or testing laboratory, approved by the Division of the State Architect, who shall furnish copies of the test results to the Contractor, Architect, Owner, and the Division of the State Architect. All tests as well as sampling and preparation of samples where applicable shall be in accordance with Standards as latest adopted by A.S.T.M.

7.8.4 If the Architect wishes to observe the inspections, tests or approvals required by this Paragraph 7.8, he will do so promptly and, where practicable, at the source of supply.

7.8.5 Neither the observations of the Architect in his administration of the Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the work in accordance with the Contract Documents.

7.8.6 Payment for Tests and Inspection will be made as follows:

A. District will pay cost of testing and inspection except the following for which

the Contractor shall reimburse the District:

1. Any retesting and sampling required due to failure of original test.
2. Concrete design mix.
3. Bacteriological Water Analysis testing for new relocatable buildings.

7.8.7 The Inspector of Record is to be employed by the Owner and approved by the Architect and DSA.

ARTICLE 8 - TIME - LIQUIDATED DAMAGES

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for substantial completion of the work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the work or designated portion thereof is the Date certified by the Architect when construction is sufficiently completed, in accordance with the Contract Documents, so the Owner may occupy the work or designated portion thereof for the use for which it is intended.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless specifically designated.

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the work forward expeditiously with adequate forces and shall complete it within the contract time.

8.3 DELAYS AND EXTENSIONS OF TIME - TIME LIMIT

8.3.1 The project shall be completed in the manner provided for in the Contract on or before the completion date as set forth in the Supplementary General Conditions (hereinafter called the "Fixed Completion Date"), unless extensions of time are granted in accordance with the Contract for delays caused by the perils covered by the insurance required by Article 1 hereof or by any are declared by an enactment of the Congress of the United States of America as set forth herein. Failure to complete the work within such time and in the manner provided for by the Contract shall

subject the Contractor to liquidated damages in accordance with Paragraph 8.4 "Liquidated Damages." Time is and shall be of the essence.

8.3.2 The Contractor shall commence work on the Project on or before five (5) calendar days from and after receipt of written "Notice to Proceed" from the Owner to the Contractor, and will diligently prosecute the work to completion. Said Notice to Proceed shall be issued following execution of Contract and the filing by the Contractor of the required bonds and insurance. The Contractor agrees to complete all of the work on or before the Estimated Completion Date. The continuous prosecution of the work within such time shall be subject only to delays caused by any changes in the work or by any default, act or omission of the Owner, or by any other contractor employed by the Owner on the work or by riots, strikes, lock-outs, fire, earthquake, flood and conditions resulting therefrom or by the inability to obtain material, equipment or labor due to Federal Government restrictions or requirements arising out of any defense or war program. Such delays, if any, shall operate only to extend the Estimated Completion Date above specified (not in excess of the period of such delay).

8.3.3 In the event it is deemed necessary by the Owner and the Contractor to extend the time of completion of the work to be done under these specifications beyond the dates of required completion herein specified, such extensions as shall be granted by the Owner shall in no way release any guarantee given by the Contractor pursuant to the provisions of the Contract, or to relieve or release the sureties on the bonds executed pursuant to said provision. The sureties in executing the bonds on the Contract shall be deemed to have expressly agreed to any such extension of time. The Owner shall not be required to pay extended overhead cost to the Contractor for allowing an extension of time to the Contract.

8.3.4 All claims for extension of time shall be made in writing to the Architect no more than fifteen days after the occurrence of the delay; otherwise they shall be waived. In the case of a continuing cause of delay, only one claim is necessary.

8.3.5 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Subparagraph 1.2.5 shall be furnished, then no claim for delay shall be allowed on account or failure to furnish such interpretations until fifteen days after demand is made for them, and not then unless such claim is reasonable.

8.3.6 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

8.4 LIQUIDATED DAMAGES

8.4.1 The actual fact of the 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 and 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 in the event of delay include loss of the use of the project, and, in addition, include, but are not limited to, expenses of prolonging employment of an engineering staff, costs of administration, inspection, supervision and the loss suffered by the public within the District by reason of the delay in the construction of the project to serve the public at the earliest possible time. Accordingly, the parties hereto agree that the amounts herein set forth shall be presumed to be the amount of damages sustained by the failure of the Contractor to complete the project within the respective times specified.

8.4.2 The amount of liquidated damages to be paid by the Contractor to the Owner for failure to complete the work specified will be **$$500.00 for each calendar day** by which completion of the project is delayed beyond the Fixed Completion Date and continuing thereafter to the time at which the Project is completed such amount being in each case the actual cash value agreed upon as the loss to the Owner resulting from the Contractor's default.

8.4.3 In the event the Contractor shall become liable for liquidated damages under this section, the Owner, in addition to all other remedies provided by law, shall have the right to withhold any and all retained payments which would otherwise be or become due the Contractor until the liability of the Contractor under this section has been finally determined.

The Owner shall have the right to use and apply such retained amounts, in whole or in part, to reimburse the Owner for all damages due to or to become due to the Owner. Any remaining balance of such retained amounts shall be paid to the Contractor only after discharge in full of all liability incurred by the Contractor under this article. If the retained amount is not sufficient to discharge all liabilities of the Contractor incurred under this article the Contractor and its sureties shall continue to remain liable to the Owner until all such liabilities are satisfied in full.

8.4.4 In addition to any other rights it may have, the Owner may terminate the Contract at any time after the Fixed Completion Date unless the Contractor shall have been granted an extension of time for delay pursuant to this Article 8. Upon such termination the Contractor shall not be entitled to any compensation for services rendered by before or after such termination, and he shall be liable to the Owner for liquidated damages for all periods of time beyond such date until the project is fully completed.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 CONTRACT SUM - DEFINITION

9.1.1 The Contract Sum is stated in the Contract, or is as may be modified by duly executed change orders, and is the total amount payable by the Owner to the Contractor for their performance of the work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to the various portions of the work, including quantities if required by the Architect, aggregating the total Contract Sum, divided by section as enumerated in the Project Manual's "Table of Contents", so as to facilitate payments to Subcontractors. Prepare schedule of values on AIA Documents G702 and G703, and supported by such data to substantiate its correctness as the Architect may require. Each item in the schedule of values shall include its proper share of overhead, and profit. This schedule, when approved by the Architect, shall be used as a basis for the Contractor's Applications for Payment.

9.3 PROGRESS PAYMENTS

9.3.1 At least ten days before each progress payment falls due, the Contractor shall submit to the Architect an itemized Application for Payment, supported by such data substantiating the Contractor's right to payment as the Owner or the Architect may require.

9.3.2 If payments are to be made on account of materials or equipment not incorporated in the work but delivered and suitable stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest including applicable insurance and transportation to the site.

9.3.3 The Contractor warrants and guarantees that title to all work, materials, and equipment covered by an application for payment, whether incorporated in the project or not, will pass to the Owner upon the receipt of such payment of the Contractor, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens" and that no work, materials, or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing the work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the contractor or such other person.

9.3.4 SUBMISSION OF CERTIFIED PAYROLL RECORDS: For all on-site work only, NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT requires weekly

submission of certified payroll certificates. In addition to the weekly payroll records for your company, you are required to submit the weekly payroll records for all subcontractors.

9.4 CERTIFICATES FOR PAYMENTS

9.4.1 If the Contractor has made Application for Payment as above, the Architect will, with reasonable promptness but not more than seven (7) days after the receipt of the Application, issue a Certificate for Payment to the Owner with a copy to the contractor for such amount as he determines to be properly due or state in writing his reasons for withholding a Certificate as provided in Subparagraph 9.5.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on his observations at the site as provided in Subparagraph 2.2.4 and the data comprising the Application for Payment, that the work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the work is in accordance with the Contract Documents (subject to an evaluation of the work as a functioning whole upon substantial Completion, to the results of any subsequent tests required by the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate and that the Contractor is entitled to payment in the amount certified). In addition, the Architect's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.7.2 have been fulfilled. However, by issuing a Certificate for Payment, the Architect shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the work or that he has reviewed construction means, methods, techniques, sequences, or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract sum.

9.4.3 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner provided in the Contract.

9.4.4 No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the project by the Owner, shall constitute an acceptance of any work not in accordance with the Contract Documents.

9.5 PAYMENTS WITHHELD

9.5.1 The Architect may decline to approve an Application for Payment and may withhold his Certificate in whole or in part if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2. The Architect may also decline to approve any Applications for Payment or, because of subsequently

discovered evidence or subsequent inspections, he may nullify the whole or any part of any Certificate for payment previously issued to such extent as may be necessary in his opinion to protect the Owner from loss because of:

1. Defective work not remedied;

2. Claims filed or reasonable evidence indicating probably filing of claims;

3. Failure of the Contractor to make payments properly to Subcontractors or for labor, materials, or equipment;

4. Reasonable doubt that the work can be completed for the unpaid balance of the Contract Sum;

5. Damage to another contractor;

6. Reasonable indication that the work will not be completed within the Contract Time; or,

7. Unsatisfactory prosecution of the work by the Contractor.

9.5.2 When the above grounds in Subparagraph 9.5.1 are removed, payment shall be made for amounts withheld because of them.

9.5.3 The Contractor may, in accordance with the provisions of Public Contract Code, Section 22300, substitute securities for any monies which the Owner may withhold to insure performance under the Contract.

9.6 FAILURE OF PAYMENT

9.6.1 If the Architect should fail to issue any Certificate for Payment, through no fault of the Contractor, within ten days after receipt of the Contractor's Application for Payment, or if the Owner would fail to pay the Contractor within twenty days after the date of payment established in the Contract any amount certified by the Architect, then the Contractor may, upon seven (7) additional days written notice to the Owner and the Architect, stop the work until payment of the amount owing has been received.

9.7 SUBSTANTIAL COMPLETION AND FINAL PAYMENT

9.7.1 When the Contractor determines that the work or a designated portion thereof acceptable to the owner is substantially complete, the Contractor shall prepare for

submission to the Architect a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.

When the Architect on the basis of an inspection determines that the work is substantially complete he will then prepare a Certificate of Substantial Completion, which shall establish the Date of Substantial Completion, which shall state the responsibilities of the Owner and the Contractor for maintenance, heat, utilities, and insurance, and shall fix the time listed therein, said time to be within the Contract Time unless extended pursuant to Paragraph 8.3.

The Certificate of Substantial Completion shall be submitted to the Owner and the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.7.2 Upon receipt of written notice that the work is ready for final inspection and acceptance, and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when he finds that work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information, and belief, and on the basis of his observations and inspections, the work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable.

9.7.3 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Architect (1) and Affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment and (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens, claims or stop notices, arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien, claim, or stop notice. If any such lien, claim, or stop notice remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the alter may be compelled to pay in discharging such lien, claim, or stop notice, including all costs and reasonable attorneys fees.

9.7.4 If after Substantial Completion of the work final completion thereof is materially delayed through no fault of the Contractor, and the Architect so confirms, the Owner shall, upon certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the work fully completed and

accepted. If the remaining balance for work not fully completed or corrected is less than the retainage stipulated in the Contract, and if bonds have been furnished as required in Subparagraph 7.5.1, the written consent of the surety to the payment of the balance due for that portion of the work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.7.5 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

1. Unsettled liens;

2. Faulty or defective work appearing after Substantial Completion;

3. Failure of the work to comply with the requirements of the Contract Documents; or,

4. Terms of any special guarantees required by the Contract Documents.

9.7.6 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.

10.2 SAFETY OF PERSONS AND PROPERTY

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

1. Employees on the work and all other persons who may be affected thereby;

2. All the work and all materials and equipment to be incorporated therein whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors; and,

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadway, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and progress of the work, all 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 utilities.

10.2.3 When the use or storage of explosives or other hazardous material or equipment is necessary for the execution of the work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.4 Shoring and Trench Safety Plan - Attention is directed to Section 832 of the Civil Code of the State of California relating to lateral and subjacent support, and the Contractor shall comply with this law.

10.2.5 In accordance with Section 6705 of the State Labor Code, the Contractor shall submit to the District specific plans to show details of provisions for worker protection from caving ground. Not less than thirty (30) days before beginning excavation for any trench or trenches five feet or more in depth required under this Contract, the Contractor shall furnish to the Architect working drawings of his trench safety plan. The trench safety plan working drawings shall be detailed plans showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground.

If such plan varies from the shoring system standards established by the Construction Safety Orders of the California Division of Industrial Safety or the Federal safety standards of the Department of Health, Education and Welfare, the plan shall be prepared by a registered civil or structural engineer. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders, or less effective than that required by said Federal Safety Standards. Submission of this plan in no way relieves the Contractor from the requirement to maintain safety in all operations performed by him or his Subcontractors.

10.2.6 All damage or loss to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor, except damage or loss attributable to faulty Drawings or Specifications or to the acts or omissions of the Owner or Architect or anyone employed by either of them or for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor.

10.2.7 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Owner and the Architect.

10.2.8 The Contractor shall not load or permit any part of the work to be loaded so as to endanger its safety.

10.2.9 Should the Contractor encounter material reasonably believed to be asbestos or polychlorinated biphenyl (PCB) on the site which has not been rendered harmless, the Contractor shall immediately stop work in the affected area and notify the District and the Architect of the condition in writing. Work in the affected area shall not be resumed except by written agreement of the District and Contractor if the material is asbestos or PCB, or when it has been rendered harmless.

10.2.10 The Contractor shall not be required to perform without consent any work relating to asbestos or PCB.

10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the work.

ARTICLE 11 - INSURANCE

11.1 PROJECT INSURANCE

11.1.1 Scope - Contractor shall procure prior to commencing any activities and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Contractor's bid.

11.1.2 Minimum Limits of Insurance - Contractor shall maintain coverage and limits no less than:

Liability - Comprehensive General Liability Insurance or Commercial General Liability Insurance including coverage for premises and operation, contractual liability, personal injury liability, products/completed operations liability, broad form property damage and owners/contractors protective liability in an amount not less than one million dollars ($1,000,000) per occurrence, combined aggregate single

limit for bodily injury, personal injury and property damage written on as occurrence form. For protection of the aggregate a separate liability policy must be used for this Contract or an endorsement issued to reserve the required aggregate for this specific contract.

Automobile - Comprehensive Automobile Liability Insurance, including as applicable owned, non-owned, and hired automobile in an amount not less than one million dollars ($1,000,000) per occurrence combined single limit for bodily injury and property damage written on an occurrence form.

Workers' Compensation - The Contractor shall submit proof that Workers' Compensation Insurance as required by the Labor Code of the State of California is secured. The insurance shall include Employers Liability limits of one million dollars ($1,000,000) per accident.

11.1.3 Builder's Risk Insurance: The contractor shall take out and maintain until final acceptance of the project, Builder's Risk Insurance against all perils on a special form basis with the customary exclusions. The District shall be named as an additional insured and the policy shall be in sufficient amount to cover fully the replacement cost of structures constituting any part of the project excluding excavation, grading and land filling.

11.2 GENERAL CONDITIONS

11.2.1 Deductibles and Self-Insured Retention - Any deductible or self-insured Retention must be declared to and approved by the District. At the option of the District either the insurer shall reduce or eliminate such deductibles or self-insured Retention as respects the District, its officials and employees; or the Contractor shall procure a bond guaranteeing payment of losses and related investigation, claim administration and defense expenses.

11.2.2 Other Provisions - The policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverage:
   a. The District, its officials, employees and volunteers are to be covered as additional insured as respects: liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, leased or used by the Contractor.

   b. The Contractor's insurance coverage shall be primary insurance as

respects the District, its officials, employees and volunteers. Any insurance or self-insurance maintained by the district, its officials, employees and volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

c. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the District, its officials, employees or volunteers.

d. Coverage shall state that the contractor's insurance shall apply separately to each insured against who claim is made or suit is brought, except with respect to the limits of the insurer's liability.

ARTICLE 12 - CHANGES IN THE WORK

12.1 ADDENDA

12.1.1 Addenda are to be signed by the Architect and approved by DSA.

12.2 CONSTRUCTION CHANGE DOCUMENTS (CCD)

12.2.1 Construction Change Documents (CCD) shall be the process for documenting changes to the approved Plans or Specifications after the contract has been awarded. CCD's shall comply with DSA Interpretation of Regulations IR A-6. All CCD's shall be signed by the Architect and approved by DSA.

12.3 CHANGE ORDERS

12.3.1 A Change Order is a written order to the Contractor signed by the Owner and the Architect, and approved by the Division of the State Architect, issued after the execution of the Contract, authorizing a Change in the work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time.

12.3.2 The Owner, without invalidating the Contract, may order changes in the work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the work shall be authorized by Change Order, and shall execute under the applicable conditions of the Contract Document. Change Orders shall be approved by the Division of the State Architect and signed by the Contractor, in addition to the Owner and Architect.

12.3.3 The cost or credit to the Owner resulting from a change in the work shall be

determined in one or more of the following ways:

1. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating date to permit evaluation;

2. By unit prices stated in the Contract Documents, Form of Proposal or subsequently agreed upon;

3. By costs to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or,

4. By the method provided in Subparagraph 12.2.4.

5. For all changes in the work, the allowance for overhead, profit and bond combined, included in the total cost to the Owner, shall be based upon the following schedule:

   For the Contractor, for any work performed by his own force, twelve percent (12%) of the cost;

   For each subcontractor involved, work performed by his own forces, twelve percent (12%) of the cost;

   For the Contractor, for work performed by his subcontractor, six percent (6%) of the amount due the subcontractor.

   Cost shall be limited to the following: cost of materials, including sales tax and cost of delivery, cost of labor, including Social Security, Old Age and Unemployment Insurance (labor cost may include a prorated share of foreman charge); worker's Compensation Insurance; Rental cost of power tools and equipment.

12.3.4 If none of the methods set forth in Clauses 12.2.3.1, 12.2.3.2 or 12.2.3.3 is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the work involved. The cost of such work shall then be determined by the Architect on the basis of the reasonable expenditures and savings of those performing the work attributable to the change, including, in the case of an increase in the Contract Sum, an allowance for overhead and profit in accordance with the schedule set forth above in paragraph 12.2.3.5.

In such case, and also under Clauses 12.2.3.3 and 12.2.3.4 above, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following:

1. Cost of materials, including sales tax and cost of delivery.

2. Cost of labor, including social security, old age and unemployment insurance and fringe benefits required by collective bargaining agreement or custom.

3. Worker's compensation insurance.

4. Bond premiums.

5. Rental cost of equipment and machinery

6. Additional cost of supervision and field office personnel directly attributable to the change.

7. As-Builts.

Pending final determination of cost to the Owner, payments on account shall be made on the Architect's Certificates for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Architect. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any with respect to that change.

12.4 CONCEALED CONDITIONS

12.4.1 Should concealed conditions encountered in the performance of the work below the surface of the ground be at variance with the conditions indicated by the Contract Documents or, should unknown physical conditions below the surface of the ground of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in this Contract, be encountered, the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within a reasonable time after the first observance of the conditions.

12.5 CLAIMS FOR ADDITIONAL COST OR TIME

12.5.1 If the Contractor wishes to make a claim for an increase in the Contract Sum or an extension in the Contract Time, he shall give the Architect and the Construction Manager written notice thereof within ten (10) days time after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Subparagraph 12.5.1. No such claim shall be valid unless so made.

If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum or the Contract Time, it shall be determined by the Architect. Any change in the Contract Sum or Contract Time resulting from such claim shall be authorized by Change Order.

12.5.2 If the Contractor claims that additional cost or time is involved because of (1) any written interpretation issued pursuant to Subparagraph 1.2.5, (2) any order by the Architect to stop the work pursuant to Subparagraph 2.2.11 where the Contractor was not at fault, or (3) any written order for a minor change in the work issued pursuant to Paragraph 12.5, the Contractor shall make such claim as provided in this Paragraph 12.4.1.

12.6 MINOR CHANGES IN THE WORK

12.6.1 The Architect shall have authority to order minor changes in the work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes may be effected by Field Order or by other written order. Such changes shall be binding on the Owner and the Contractor. The Owner shall be notified in writing by the Architect of such changes. The Contractor shall carry out such written orders promptly.

12.7 FIELD ORDERS

12.7.1 The Architect may issue written Field Orders which interpret the Contract Documents in accordance with Subparagraph 1.2.5 or which order minor changes in the work in accordance with Paragraph 12.5 without change in Contract Sum or Contract Time. The Contractor shall carry out such Field Orders promptly.

ARTICLE 13 - UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any work should be covered contrary to the request of the Architect, or to requirement specifically expressed in the Contract Document, it must if required in writing by the Architect, be uncovered for his observation and replaced, at the Contractor's expense.

13.1.2 If any other portion of the work has been covered which the Architect has not specifically requested to observe prior to being covered, the Architect may request to see such work and it shall be uncovered by the Contractor.

If such work be found in accordance with the Contract Documents, the cost of

uncovering and replacement shall be by appropriate Change Order, be charged to the Owner. If such work be found not in accordance with the Contract Document, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor employed as provided in Article 6, and in that event the Owner shall be responsible for the payment of such costs.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly correct all work rejected by the Architect as defective or as failing to conform to the Contract Documents whether observed before or after substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Architect's additional services thereby made necessary.

13.2.2 If, within one year after the Date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor shall remove from the site all portions of the work which are defective or non-conforming and which have not been corrected under Subparagraphs 4.5.1, 13.2.1 and 13.2.2, unless removal is waived by the Owner.

13.2.4 If the Contractor fails to correct defective or non-conforming work as provided in Subparagraphs 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 7.6.

13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and may store the materials or equipment at the expense of the Contractor.

If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may upon ten additional days written notice sell such work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the cost that should have been borne by the Contractor, including compensation for additional architectural services. If such proceeds of sale do not cover all cost which the Contractor should have borne, the difference shall be charged the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such

amount, the Contractor shall pay the difference to the Owner.

13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

13.2.7 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such long period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the work, and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, not to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations other than specifically to correct the work.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

13.3.1 If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case the Change Order will be issued to reflect an appropriate reduction in the Contract Sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.

ARTICLE 14 - TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the work is stopped for a period of thirty (30) days under an order of any court or other public authority having jurisdiction, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the work under a contract with the Contractor, or if the work should be stopped for a period of thirty days by the Contractor because the Architect has not issued a Certificate for Payment as provided in Paragraph 9.6 or because the Owner has not made payment thereon as provided in Paragraph 9.6, then the Contractor may, upon fifteen days written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

14.2 TERMINATION BY THE OWNER

14.2.1 If the Contractor is adjudged bankrupt, or if he makes general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension

of time is provided, to supply enough property skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or order of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven days written notice, terminate the employment of the Contractor and take possession of the site, and of all materials, equipment, tools, construction, equipment and machinery thereon owned by the Contractor and may finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished.

14.2.2 If the unpaid balance of the Contract Sum exceeds the costs of finishing the work, including compensation for the Architect's and the Owner's inspectors, additional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the Owner.

The costs incurred by the Owner as herein provided shall be certified by the Architect.

ARTICLE 15 - GUARANTEE OF WORK

15.1.1 In addition to guarantees called for elsewhere in these specifications, the Contractor shall guarantee all of his work for a period of one (1) year after the date of filing of the Notice of Completion against defective material or faulty workmanship that may arise within that period. All guarantees must be submitted to the Owner in the form attached hereto.

ARTICLE 16 - USE OF ASBESTOS

16.1.1 The use of asbestos or asbestos containing materials in this project is absolutely forbidden.

ARTICLE 17 - CHECK-IN AT SCHOOL OFFICE

17.1.1 California State Law requires that anyone, other than District personnel, must check-in at a school office before beginning work on a school site. Field crews, foremen and sub-contractors must check-in at the school office daily, must give location of work area, must describe work to be performed and must give an estimate of time required to complete the work. Compliance with these requirements will facilitate timely response from District staff including assistance to the Contractor to gain site access.

ARTICLE 18 - DIVISION OF THE STATE ARCHITECT REQUIREMENTS

18.1 All addenda shall be signed by the Architect, in compliance with Title 24, Part 1, Section 4-338 and approved by D.S.A.

18.2 All work shall be in compliance with Title 24, parts 1 through 5 and Title 19 and copies kept on job site at all times by the Contractor. Copies shall be most recent editions.

18.3 The Project Inspector shall be employed by the Owner and approved by the Architect, Structural Engineer and D.S.A. The Inspector must be present during all work proceedings.

18.4 The Testing Laboratory shall be employed by the Owner and approved by the Architect and D.S.A.

18.5 Changes, deletions or additions shall be documented by the Architect by means of Construction Change Documents, per DSA IR A-6 and approved by the Division of the State Architect.

ARTICLE 19 - ASBESTOS NOTIFICATION

19.1 Asbestos Hazard Emergency Response Act (AHERA) B regulations require that every firm doing contract work on a school site be informed of the presence of asbestos in the areas where they would be working. The attached "Short Term Worker Notification" provides that information. Contractors are hereby advised that their work must not disturb the asbestos and that certain health hazards are associated with exposure to asbestos fibers. Short Term Worker Notification form will be completed and signed by LEA Designee and Contractor at the Pre-Construction Conference.

ARTICLE 20
CONTRACTOR'S GUARANTEE

GUARANTEE FOR _____

_____

We hereby guarantee the _____

Which we have installed in the _____

at _____ for _____ years from date of final payment.
We Agree to repair or replace to the satisfaction of the Owner any and all such work that may prove defective in workmanship or materials within that period, ordinary wear and tear and unusual abuse or neglect excepted, together with any other work which may be damaged or displaced in so doing. In the event of our failure to comply with the above mentioned conditions within a reasonable time after being notified in writing, we collectively and separately do hereby authorize the Owner to proceed to have the defects repaired and made good at our expense, and we will pay the costs and charges therefore immediately upon demand.

_____
(Signature of Subcontractor)

_____
(Signature of Subcontractor)

Date_____

ARTICLE 21
CRIMINAL HISTORY CLEARANCE/
SITE PROTECTION CERTIFICATION

In accordance with statutory, regulatory and constitutional restrictions governing the use and dissemination of criminal offender record information, the above mentioned Education Code sections allow for exceptions from obtaining a criminal history clearance of all employees under the following conditions:

1. The installation of a physical barrier at the worksite to limit contact with pupils.

2. Continual supervision and monitoring of all employees of the contractor by an employee of the contractor whom the Department of Justice has ascertained has not been convicted of a violent or serious felony.

Construction contractors are not required to comply with the backgrounding requirements set forth in the Michelle Montoya School Safety Act if one or more of the above mentioned conditions exist.

I, the undersigned, agree to fulfill the terms and requirements of Education Code Sections 33192 and 45125.1 listed above and required that the employee agree to abide by the terms of that statement.

I also, understand that if the District determines that I have either;

(a) made a false certification herein, or

(b) violated this certification by failing to carry out the requirements of Sections 33192 and 45125.1,

that the contract awarded herein is subject to termination, suspension of payments or both. I further understand that, should I violate the terms of the Michelle Montoya Safety Act of 1997, I may be subject to punishment in accordance with the requirements of Sections 33192 and 45125.1 et seq.

I acknowledge that I am aware of the provision of Education Code Sections 33192 and 4512.1 et seq., and hereby certify that I will adhere to the requirements of the Michelle Montoya School Safety Act of 1997.

_____ _____

Signature Date

END OF SECTION

SUPPLEMENTAL GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

1.1 MATERIALS - Materials incorporated in the project, or used, or consumed, in the performance of the work.

1.2 BUILDING - Includes the entire structure, drives, walks, steps, approaches, and site.

1.3 SIMILAR - Shall be taken in its general sense and not meaning identical, and all details of such work shall be in proper relation to the location and connection of other parts of the work.

1.4 PROVIDE - Shall mean, "Furnish and install in place".

1.5 (As Directed) (Acceptable) (Rejected) Or others of similar meaning which authorize any exercise of judgment shall be distinctly understood to mean that such power to direct, accept, reject, and approve shall be vested Only in the Owner and/or Architect.

1.6 N.I.C. - Where the indication, "N.I.C." is noted on the drawings or listed in the specifications, such item is shown or listed for the purpose of general information is, "Not in Contract." Installation and connection to services for such work are not in the contract.

1.7 O.F.C.I. - Where the indication, "O.F.C.I." is noted on the drawings or listed in the specifications, such item is shown or listed for information and will be, "Owner **furnished**, Contractor **installed**." The Contractor shall verify all dimensions and details necessary for the proper installation of this item.

1.8 TIME LIMITS - All time limits stated in the contract documents are of the essence of the contract.

1.9 CALLED FOR - As called for, shown, noted, and/or indicated in the specifications and/or drawings.

ARTICLE 2 - COMPLETION DATES

2.1 FIXED COMPLETION AND ESTIMATED COMPLETION DATE: The Work shall be commenced on the date stated in the Owner's, "Notice to Proceed" (which date will not be less than five (5) consecutive calendar days from and after the date of execution of the Contract) and shall be completed within (365) three hundred sixty-five calendar days. Reference Paragraph 8.3 of the General Conditions. This fixed completion date is defined as the Estimate Completion Date.

END OF SECTION

CONTRACT FORM

This agreement made on the _____, at NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, in Stanislaus County, California, by and between:

_____ and

NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT, 1223 Main St., Newman, CA 95360, hereinafter called the Owner.

WITNESSETH: That the Contractor and the Owner for the consideration hereinafter named agree as follows:

ARTICLE I. The Contractor agrees to furnish all labor and materials, including tools, implements, and appliances required, and to perform all the Work in a good and worker-like manner, free from any and all liens and claims of mechanics, material suppliers, subcontractors, artisans, machinists, teamsters, drayers, and laborers required for:

VON RENNER ELEMENTARY SCHOOL: CLASSROOM BUILDING

for
NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT

all in strict compliance with the plans, drawings and specifications therefore prepared by Timothy P. Huff, Architect, and other Contract Documents relating thereto.

ARTICLE II. The contractor and the Owner agree that the Advertisement (Notice to Contractors), the Wage Scale, the General Conditions of the Contract, the Supplemental General Conditions of the Contract, Instructions to Bidders, the Specifications, the Drawings and the Addenda and Bulletins thereto, together with this Agreement, form the Contract, and they are as fully a part of the Contract as if thereto attached or therein repeated. The specifications and drawings are intended to cooperate, so that any work exhibited in the drawings and not mentioned in the specifications, or vice versa, is to be executed the same as if both mentioned in the specifications and set forth in the drawings, to the true intent and meaning of the said drawings and specifications when taken together. But no part of said specifications that is in conflict with any portion of this Contract, or that is not actually descriptive of the work to be done thereunder, or of the manner in which the said work is to be executed, shall be considered as any part of this Contract, but shall be utterly null and void, and anything that is expressly stated, delineated or shown in or upon the specifications or drawings shall govern and be followed, not withstanding anything to the contrary in any other source of information or authority to which reference may be made.

ARTICLE III. The Owner agrees to pay to the Contractor in current funds for the performance of the Contract:

($ _____) Dollars

and to make payments or account thereof as provided for in the Contract Documents.

ARTICLE IV. In the event of a dispute between the Owner or Architect and the Contractor as to an interpretation of any of the specifications or as to the quality or sufficiency of material or workmanship, the decision of the Architect shall for the time being prevail and the Contractor without delaying the job, shall proceed as directed by the Architect without prejudice to a final determination by negotiation, arbitration by mutual consent or litigation, and should the Contractor be finally determined to be either wholly or partially correct, the Owner shall reimburse him for any added costs he may have incurred by reason of work done or material supplied beyond the terms of the Contract as a result of complying with the Architect's directions as aforesaid.

ARTICLE V. Pursuant to the provisions of Sections 1773 et seq. of the Labor Code of the State of California, which are hereby incorporated by reference and made a part thereof, the Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality of which the Work is to be performed, for each craft, classification or type of workman needed to execute this contract. Per diem wages shall be deemed to include employer payments for health and welfare, pension, vacation, apprenticeship or other training programs, and similar purposes. The director of the Department of Industrial Relations has further determined that the rate of prevailing wage for any craft, classification or type of worker to be employed on the Project is the rate established by the applicable collective bargaining agreement on file at the Director of the Department of Industrial Relations principal office at San Francisco, phone, (415) 972-8846, which rate so provided is hereby adopted by reference and shall be effective for the life of this agreement or until the Director of Department of Industrial Relations determines that another rate be adopted. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workmen employed in the execution of this agreement.

There shall be paid to each worker needed to execute the work to be performed hereunto such travel and subsistence payments as are defined in the applicable collective bargaining agreements filed in accordance with the provision of Labor Code Section 1773.8.

The Contractor as a penalty to the Owner shall forfeit Twenty-five Dollars ($25.00) for each calendar day or portion thereof for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed.

The difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

The Contractor and each subcontractor shall keep or cause to be kept an accurate record showing the names and occupations of all laborers, workers, and mechanics employed by him in connection with the extension of this Contract or any subcontract thereunder, and showing also the actual per diem wage paid to each of such workers, which records shall be open at all reasonable hours to inspection by the Owner, its officers and agents and to the representatives of the Division of Labor Law Enforcement of the State Department of Industrial Relations.

ARTICLE VI. It is further understood and agreed that in accordance with the provision of Sections 1810 to 1815, inclusive, of the Labor Code of the State of California, which are hereby incorporated and made a part hereof, the time of service of any worker employed by the Contractor or subcontractor doing or contracting to do any part of the work contemplated by this agreement is limited and restricted to eight hours during any one calendar day and forty hours during any one calendar week, provided, however, work may be performed by such employee in excess of said eight hour per day and forty hours per week provided that compensation for all hours worked in excess of eight hours per day and forty hours per week, is paid at a rate not less than one and one-half times the basic rate of pay. Every Contractor and subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the work. The records shall be kept open at all reasonable hours to inspection by representatives of the Owner and the Division of Labor Law Enforcement. The Contractor shall as a penalty to the Owner forfeit 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 hours in any one calendar day and forty hours in any one calendar week, except as herein provided.

ARTICLE VII. Contractor agrees to comply with Chapter 1, Part 7, Division 2, Section 1777.5 and 1777.6 of the California Labor Code, which are hereby incorporated and made a part hereof. These sections require that contractors and subcontractors employ apprentices in apprenticeable occupations in a ratio of not less than one apprentice for each five journeymen (unless an exemption is granted in accordance with Section 1777.5) and that contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public works solely on the ground of sex, race, religious creed, national origin, ancestry or color.

Only apprentices as defined in Section 3077, who are in training under apprenticeship standards and who have signed written apprentice agreements will be employed on public works in apprenticeable occupations. The responsibility for compliance with these provisions is fixed with the prime contractor for all apprenticeable occupations.

ARTICLE VIII. The Contractor will indemnify the Owner against and hold it harmless of all and any liability for damages on account of injury to persons or damage to property resulting from or arising out of or in any way connected with the performance by the Contractor of his Contract and reimburse the Owner for all cost, expenses and loss incurred by it in consequence of any claims, demands, and causes of action which may be brought against it arising out of the performance by the Contractor of this Contract.

This indemnity shall be in addition to the other indemnification provisions contained in the Contract Documents.

By this statement the Contractor represents that he has secured the payment of Workers Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provision of said Code. The Contractor shall supply the Owner with certificates of insurance evidencing that Workers Compensation Insurance is in effect and providing that the Owner will receive 30 days notice of cancellation.

_____	Newman-crows Landing Unified School District
Contractor	Owner
By_____	By_____
Signature	Signature
_____	_____
Print Name	Print Name
_____	_____
Title	Title

_____
Federal I.D.#

_____
Department of Industrial Relations #

Note: If a corporation is the contractor, state the capacity (i.e., President) of the corporate office signing and affix the corporation seal; if a partnership, all partners should sign under the partnership name.

END OF SECTION

Mountain View Environmental
5412 Shelly Court Salida, Ca 95368
Office (209) 545-8753 Mobile (209) 484-4395

Asbestos, Lead Based Paint & Mold
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E-mail: mountainviewenvironmental@gmail.com

ASBESTOS SAMPLING REPORT

Von Renner Elementary School
1388 Patchett Drive
Newman, CA 95360



7/22/26

Mountain View Environmental

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ASBESTOS SAMPLING REPORT

At the request of Matt Vargas, Director of Maintenance & Operations, Newman-Crows Landing Unified School District, on July 22, 2026, Ken Horrillo, Certified Asbestos Consultant, Mountain View Environmental performed a sampling of Suspected Asbestos Containing Building Material on the Von Renner Elementary School Project located at 1388 Patchett Drive Newman, CA 95360.

The purpose of the Asbestos Sampling Report is to confirm or deny the existence of asbestos in suspected building materials that will become impacted by the demolition and relocation of the Modular classrooms.

This is a requirement of the United States Environmental Protection Agency (EPA) and the National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR and the San Joaquin Valley Unified Air Pollution Control District.

PROPERTY DESCRIPTION

The demolition and relocation project will be impacting the Von Renner Elementary School located at 1388 Patchett Drive Newman, CA 95360. These eight modular buildings serve as classrooms for the school.

SAMPLING

Sampling was performed following the sampling guidelines under AHERA. The samples were collected placed in their own individual containers, assigned a unique sampling number, placed under a chain-of-custody and delivered to EMSL Analytical Inc. 464 McCormick Street San Leandro, CA 94577 for analysis by Polarized Light Microscopy. EMSL, Inc. is an EPA certified laboratory.

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SAMPLING AND LABORATORY RESULTS USING BULK SAMPLING

Suspected Building Material

A-1	Vinyl Sheet Flooring / Room #15 /White	No Asbestos Detected
A-1	Mastic / Room #15 / Brown	No Asbestos Detected
A-1	Compound / Room #15 / White	No Asbestos Detected
A-2	Baseboard / Room #15 / Blue	No Asbestos Detected
A-2	Mastic / Room #15 / White	No Asbestos Detected
A-3	Carpet / Room #15 Floor Tile / Floor / Blue / Gray	No Asbestos Detected
A-3	Mastic 1 / Room #15 / Tan	No Asbestos Detected
A-3	Mastic 2 / Room #15 Brown	No Asbestos Detected
A-3	Compound / Room #15 / White	No Asbestos Detected
A-4	Vinyl Sheet Paneling / Room #15 / Brown	No Asbestos Detected
A-5	Fiberboard Ceiling Panels / Room #15 / Beige	No Asbestos Detected
A-6	Styrofoam Ceiling Panels / Room #15 / White	No Asbestos Detected
A-7	Vinyl Sheet Paneling / Exterior siding Room #15 & 16 / Gray / Beige	No Asbestos Detected
A-7	Mastic / Exterior Siding Room #15 & 16 / Tan	No Asbestos Detected
A-8	Vinyl Sheet Paneling /Exterior Siding Room #15 & 16 / Gray / Tan	No Asbestos Detected
A-8	Mastic / Exterior Siding Room #15 & 16 / Beige	No Asbestos Detected
A-9	Vinyl Sheet flooring / Room # 16 / Brown / Gray	No Asbestos Detected
A-9	Mastic / Room #16 / Tan	No Asbestos Detected
A-10	Fiberboard Ceiling panels / Room #16 / Gray	No Asbestos Detected
A-11	Carpet / Room #16 / Gray / Blue	No Asbestos Detected
A-11	Mastic / Room #16 / Brown	No Asbestos Detected
A-12	Vinyl Wall Paneling / Room #16 / Brown / White	No Asbestos Detected
A-13	Baseboard / Room #16 / Blue	No Asbestos Detected
A-13	Mastic / Room # 16 / Tan	No Asbestos Detected
A-14	Baseboard / Room #17 / Beige	No Asbestos Detected
A-14	Mastic / Room #17 / Brown	No Asbestos Detected
A-15	Vinyl Wall Panels / Room #17 / Beige	No Asbestos Detected
A-16	Carpet / Room # 17 / Blue / Green	No Asbestos Detected
A-16	Mastic / Room #17 / Tan	No Asbestos Detected
A-17	Carpet / Room #18 / Blue / Green	No Asbestos Detected
A-17	Mastic / Room #18 / Tan	No Asbestos Detected
A-18	Baseboard / Room # 18 / Beige	No Asbestos Detected
A-18	Mastic / Room #18 / Brown	No Asbestos Detected
A-19	Vinyl Wall Paneling / Room #18 /Beige	No Asbestos Detected
A-20	Vinyl Sheet Paneling / Exterior Siding Rms #17 & #18 / Gray / White	No Asbestos Detected
A-20	Mastic / Exterior Siding Rooms #17 & #18 / Gray	No Asbestos Detected
A-21	Vinyl Sheet Paneling / Exterior Siding Rooms #17 &18 / Gray / White	No Asbestos Detected

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A-21	Mastic / Exterior Siding Rooms #17 & #18 / Gray / White	No Asbestos Detected
A-22	Vinyl Wall Paneling / Room # 19 / Brown	No Asbestos Detected
A-22	Wrap Vinyl Wall Paneling / Room #19 / White Beige	No Asbestos Detected
A-23	Carpet / Room # 19 / Gray /Blue	No Asbestos Detected
A-23	Mastic / Room # 19 / Yellow	No Asbestos Detected
A-24	Fiberglass Ceiling Panels / Room # 19 / Yellow	No Asbestos Detected
A-25	Exterior Siding / Exterior Room # 19 / Tan	No Asbestos Detected
A-26	Exterior Siding / Exterior Room # 19 / Tan	No Asbestos Detected
A-27	Vinyl wall Paneling / Room # 20 / Brown	No Asbestos Detected
A-27	Vinyl wall Wrap / Room # 20 / White / Beige	No Asbestos Detected
A-28	Carpet / Room # 20 / Gray / Blue	No Asbestos Detected
A-28	Mastic / Room #20 / Yellow	No Asbestos Detected
A-29	Concrete/ Footing Room # 20 / Gray	No Asbestos Detected
A-30	Vinyl wall Paneling / Room # 21 / Brown / White	No Asbestos Detected
A-31	Carpet / Room # 21 / Orange	No Asbestos Detected
A-31	Mastic / Room # 21 / Brown	No Asbestos Detected
A-32	Baseboard / Room # 21 / Brown	No Asbestos Detected
A-32	Mastic / Room # 21 / Brown	No Asbestos Detected
A-33	Fiberboard Ceiling Panels / Room # 22 / Brown	No Asbestos Detected
A-34	Carpet / Room # 22 / Black / Blue	No Asbestos Detected
A-34	Mastic / Room # 22 / Tan	No Asbestos Detected
A-35	Vinyl Wall Panels / Room # 22 / Brown / White	No Asbestos Detected
A-36	Baseboard / Room # 23 / Gray	No Asbestos Detected
A-36	Mastic / Room # 23 / Beige	No Asbestos Detected
A-37	Vinyl Wall Panels / Room # 23 / Brown / White	No Asbestos Detected
A-38	Pad / Room # 23 / Beige	No Asbestos Detected
A-38	Mastic / Room #23 / Blue	No Asbestos Detected
A-39	Concrete Pad / Room #23 / Gray	No Asbestos Detected
A-40	Concrete Pad / Room # 24 / Gray	No Asbestos Detected
A-41	Carpet / Room # 24 / Gray / Black	No Asbestos Detected
A-41	Mastic / Room #24 / Tan / Clear	No Asbestos Detected
A-42	Baseboard / Room #24 / Blue	No Asbestos Detected
A-42	Mastic / Room #24 / White	No Asbestos Detected
A-43	Vinyl Sheet Flooring / Room #24 / White / Gray	No Asbestos Detected
A-43	Mastic / Room #24 / yellow	No Asbestos Detected
A-43	Leveler / Room #24 / Gray	No Asbestos Detected
A-44	Concrete Footing / Bldg. # 1 Room #15 & #15 / Gray	No Asbestos Detected
A-45	Foundation Skirting / Bldg. #2 Room #18 & #19 / Beige	No Asbestos Detected
A-46	Concrete Footing / Bldg. #2 Room #18 & #19 / Gray	No Asbestos Detected

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A-47	Membrane / Bldg. #3 Room #15 & #16 / White	No Asbestos Detected
A-47	Roofing Mineral Cap / Bldg. #3 Room #15 & 16 / Black	No Asbestos Detected
A-47	Roofing Felt / Bldg. #3 Room #15 & 16 / Black	No Asbestos Detected
A-48	Roofing Membrane / Bldg. #3 Room #15 & #16 / White	No Asbestos Detected
A-48	Roofing Mineral Cap / Bldg. #3 Room #15 & #16 / Black	No Asbestos Detected
A-48	Felt/ Bldg. #3 Room #15 & #16 / Black	No Asbestos Detected
A-49	Roofing Membrane / Bldg. #2 Room #17 & #18 / White	No Asbestos Detected
A-49	Roofing Mineral Cap / Bldg. #2 Room #17 & #18 / Black	No Asbestos Detected
A-50	Roofing Membrane / Bldg. #2 Room #17 & #18 / White	No Asbestos Detected
A-50	Roofing Mineral Cap / Bldg. #2 Room #17 & #18 / Black	No Asbestos Detected
A-51	Roofing Membrane / Bldg. #1 Room #19 / White	No Asbestos Detected
A-51	Roofing / Bldg. #1 Room #19 / Black	2% Chrysotile Detected
A-51	Roofing Mineral Cap / Bldg. #1 Room #19 / Brown Gray Black	30% Chrysotile Detected
A-52	Roofing Membrane / Bldg. #1 Room #19 / White	No Asbestos Detected
A-52	Roofing / Bldg. #1 Room #19 / Black	2% Chrysotile Detected
A-53	Roofing Membrane / Bldg. #4 Room #23 / White	No Asbestos Detected
A-53	Roofing Mineral Cap / Bldg. #4 Room #23 / Gray Black	No Asbestos Detected
A-53	Felt / Bldg. #4 Room #23 / Black	No Asbestos Detected
A-54	Roofing Membrane / Bldg. #4 Room #23 / White	No Asbestos Detected
A-54	Roofing Mineral Cap/ Bldg. #4 Room #23 / Gray / Black	No Asbestos Detected
A-54	Felt / Bldg. #4 Room #23 / Black	No Asbestos Detected
A-55	Membrane / Bldg. #3 Room #22 / White	No Asbestos Detected
A-55	Roofing Mineral Cap / Bldg. #3 Room #22 / Gray / Black	No Asbestos Detected
A-55	Felt / Bldg. #3 Room #22 / Black	No Asbestos Detected
A-56	Roofing Membrane / Bldg. #3 Room #22 / White	No Asbestos Detected
A-56	Roofing Mineral Cap / Bldg. #3 Room #22 / Gray / Black	No Asbestos Detected
A-56	Felt / Bldg. #3 Room #22 / Black	No Asbestos Detected
A-57	Roofing Membrane / Bldg. #2 Room #21 / White	No Asbestos Detected
A-57	Roofing / Bldg. #2 Room #21 / Gray Black	No Asbestos Detected
A-58	Roofing Membrane / Bldg. #2 Room #21 /White	No Asbestos Detected
A-58	Roofing / Bldg. #2 Room #21 / Gray Black	No Asbestos Detected
A-59	Roofing / Bldg. #1 Room #20 / Gray Black	No Asbestos Detected
A-60	Roofing Mineral Cap / Bldg. #1 Room #20 / Gray Black	No Asbestos Detected
A-60	Felt / Bldg. #1 Room #20 / Black	No Asbestos Detected

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SUMMARY

Samples A-51 and A-52 of the following suspected Asbestos containing building material that could be impacted by the by the demolition of the structure was shown by the laboratory analysis to contain more than1 percent (1%) asbestos as determined by Polarized Light Miscopy (PLM) by an accredited laboratory.

The above-mentioned suspected building material identified at the site contains < 1% amount of Asbestos and is a regulated material per EPA/San Joaquin Valley Unified Air Quality District.

This material is considered Regulated Asbestos Containing Material (RACM) and does need to be handled and disposed of using EPA regulations.

Cal OSHA regulations do recognize any detectable amount of “Asbestos Containing Construction Material” in regards to worker safety. Worker safety is a concern; therefore, if this material is impacted or removed, it is required that the work be performed by a DOSH Certified Contractor.

It is a requirement of the San Joaquin Valley Unified Air Pollution Control district that all regulated asbestos containing materials that will be impacted must be removed and disposed of by a properly licensed California abatement contractor prior to the demolition or renovation of the building following all applicable laws and regulations pertaining to the removal and disposal of asbestos containing building materials.

See attachments:
- A- Chain of Custody
- B- Laboratory Asbestos Analysis for bulk Material
- C- Sampling location footprint

Ken Horrillo
CAC # 10-4691
Mountain View Environmental

OrderID: 092608343

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody
For California

EMSL Order Number (*lab use only*):

#092608343

PHONE:
FAX:

Company Name : Mountain View Environmental		**EMSL Customer ID:**	
Street: 5412 Shelly Court		**City:** Salida	**State or Province:** CA
Zip/Postal Code: 95368	**Country:** US	**Telephone #:** 209-545-8753	**Fax #:**
Report To (Name): Ken Horrillo		**Please Provide Results via:** ☐ Fax ☒ Email	
email Address: Mountainviewenvironmental@gmail.com		**Purchase Order Number:**	
Client Project ID: 1388 Patchett Drive Newman, CA		**EMSL Project ID** (*internal use only*):	
State or Province Collected: CA			

EMSL Bill-to: ☒ Same ☐ Different: If Bill-to is different, note instructions in comments below. *Third-party billing requires written authorization.*

Turnaround Time (TAT) Options Please Check

☐ 3 Hr[1] | ☐ 4-4.5Hr[1] AHERA Only | ☐ 6 Hr[1] | ☐ 24 Hr | ☐ 32 Hr[2] | ☒ 48 Hr | ☐ 72 Hr | ☐ 96 HR | ☐ 1 Week | ☐ 2 Week

[1]Premium Service Charge applies for 3 Hour TEM AHERA or EPA Level II TAT – you will be asked to sign an authonzation form. TEM Air 3 -6 Hour, please call ahead to schedule
[2]32 Hour TAT available for select tests only; samples must be submitted by 11.30am

PCM - Air
- ☐ NIOSH 7400
- ☐ w/ OSHA 8hr. TWA

PLM – Bulk (Reporting Limit)
- ☒ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)
- ☐ 400 Point Count (<0.25%)
- ☐ 400 Point Count with Gravimetric Reduction (<0.25%)
- ☐ 1000 Point Count (<0.1%)
- ☐ 1000 Point Count with Gravimetric Reduction (<0.1%)
- ☐ NIOSH 9002 (<1%)

TEM – Water: EPA 100 2
Fibers >10µm ☐ Waste ☐ Drinking
All Fiber Sizes ☐ Waste ☐ Drinking

TEM – Air
- ☐ AHERA 40 CFR, Part 763
- ☐ CARB Modified AHERA
- ☐ EPA Level II
- ☐ NIOSH 7402
- ☐ ISO 10312

TEM - Bulk
- ☐ TEM EPA NOB
- ☐ TEM EPA 600/R-93/116 with Milling Prep (<0.1%)*

Soil/Rock/Vermiculite (Reporting Limit)
- ☐ PLM CARB 435 – A (<0.25%)*
- ☐ TEM CARB 435 – B (<0.1%)
- ☐ TEM CARB 435 – C (<0.01%)*
- ☐ TEM Qualitative via Filtration Prep
- ☐ TEM Qualitative via Drop Mount Prep
- ☐ PLM EPA 600/R-93/116 with Milling Prep (<0.25%)
- ☐ PLM EPA 600/R-93/116 with Milling Prep (<0.1%)
- ☐ TEM EPA 600/R-93/116 with Milling Prep (<0.1%)*

** Lower reporting limits available upon request*

TEM- Dust
- ☐ Microvac - ASTM D 5755
- ☐ Wipe - ASTM D6480
- ☐ Carpet Sonication (EPA 600/J-93/167)

Other test (please specify)

☐ **Stop At First Positive** (*clearly identify homogenous areas below*)

Filter Pore Size (Air Samples): ☐ 0.8µm ☐ 0.45µm

Sampler's Name: Ken Horrillo **Sampler's Signature:** Ken Horrillo

Sample #	Sample Description/ Location	Volume, Area, or Homogenous Area	Date and Time Sampled
A-1	Sheet vinyl goods -Entry - Room #15	Bulk	7-22-26/10:30am
A-2	Rubber Baseboard - Room #15	Bulk	7-22-26/10:30am
A-3	Carpet and mastic - Room #15	Bulk	7-22-26/10:30am
A-4	Vinyl wall panels - Room #15	Bulk	7-22-26/10:30am

Client Sample # (s): A-1 - A-60 **Total # of Samples:** 60

Relinquished by (Client): Kenneth Horrillo **Date:** 7-25-26 **Time:** 9:30

Received by (Lab): [illegible] EFX CD **Date:** 7/28/26 **Time:** 8:45 AM

Comments/Special Instructions:

EMSL Analytical, Inc.'s (DBA: LA Testing) Laboratory Terms and Conditions are incorporated into this chain of custody by reference in their entirety. Submission of samples to LA Testing constitutes acceptance and acknowledgment of all terms and conditions.

OrderID: 092608343

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody
For California

EMSL Order Number *(Lab Use Only)*:
#092608343

PHONE:
FAX:

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description/ Location	Volume, Area, or Homogenous Area #	Date andTime Sampled
A-5	Fiberboard ceiling Panels- Room #15	Bulk	7-22-10:30am
A-6	Styrofoam ceiling insulation- Room #15	Bulk	7-22-26/10:30am
A-7	Exterior siding- Room #15 & #16	Bulk	7-22-26/10:30am
A-8	Exterior siding - Room #15 & 16	Bulk	7-22-26/10:30am
A-9	Sheet vinyl goods -Entry - Room #16	Bulk	7-22-26/10:30am
A-10	Fiberboard ceiling Panels- Room #16	Bulk	7-22-26/10:30am
A-11	Carpet & Mastic - Room #16	Bulk	7-22-26/10:30am
A-12	Vinyl wall panels - Room #16	Bulk	7-22-26/10:30am
A-13	Baseboard & Mastic - Room #16	Bulk	7-22-26/10:30am
A-14	Baseboard & Mastic - Room #17	Bulk	7-22-26/10:30am
A-15	Vinyl wall panels - Room #17	Bulk	7-22-26/10:30am
A-16	Carpet and Mastic - Room #17	Bulk	7-22-26/10:30am
A-17	Carpet and mastic - Room #18	Bulk	7-22-26/10:30am
A-18	Baseboard & mastic - Room 18	Bulk	7-22-26/10:30am
A-19	Vinyl wall panels - Room #18	Bulk	7-22-26/10:30am
A-20	Exterior siding- Room #17 & #18	Bulk	7-22-26/10:30am
A-21	Exterior siding- Room #17 & #18	Bulk	7-22-26/10:30am
A-22	Vinyl wall panels - Room # 19	Bulk	7-22-26/10:30am
A-23	Carpet and Mastic -Room # 19	Bulk	7-22-26/10:30am
A-24	Fiberglass ceiling Panels- Room #19	Bulk	7-22-26/10:30am
A-25	Exterior siding- Room #19	Bulk	7-22-26/10:30am
A-26	Exterior siding- Room #19	Bulk	7-22-26/10:30am

***Comments/Special Instructions:**

rec: [illegible] CF/CD 7/28/26 8:45 Ah

Controlled Document – COC-51 Asbestos CA R1 09/03/2019

EMSL Analytical, Inc 's (DBA: LA Testing) Laboratory Terms and Conditions are incorporated into this chain of custody by reference in their entirety. Submission of samples to LA Testing constitutes acceptance and acknowledgment of all terms and conditions.

SEPTEMBER 2026

OrderID: 092608343

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody
For California
EMSL Order Number (*Lab Use Only*):

#092608343

PHONE:
FAX:

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description/ Location	Volume, Area, or Homogenous Area #	Date and Time Sampled
A-27	Vinyl wall panels - Room #20	Bulk	7-22-26/10:30am
A-28	Carpet & Mastic - Room #20	Bulk	7-22-26/10:30am
A-29	Concrete footing - Room #20	Bulk	7-22-26/10:30am
A-30	Vinyl wall panels - Room #21	Bulk	7-22-26/10:30am
A-31	Carpet & Mastic - Room #21	Bulk	7-22-26/10:30am
A-32	Baseboard & Mastic - Room #21	Bulk	7-22-26/10:30am
A-33	Fiberboard ceiling Panels- Room #22	Bulk	7-22-26/10:30am
A-34	Carpet & mastic - Room #22	Bulk	7-22-26/10:30am
A-35	Vinyl wall panels - Room #22	Bulk	7-22-26/10:30am
A-36	Baseboard & Mastic - Room #23	Bulk	7-22-26/10:30am
A-37	Vinyl wall panels - Room #23	Bulk	7-22-26/10:30am
A-38	Carpet Pad and Mastic - Room #23	Bulk	7-22-26/10:30am
A-39	Concrete footing - Room #23	Bulk	7-22-26/10:30am
A-40	Concrete Pad - Room #24	Bulk	7-22-26/10:30am
A-41	Carpet and Mastic - Room #24	Bulk	7-22-26/10:30am
A-42	Baseboard & Mastic- Room #24	Bulk	7-22-26/10:30am
A-43	Sheet vinyl goods -Entry - Room #24	Bulk	7-22-26/10:30am
A-44	Concrete footing - Rooms # 15 &16 Bldg. #1	Bulk	7-22-26/10:30am
A-45	Foundation skirting - Rooms 18 & 19 Bldg. #2	Bulk	7-22-26/10:30am
A-46	Concrete footing- 18 & 19 Bldg. #2	Bulk	7-22-26/10:30am
A-47	Roofing Bldg. #3 - Room #15 & #16	Bulk	7-22-26/10:30am
A-48	Roofing Bldg. #3 - Room #15 & #16	Bulk	7-22-26/10:30am

***Comments/Special Instructions:**

Eff @ 7/28/26 8:45 AM

Controlled Document – COC-51 -Asbestos CA R1 09/03/2019

EMSL Analytical, Inc.'s (DBA: LA Testing) Laboratory Terms and Conditions are incorporated into this chain of custody by reference in their entirety. Submission of samples to LA Testing constitutes acceptance and acknowledgment of all terms and conditions.

OrderID: 092608343

EMSL ANALYTICAL, INC.
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Asbestos Chain of Custody
For California

EMSL Order Number *(Lab Use Only)*:

#092608343

PHONE:
FAX:

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description/ Location	Volume, Area, or Homogenous Area #	Date andTime Sampled
A-49	Roofing Bldg. #2 - Room #17 & #18	Bulk	7-22-26/10:30am
A-50	Roofing Bldg. #2 - Room #17 & #18	Bulk	7-22-26/10:30am
A-51	Roofing Bldg. #1 - Room #19	Bulk	7-22-26/10:30am
A-52	Roofing Bldg. #1 - Room #19	Bulk	7-22-26/10:30am
A-53	Roofing Bldg. # 4 - Room # 23	Bulk	7-22-26/10:30am
A-54	Roofing Bldg. # 4 - Room # 23	Bulk	7-22-26/10:30am
A-55	Roofing Bldg. #3 - Room #22	Bulk	7-22-26/10:30am
A-56	Roofing Bldg. #3 - Room #22	Bulk	7-22-26/10:30am
A-57	Roofing Bldg. #2 - Room #21	Bulk	7-22-26/10:30am
A-58	Roofing Bldg. #2 - Room #21	Bulk	7-22-26/10:30am
A-59	Roofing Bldg. #1 - Room #20	Bulk	7-22-26/10:30am
A-60	Roofing Bldg. #1 - Room #20	Bulk	7-22-26/10:30am

***Comments/Special Instructions:**

rec: [signature] EAK CD 7/28/26 8:45a

Controlled Document – COC-51 Asbestos CA R1 09/03/2019

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464 McCormick Street San Leandro, CA 94577

Tel/Fax: (510) 895-3675 / (510) 895-3680

http://www.EMSL.com / sanleandrolab@emsl.com

EMSL Order:	092608343
Customer ID:	32MOUN22
Customer PO:	
Project ID:	

Attention: Results
Mountain View Environmental
5412 Shelly Court
Salida, CA 95368

Project: 1388 PATCHETT DRIVE NEWMAN, CA

Phone:	(209) 545-8753
Fax:	(209) 545-8753
Received Date:	07/28/2026 8:45 AM
Analysis Date:	07/30/2026 - 07/31/2026
Collected Date:	07/22/2026

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
A-1-Vinyl Sheet Flooring *092608343-0001*	SHEET VINYL GOODS - ENTRY - ROOM #15	White Fibrous Homogeneous	30% Cellulose	50% Matrix 20% Non-fibrous (Other)	None Detected
A-1-Mastic *092608343-0001A*	SHEET VINYL GOODS - ENTRY - ROOM #15	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-1-Compound *092608343-0001B*	SHEET VINYL GOODS - ENTRY - ROOM #15	White Non-Fibrous Homogeneous		30% Ca Carbonate 50% Gypsum 20% Non-fibrous (Other)	None Detected
A-2-Baseboard *092608343-0002*	RUBBER BASEBOARD - ROOM #15	Blue Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-2-Mastic *092608343-0002A*	RUBBER BASEBOARD - ROOM #15	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-3-Carpet *092608343-0003*	CARPET AND MASTIC - ROOM #15	Gray/Blue Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-3-Mastic 1 *092608343-0003A*	CARPET AND MASTIC - ROOM #15	Tan Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-3-Mastic 2 *092608343-0003B*	CARPET AND MASTIC - ROOM #15	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-3-Compound *092608343-0003C*	CARPET AND MASTIC - ROOM #15	White Non-Fibrous Homogeneous		70% Ca Carbonate 30% Non-fibrous (Other)	None Detected
A-4 *092608343-0004*	VINYL WALL PANELS - ROOM #15	Brown Fibrous Homogeneous	40% Cellulose 20% Synthetic	20% Matrix 20% Non-fibrous (Other)	None Detected
A-5 *092608343-0005*	FIBERBOARD CEILING PANELS - ROOM #15	Beige Fibrous Homogeneous	40% Cellulose 40% Min. Wool	20% Non-fibrous (Other)	None Detected
A-6 *092608343-0006*	STYROFOAM CEILING INSULATION - ROOM #15	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
A-7-Vinyl Sheet Paneling *092608343-0007* *This is a composite result of both vinyl and backing layer*	EXTERIOR SIDING - ROOM #15 AND 16	Gray/Beige Fibrous Homogeneous	40% Glass	40% Matrix 20% Non-fibrous (Other)	None Detected
A-7-Mastic *092608343-0007A*	EXTERIOR SIDING - ROOM #15 AND 16	Tan Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-8-Vinyl Sheet Paneling *092608343-0008*	EXTERIOR SIDING - ROOM #15 AND 16	Gray/Tan Fibrous Homogeneous	40% Glass	40% Matrix 20% Non-fibrous (Other)	None Detected

Report amended: 08/03/2026 16:08:37 Replaces initial report from: 07/31/2026 10:56:26 Reason Code: Client-Change to Sample ID

EMSL Analytical, Inc.
464 McCormick Street San Leandro, CA 94577
Tel/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com / sanleandrolab@emsl.com

EMSL Order: 092608343
Customer ID: 32MOUN22
Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
This is a composite result of both vinyl and backing layer					
A-8-Mastic *092608343-0008A*	EXTERIOR SIDING - ROOM #15 AND 16	Beige Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-9-Vinyl Sheet Flooring *092608343-0009*	SHEET VINYL GOODS - ENTRY - ROOM #16	Brown/Gray Fibrous Homogeneous	40% Cellulose	40% Matrix 20% Non-fibrous (Other)	None Detected
This is a composite result of both vinyl and backing layer					
A-9-Mastic *092608343-0009A*	SHEET VINYL GOODS - ENTRY - ROOM #16	Tan Non-Fibrous Homogeneous		70% Matrix 30% Non-fibrous (Other)	None Detected
A-10 *092608343-0010*	FIBERBOARD CEILING PANELS - ROOM #16	Gray Fibrous Homogeneous	40% Cellulose 40% Min. Wool	20% Non-fibrous (Other)	None Detected
A-11-Carpet *092608343-0011*	CARPET & MASTIC - ROOM #16	Gray/Blue Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-11-Mastic *092608343-0011A*	CARPET & MASTIC - ROOM #16	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-12 *092608343-0012*	VINYL WALL PANELS - ROOM #16	Brown/White Fibrous Homogeneous	40% Cellulose 20% Synthetic	20% Matrix 20% Non-fibrous (Other)	None Detected
This is a composite result of both vinyl and backing layer					
A-13-Baseboard *092608343-0013*	BASEBOARD & MASTIC - ROOM #16	Blue Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-13-Mastic *092608343-0013A*	BASEBOARD & MASTIC - ROOM #16	Tan Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-14-Baseboard *092608343-0014*	BASEBOARD & MASTIC - ROOM #17	Beige Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-14-Mastic *092608343-0014A*	BASEBOARD & MASTIC - ROOM #17	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-15 *092608343-0015*	VINYL WALL PANELS - ROOM #17	Beige Fibrous Homogeneous	20% Cellulose	60% Matrix 20% Non-fibrous (Other)	None Detected
A-16-Carpet *092608343-0016*	CARPET & MASTIC - ROOM #17	Blue/Green Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-16-Mastic *092608343-0016A*	CARPET & MASTIC - ROOM #17	Tan Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-17-Carpet *092608343-0017*	CARPET & MASTIC - ROOM #18	Blue/Green Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-17-Mastic *092608343-0017A*	CARPET & MASTIC - ROOM #18	Tan Non-Fibrous Homogeneous		60% Matrix 40% Non-fibrous (Other)	None Detected
Result includes a small amount of inseparable attached material					
A-18-Baseboard *092608343-0018*	BASEBOARD & MASTIC - ROOM #18	Beige Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected

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Tel/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com / sanleandrolab@emsl.com

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
A-18-Mastic *092608343-0018A*	BASEBOARD & MASTIC - ROOM #18	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-19 *092608343-0019*	VINYL WALL PANELS - ROOM #18	Beige Fibrous Homogeneous	20% Cellulose	60% Matrix 20% Non-fibrous (Other)	None Detected
A-20-Vinyl Sheet Paneling *092608343-0020*	EXTERIOR SIDING - ROOM #17 & #18	Gray/White Fibrous Homogeneous	40% Glass	40% Matrix 20% Non-fibrous (Other)	None Detected
A-20-Mastic *092608343-0020A*	EXTERIOR SIDING - ROOM #17 & #18	Gray Non-Fibrous Homogeneous	10% Glass	70% Matrix 20% Non-fibrous (Other)	None Detected
A-21-Vinyl Sheet Paneling *092608343-0021*	EXTERIOR SIDING - ROOM #17 & #18	Gray/White Fibrous Homogeneous	40% Glass	40% Matrix 20% Non-fibrous (Other)	None Detected
A-21-Mastic *092608343-0021A*	EXTERIOR SIDING - ROOM #17 & #18	Gray/White Non-Fibrous Homogeneous	10% Glass	70% Matrix 20% Non-fibrous (Other)	None Detected
A-22-Paneling *092608343-0022*	VINYL WALL PANELS - ROOM #19	Brown Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
A-22-Wrap *092608343-0022A*	VINYL WALL PANELS - ROOM #19	White/Beige Fibrous Homogeneous	40% Cellulose	40% Matrix 20% Non-fibrous (Other)	None Detected
A-23-Carpet *092608343-0023*	CARPET AND MASTIC - ROOM #19	Gray/Blue Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-23-Mastic *092608343-0023A*	CARPET AND MASTIC - ROOM #19	Yellow Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-24 *092608343-0024*	FIBERGLASS CEILING PANELS - ROOM #19	Yellow Fibrous Homogeneous	80% Min. Wool	20% Non-fibrous (Other)	None Detected
A-25 *092608343-0025*	EXTERIOR SIDING - ROOM #19	Tan Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
A-26 *092608343-0026*	EXTERIOR SIDING - ROOM #19	Tan Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
A-27-Paneling *092608343-0027*	VINYL WALL PANELS - ROOM #20	Brown Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
A-27-Wrap *092608343-0027A*	VINYL WALL PANELS - ROOM #20	White/Beige Fibrous Homogeneous	40% Cellulose	40% Matrix 20% Non-fibrous (Other)	None Detected
A-28-Carpet *092608343-0028*	CARPET & MASTIC - ROOM #20	Gray/Blue Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-28-Mastic *092608343-0028A*	CARPET & MASTIC - ROOM #20	Yellow Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-29 *092608343-0029*	CONCRETE FOOTING - ROOM #20	Gray Non-Fibrous Homogeneous		40% Quartz 40% Ca Carbonate 20% Non-fibrous (Other)	None Detected

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SEPTEMBER 2026

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Tel/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com / sanleandrolab@emsl.com

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
A-30 *092608343-0030* *This is a composite result of both vinyl and backing layer*	VINYL WALL PANELS - ROOM #21	Brown/White Fibrous Homogeneous	50% Cellulose	30% Matrix 20% Non-fibrous (Other)	None Detected
A-31-Carpet *092608343-0031*	CARPET & MASTIC - ROOM #21	Orange Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-31-Mastic *092608343-0031A*	CARPET & MASTIC - ROOM #21	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-32-Baseboard *092608343-0032*	BASEBOARD & MASTIC - ROOM #21	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-32-Mastic *092608343-0032A*	BASEBOARD & MASTIC - ROOM #21	Brown Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-33 *092608343-0033*	FIBERBOARD CEILING PANELS - ROOM #22	Brown Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
A-34-Carpet *092608343-0034*	CARPET & MASTIC - ROOM #22	Black/Blue Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-34-Mastic *092608343-0034A*	CARPET & MASTIC - ROOM #22	Tan Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-35 *092608343-0035*	VINYL WALL PANELS - ROOM #22	Brown/White Fibrous Homogeneous	40% Cellulose	30% Matrix 30% Non-fibrous (Other)	None Detected
A-36-Baseboard *092608343-0036*	BASEBOARD & MASTIC - ROOM #23	Gray Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-36-Mastic *092608343-0036A*	BASEBOARD & MASTIC - ROOM #23	Beige Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-37 *092608343-0037*	VINYL WALL PANELS - ROOM #23	Brown/White Fibrous Homogeneous	50% Cellulose	30% Matrix 20% Non-fibrous (Other)	None Detected
A-38-Pad *092608343-0038*	CARPET PAD AND MASTIC - ROOM #23	Beige Fibrous Homogeneous	50% Synthetic	30% Matrix 20% Non-fibrous (Other)	None Detected
A-38-Mastic *092608343-0038A*	CARPET PAD AND MASTIC - ROOM #23	Blue Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-39 *092608343-0039*	CONCRETE FOOTING - ROOM #23	Gray Non-Fibrous Homogeneous		40% Quartz 40% Ca Carbonate 20% Non-fibrous (Other)	None Detected
A-40 *092608343-0040*	CONCRETE PAD - ROOM #24	Gray Non-Fibrous Homogeneous		40% Quartz 40% Ca Carbonate 20% Non-fibrous (Other)	None Detected
A-41-Carpet *092608343-0041*	CARPET AND MASTIC - ROOM #24	Gray/Black Fibrous Homogeneous	80% Synthetic	20% Non-fibrous (Other)	None Detected
A-41-Mastic *092608343-0041A*	CARPET AND MASTIC - ROOM #24	Tan/Clear Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-42-Baseboard *092608343-0042*	BASEBOARD & MASTIC - ROOM #24	Blue Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
A-42-Mastic *092608343-0042A*	BASEBOARD & MASTIC - ROOM #24	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-43-Vinyl Sheet Flooring *092608343-0043* *This is a composite result of both vinyl and backing layer*	SHEET VINYL GOODS - ENTRY - ROOM #24	Gray/White Fibrous Homogeneous	10% Synthetic 5% Glass	60% Matrix 25% Non-fibrous (Other)	None Detected
A-43-Mastic *092608343-0043A*	SHEET VINYL GOODS - ENTRY - ROOM #24	Yellow Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-43-Leveler *092608343-0043B*	SHEET VINYL GOODS - ENTRY - ROOM #24	Gray Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
A-44 *092608343-0044*	CONCRETE FOOTING- ROOMS #15 & 16 BLDG #1	Gray Non-Fibrous Homogeneous		40% Quartz 40% Ca Carbonate 20% Non-fibrous (Other)	None Detected
A-45 *092608343-0045*	FOUNDATION SKIRTING - ROOMS18 & 19 BLDG #2	Beige Non-Fibrous Homogeneous		10% Quartz 70% Ca Carbonate 20% Non-fibrous (Other)	None Detected
A-46 *092608343-0046*	CONCRETE FOOTING - 18 & 19 BLDG. #2	Gray Non-Fibrous Homogeneous		40% Quartz 40% Ca Carbonate 20% Non-fibrous (Other)	None Detected
A-47-Membrane *092608343-0047*	ROOFING BLDG, #3 - ROOM #15 & #16	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-47-Shingle *092608343-0047A*	ROOFING BLDG, #3 - ROOM #15 & #16	Black Fibrous Homogeneous	10% Glass	5% Quartz 60% Matrix 25% Non-fibrous (Other)	None Detected
A-47-Felt *092608343-0047B*	ROOFING BLDG, #3 - ROOM #15 & #16	Black Fibrous Homogeneous	40% Glass	40% Matrix 20% Non-fibrous (Other)	None Detected
A-48-Membrane *092608343-0048*	ROOFING BLDG, #3 - ROOM #15 & #16	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-48-Shingle *092608343-0048A*	ROOFING BLDG, #3 - ROOM #15 & #16	Black Fibrous Homogeneous	10% Glass	5% Quartz 60% Matrix 25% Non-fibrous (Other)	None Detected
A-48-Felt *092608343-0048B*	ROOFING BLDG, #3 - ROOM #15 & #16	Black Fibrous Homogeneous	40% Glass	40% Matrix 20% Non-fibrous (Other)	None Detected
A-49-Membrane *092608343-0049*	ROODING BLDG, #2 - ROOM #17 & #18	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-49-Shingle *092608343-0049A* *This is a composite result of inseparable roofing layers.*	ROODING BLDG, #2 - ROOM #17 & #18	Black Fibrous Homogeneous	15% Glass	5% Quartz 50% Matrix 30% Non-fibrous (Other)	None Detected
A-50-Membrane *092608343-0050*	ROODING BLDG, #2 - ROOM #17 & #18	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-50-Shingle *092608343-0050A*	ROODING BLDG, #2 - ROOM #17 & #18	Black Fibrous Homogeneous	10% Glass	5% Quartz 60% Matrix 25% Non-fibrous (Other)	None Detected
A-51-Membrane *092608343-0051*	ROOFING BLDG. #1 - ROOM #19	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected

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Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
A-51-Roofing *092608343-0051A*	ROOFING BLDG. #1 - ROOM #19	Black Fibrous Homogeneous	20% Cellulose	30% Matrix 48% Non-fibrous (Other)	**2% Chrysotile**
This is a composite result of inseparable roofing layers.					
A-51-Shingle *092608343-0051B*	ROOFING BLDG. #1 - ROOM #19	Brown/Gray/Black Fibrous Homogeneous	30% Cellulose	20% Matrix 20% Non-fibrous (Other)	**30% Chrysotile**
A-52-Membrane *092608343-0052*	ROOFING BLDG. #1 - ROOM #19	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-52-Roofing *092608343-0052A*	ROOFING BLDG. #1 - ROOM #19	Black Fibrous Homogeneous	20% Cellulose	30% Matrix 48% Non-fibrous (Other)	**2% Chrysotile**
A-53-Membrane *092608343-0053*	ROOFING BLDG. #4 - ROOM #23	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-53-Shingle *092608343-0053A*	ROOFING BLDG. #4 - ROOM #23	Gray/Black Fibrous Homogeneous	20% Glass	50% Matrix 30% Non-fibrous (Other)	None Detected
A-53-Felt *092608343-0053B*	ROOFING BLDG. #4 - ROOM #23	Black Fibrous Homogeneous	60% Glass	20% Matrix 20% Non-fibrous (Other)	None Detected
A-54-Membrane *092608343-0054*	ROOFING BLDG. #4 - ROOM #23	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-54-Shingle *092608343-0054A*	ROOFING BLDG. #4 - ROOM #23	Gray/Black Fibrous Homogeneous	20% Glass	50% Matrix 30% Non-fibrous (Other)	None Detected
A-54-Felt *092608343-0054B*	ROOFING BLDG. #4 - ROOM #23	Black Fibrous Homogeneous	60% Glass	20% Matrix 20% Non-fibrous (Other)	None Detected
A-55-Membrane *092608343-0055*	ROOFING BLDG. #3 - ROOM #22	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-55-Shingle *092608343-0055A*	ROOFING BLDG. #3 - ROOM #22	Gray/Black Fibrous Homogeneous	20% Glass	50% Matrix 30% Non-fibrous (Other)	None Detected
A-55-Felt *092608343-0055B*	ROOFING BLDG. #3 - ROOM #22	Black Fibrous Homogeneous	60% Glass	20% Matrix 20% Non-fibrous (Other)	None Detected
A-56-Membrane *092608343-0056*	ROOFING BLDG. #3 - ROOM #22	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-56-Shingle *092608343-0056A*	ROOFING BLDG. #3 - ROOM #22	Gray/Black Fibrous Homogeneous	20% Glass	50% Matrix 30% Non-fibrous (Other)	None Detected
A-56-Felt *092608343-0056B*	ROOFING BLDG. #3 - ROOM #22	Black Fibrous Homogeneous	60% Glass	20% Matrix 20% Non-fibrous (Other)	None Detected
A-57-Membrane *092608343-0057*	ROOFING BLDG. #2 - ROOM #21	White Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
A-57-Roofing *092608343-0057A*	ROOFING BLDG. #2 - ROOM #21	Gray/Black Fibrous Homogeneous	50% Glass	30% Matrix 20% Non-fibrous (Other)	None Detected
This is a composite result of inseparable roofing layers.					

Report amended: 08/03/2026 16:08:37 Replaces initial report from: 07/31/2026 10:56:26 Reason Code: Client-Change to Sample ID

EMSL Analytical, Inc.
464 McCormick Street San Leandro, CA 94577
Tel/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com / sanleandrolab@emsl.com

EMSL Order: 092608343
Customer ID: 32MOUN22
Customer PO:
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
A-58-Membrane *092608343-0058*	ROOFING BLDG. #2 - ROOM #21	White Non-Fibrous Homogeneous		0% Matrix 100% Non-fibrous (Other)	None Detected
A-58-Roofing *092608343-0058A* *This is a composite result of inseparable roofing layers.*	ROOFING BLDG. #2 - ROOM #21	Gray/Black Fibrous Homogeneous	50% Glass	30% Matrix 20% Non-fibrous (Other)	None Detected
A-59 *092608343-0059* *This is a composite result of inseparable roofing layers.*	ROOFING BLDG. #1 - ROOM #20	Gray/Black Fibrous Homogeneous	50% Glass	30% Matrix 20% Non-fibrous (Other)	None Detected
A-60-Shingle *092608343-0060*	ROOFING BLDG. #1 - ROOM #20	Gray/Black Fibrous Homogeneous	20% Glass	50% Matrix 30% Non-fibrous (Other)	None Detected
A-60-Felt *092608343-0060A*	ROOFING BLDG. #1 - ROOM #20	Black Fibrous Homogeneous	60% Glass	20% Matrix 20% Non-fibrous (Other)	None Detected

Report Comment: **Sample IDs updated per client request.**

Analyst(s)

Brayant Rodriguez (45)
Damaris Pineda Ayala (40)
Xeena Paul (25)

Jonathan Nomura, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc San Leandro, CA NVLAP Lab Code 101048-3, WA C884

Report amended: 08/03/2026 16:08:37 Replaces initial report from: 07/31/2026 10:56:26 Reason Code: Client-Change to Sample ID



Asbestos Bulk Sampling Location

1388 Patchett Drive
Newman, CA 95360

Attachment C

Mountain View Environmental
5412 Shelly Court Salida, Ca 95368
Office (209) 545-8753 Mobile (209) 484-4395

Asbestos, Lead Based Paint & Mold
Consulting, Inspections & Supervision
Specializing in CDBG funded programs
E-mail: mountainviewenvironmental@gmail.com

BULK PAINT SAMPLING

Von Renner Elementary School
1388 Patchett Drive
Newman, CA 95360



7/22/26

SEPTEMBER 2026

Mountain View Environmental

5412 Shelly Court Salida, Ca 95368

Office (209) 545-8753 Mobile (209) 484-4395

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BULK PAINT CHIP SAMPLING REPORT

On July 22, 2026, Kenneth C. Horrillo, a California Department of Health Services Certified Lead Inspector/Assessor, DHS #11679, at the request of Matt Vargas, Director of Maintenance & Operations, to collect bulk paint samples from painted surfaces of the Von Renner Elementary School Project located at 1388 Patchett Drive Newman, CA 95360.

The purpose of the sampling was to determine whether or not the paint chip or surface coatings on the structures that will be impacted by the demolition and relocation of Portable Classrooms of the Von Renner Elementary School, are by definition lead/based paint.

The samples were taken by Ken Horrillo following the Department of Health Services (DHS) guidelines for the collection of bulk paint samples.

The collected samples were placed under a chain-of-custody and shipped via FedEx to LA Testing, 5431 Industrial Drive Huntington Beach, CA 92649, an EPA certified laboratory for analysis by Atomic Absorption Spectrometry (AA Flame).

The definition of lead/based paint is paint or other surface coating that contains an amount of lead equal to or in excess of one milligram per square centimeter (1.0 mg/mc sq) or more than half of one percent (0.5%) by weight or greater than 5,000 ppm lead.

The results of the laboratory analysis are as follows:

P-1	Paint chip / Exterior Field Rms 15-18/ Tan	1100 ppm	Not Lead/Based Paint by definition
P-2	Paint chip / Exterior Trim Rms 15-18 / Purple	<64 ppm	Not Lead/Based Paint by definition
P-3	Paint chip / Exterior Trim Rms 21-23/ Purple	<64 ppm	Not Lead/Based Paint by definition
P-4	Paint chip / Exterior Trim Rms 21-23 / Purple	<64 ppm	Not Lead/Based Paint by definition
P-5	Paint chip / Exterior Field Rms 21-23 / Tan	< 64 ppm	Not Lead/Based Paint by definition
P-6	Paint chip / Exterior Field Rm 24 / Tan	3700 ppm	Not Lead/Based Paint by definition

Mountain View Environmental

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EXECUTIVE SUMMARY

The laboratory analysis of samples P-1, P-2, P-3, P-4, P-5 & P-6 of surface coating was found by definition not to be lead/based paint.

CAL-OSHA has certain requirements in regard to worker protection with the presents of lead in paint or surface coating.

Because some areas that are to be impacted did have detectable levels of lead Contractors should follow Cal-OSHA regulations pertaining to worker protection standards (Title 8, CCR Section 1532.1 Lead in Construction standard and any other applicable standards) in the handling and disposal of these materials.

See attachments:
- A- Chain of Custody
- B- Laboratory Lead in Bulk Material
- C- Sampling location footprint

Ken Horrillo
CAC # 10-4691
DPH #11679
Mountain View Environmental

EMSL ANALYTICAL, INC.
TESTING LABS • PRODUCTS • TRAINING

Lead Chain of Custody

EMSL Order Number / Lab Use Only: GE55576

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
PHONE: (800) 220-3675
EMAIL: CinnaminsonLeadLab@emsl.com

If Bill-To is the same as Report-To leave this section blank. Third-party billing requires written authorization.

Customer Information		Billing Information	
Customer ID:	32Moun22	Billing ID:	
Company Name:	Mountain View Environmental	Company Name:	
Contact Name:	Ken Horrillo	Billing Contact:	
Street Address:	5412 Shelly Court	Street Address:	
City, State, Zip:	Salida, CA, 95368	City, State, Zip:	
Country:	US	Country:	
Phone:	209 484-4395	Phone:	
Email(s) for Report:	Mountainviewenvironmental@gmail.com	Email(s) for Invoice:	

Project Information

Project Name/No:	1388 Patchett Drive, Newman	Purchase Order:	
EMSL LIMS Project ID: (If applicable, EMSL will provide)		US State where samples collected:	
State of Connecticut (CT) must select project location:	☐ Commercial (Taxable) ☐ Residential (Non-Taxable)		
Sampled By Name:	Ken Horrillo	Sampled By Signature:	Ken Horrillo
No. of Samples in Shipment			

Turn-Around-Time (TAT)

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 32 Hour ☑ 48 Hour ☐ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

Please call ahead for large projects and/or turnaround times 6 Hours or Less. *32 Hour TAT available for select tests only; samples must be submitted by 11:30am.

MATRIX	METHOD	INSTRUMENT	REPORTING LIMIT	SELECTION
CHIPS ☐ % by wt. ☑ ppm (mg/kg) ☐ mg/cm² *Chips reporting Limit based on a minimum 0.25g sample weight. Not appropriate for Ceramic Tiles - XRF is recommended. *Sample Area Required below for mg/cm²	SW 846-7000B	Flame Atomic Absorption	*Please select reporting on left. - 0.0064% - 64 ppm - mg/cm2 - RL is Variable	☑
	SW 846-6010D	ICP-OES	*Please select reporting on left. - 0.0004% - 4 ppm - mg/cm2 - RL is Variable	☐
AIR	NIOSH 7082	Flame Atomic Absorption	3.2 µg/filter	☐
	NIOSH 7303M	ICP-OES	1.0µ g/filter	☐
	NIOSH 7303M	ICP-MS	0.05 µg/filter	☐
WIPE ☐ ASTM ☐ NON-ASTM	SW 846-7000B*	Flame Atomic Absorption	8 µg/wipe	☐
*If no box is checked, non-ASTM Wipe is assumed	SW 846-6010D*	ICP-OES	1.0 µg/wipe	☐
TCLP	SW 846-1311 / 7000B / SM 3111B	Flame Atomic Absorption	0.32 mg/L (ppm)	☐
	SW 846-1311 / SW 846-6010D*	ICP-OES	0.1 mg/L (ppm)	☐
SPLP	SW 846-1312 / 7000B / SM 3111B	Flame Atomic Absorption	0.32 mg/L (ppm)	☐
	SW 846-1312 / SW 846-6010D*	ICP-OES	0.1 mg/L (ppm)	☐
TTLC	22 CCR App. II, 7000B	Flame Atomic Absorption	32 mg/kg (ppm)	☐
	22 CCR App. II, SW 846-6010D*	ICP-OES	2 mg/kg (ppm)	☐
STLC	22 CCR App. II, 7000B	Flame Atomic Absorption	0.32 mg/L (ppm)	☐
	22 CCR App. II, SW 846-6010D*	ICP-OES	0.1 mg/L (ppm)	☐
Soil	SW 846-7000B	Flame Atomic Absorption	32 mg/kg (ppm)	☐
	SW 846-6010D*	ICP-OES	2 mg/kg (ppm)	☐
Wastewater Unpreserved ☐	SM 3111B / SW 846-7000B	Flame Atomic Absorption	0.32 mg/L (ppm)	☐
Preserved with HNO3 ☐ PH<2	EPA 200.7 / 6010D	ICP-OES	0.020 mg/L (ppm)	☐
Drinking Water Unpreserved ☐	EPA 200.5	ICP-OES	0.003 mg/L (ppm)	☐
Preserved with HNO3 ☐ PH<2	EPA 200.8	ICP-MS	0.001 mg/L (ppm)	☐
TSP/SPM Filter	40 CFR Part 50	ICP-OES	12 µg/filter	☐
		ICP-MS	0.6 µg/filter	☐
Other:				

Sample Number	Sample Location	Volume / Area	Date / Time Sampled
P-1	Exterior / Field Paint / Rms 15,16,17 &18 / Tan	Bulk	7-22-26 / 11:30 am
P-2	Exterior / Trim Paint / Rms 15, 16 17 & 18 / Purple	Bulk	7-22-26 / 11:30 am
P-3	Exterior / Trim Paint / Rms 21, 22 & 23 / Purple	Bulk	7-22-26 / 11:30 am
P-4	Exterior / Trim Paint / Rms 21, 22 & 23 / Light Purple	Bulk	7-22-26 / 11:30 am
P-5	Exterior / Field Paint / Rms 21, 22 & 23 / Tan	Bulk	7-22-26 / 11:30 am

Method of Shipment:	Fedex	Sample Condition Upon Receipt:	
Relinquished by:	Kenneth Horrillo	Date/Time: 7-27-26 / 3:00 pm	Received by: FX Date/Time 7/28/26 8:45A
Relinquished by:	FX	Date/Time: 7/28/26 4:00	Received by: Chloe TJ (FX) 07/29/26 Date/Time 09:35AM

Controlled Document CDC-25 Lead R22 03/28/2025

*6010C Available Upon Request

☑ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.

SEPTEMBER 2026

EMSL ANALYTICAL, INC.
TESTING LABS • PRODUCTS • TRAINING

Lead Chain of Custody

EMSL Order Number / Lab Use Only

GE55576

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077

PHONE: (800) 220-3675
EMAIL: CinnaminsonLeadLab@emsl.com

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

Sample Number	Sample Location	Volume / Area	Date / Time Sampled
P-6	Exterior / Field Paint / Rm. 24 / Tan / Grey	Bulk	7-22-26 / 11:30 am

Method of Shipment: Fedex

Sample Condition Upon Receipt:

Relinquished by: Kenneth Horrillo	Date/Time: 7-27-26 / 3:00 pm	Received by: Exp ①	Date/Time 7/28/26 8:45A
Relinquished by: FX	Date/Time: 7/29/26 4:00P	Received by:	Date/Time

Controlled Document COC-25 Lead R22 03/28/2025

☑ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety.
Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.

SEPTEMBER 2026

LA Testing

5431 Industrial Drive, Huntington Beach, CA, 92649
Telephone: (714)-828-4999 Fax:(714)-828-4944
www.emsl.com

EMSL Order ID: 332655576
LIMS Reference ID: GE55576
EMSL Customer ID: 32MOUN22

Attention: Ken Horrillo
Mountain View Environmental [32MOUN22]
5412 Shelly Court
Salida, CA 95368
(209) 545-8753
mountainviewenvironmental@gmail.com

Project Name: 1388 PATCHETT DRIVE, NEWMAN

Customer PO:
EMSL Sales Rep: Callum McMillan
Received: 07/29/2026 09:35
Reported: 07/31/2026 09:51

Analytical Results

Analyte	Results	RL	Weight	Prep Date & Tech	Prep Method	Analysis Date & Analyst	Analytical Method	Q	DF
Client Sample ID: P-1/EXTERIOR / FIELD PAINT / RMS 15, 16, 17 & 18 / TAN									**Date Sampled: 07/22/26**
Matrix: Chips									**LIMS Reference ID: GE55576-01**
Lead	1100 ppm	64 ppm	0.2583 g	07/31/26 DA1	SW-846 3050B	07/31/26 DCM	SW 846-7000B		1
Client Sample ID: P-2/EXTERIOR / TRIM PAINT / RMS 15, 16, 17 & 18 / PURPLE									**Date Sampled: 07/22/26**
Matrix: Chips									**LIMS Reference ID: GE55576-02**
Lead	<64 ppm	64 ppm	0.2985 g	07/31/26 DA1	SW-846 3050B	07/31/26 DCM	SW 846-7000B		1
Client Sample ID: P-3/EXTERIOR / TRIM PAINT / RMS 21, 22 & 23 / PURPLE									**Date Sampled: 07/22/26**
Matrix: Chips									**LIMS Reference ID: GE55576-03**
Lead	<64 ppm	64 ppm	0.2722 g	07/31/26 DA1	SW-846 3050B	07/31/26 DCM	SW 846-7000B		1
Client Sample ID: P-4/EXTERIOR / TRIM PAINT / RMS 15, 16, 17 & 18 / LIGHT PURPLE									**Date Sampled: 07/22/26**
Matrix: Chips									**LIMS Reference ID: GE55576-04**
Lead	<64 ppm	64 ppm	0.2533 g	07/31/26 DA1	SW-846 3050B	07/31/26 DCM	SW 846-7000B		1
Client Sample ID: P-5/EXTERIOR / FIELD PAINT / RMS 21, 22 & 23 / TAN									**Date Sampled: 07/22/26**
Matrix: Chips									**LIMS Reference ID: GE55576-05**
Lead	<64 ppm	64 ppm	0.2765 g	07/31/26 DA1	SW-846 3050B	07/31/26 DCM	SW 846-7000B		1
Client Sample ID: P-6/EXTERIOR / FIELD PAINT / RM. 24 / TAN/ GREY									**Date Sampled: 07/22/26**
Matrix: Chips									**LIMS Reference ID: GE55576-06**
Lead	3700 ppm	64 ppm	0.2606 g	07/31/26 DA1	SW-846 3050B	07/31/26 DCM	SW 846-7000B		1

SEPTEMBER 2026

LA Testing

5431 Industrial Drive, Huntington Beach, CA, 92649
Telephone: (714)-828-4999 Fax:(714)-828-4944
www.emsl.com

EMSL Order ID: 332655576
LIMS Reference ID: GE55576
EMSL Customer ID: 32MOUN22

Attention: Ken Horrillo
Mountain View Environmental [32MOUN22]
5412 Shelly Court
Salida, CA 95368
(209) 545-8753
mountainviewenvironmental@gmail.com

Project Name: 1388 PATCHETT DRIVE, NEWMAN

Customer PO:
EMSL Sales Rep: Callum McMillan
Received: 07/29/2026 09:35
Reported: 07/31/2026 09:51

Certified Analyses included in this Report

Analyte	Certifications
SW 846-7000B in Chips	
Lead	33-AIHA ELLAP

List of Certifications

Code	Description	Number	Expires
33-AIHA ELLAP	American Industrial Hygiene Assocation (AIHA LAP, LLC) - ELLAP	101650	02/01/2027
33-AIHA IHLAP	American Industrial Hygiene Assocation (AIHA LAP, LLC) - IHLAP	101650	02/01/2027
33-CA Water Boards	California Water Boards	1406	01/31/2028

Please see the specific Field of Testing (FOT) on www.emsl.com <http://www.emsl.com> for a complete listing of parameters for which EMSL is certified.

Notes and Definitions

Item	Definition
(Dig)	For metals analysis, sample was digested.
[2C]	Reported from the second channel in dual column analysis.
DA	Direct Analysis
DF	Dilution Factor
MDL	Method Detection Limit.
ND	Analyte was NOT DETECTED at or above the reporting limit, or the mdl if provided.
NR	Spike/Surrogate showed no recovery.
Q	Qualifier
RCS	Respirable Crystalline Silica
RL	Reporting Limit
Wet	Sample is not dry weight corrected.

Measurement of uncertainty and any applicable definitions of method modifications are available upon request. Per EPA NLLAP policy, sample results are not blank corrected.

LA Testing

5431 Industrial Drive, Huntington Beach, CA, 92649
Telephone: (714)-828-4999 Fax:(714)-828-4944
www.emsl.com

EMSL Order ID: 332655576
LIMS Reference ID: GE55576
EMSL Customer ID: 32MOUN22

Attention: Ken Horrillo
Mountain View Environmental [32MOUN22]
5412 Shelly Court
Salida, CA 95368
(209) 545-8753
mountainviewenvironmental@gmail.com

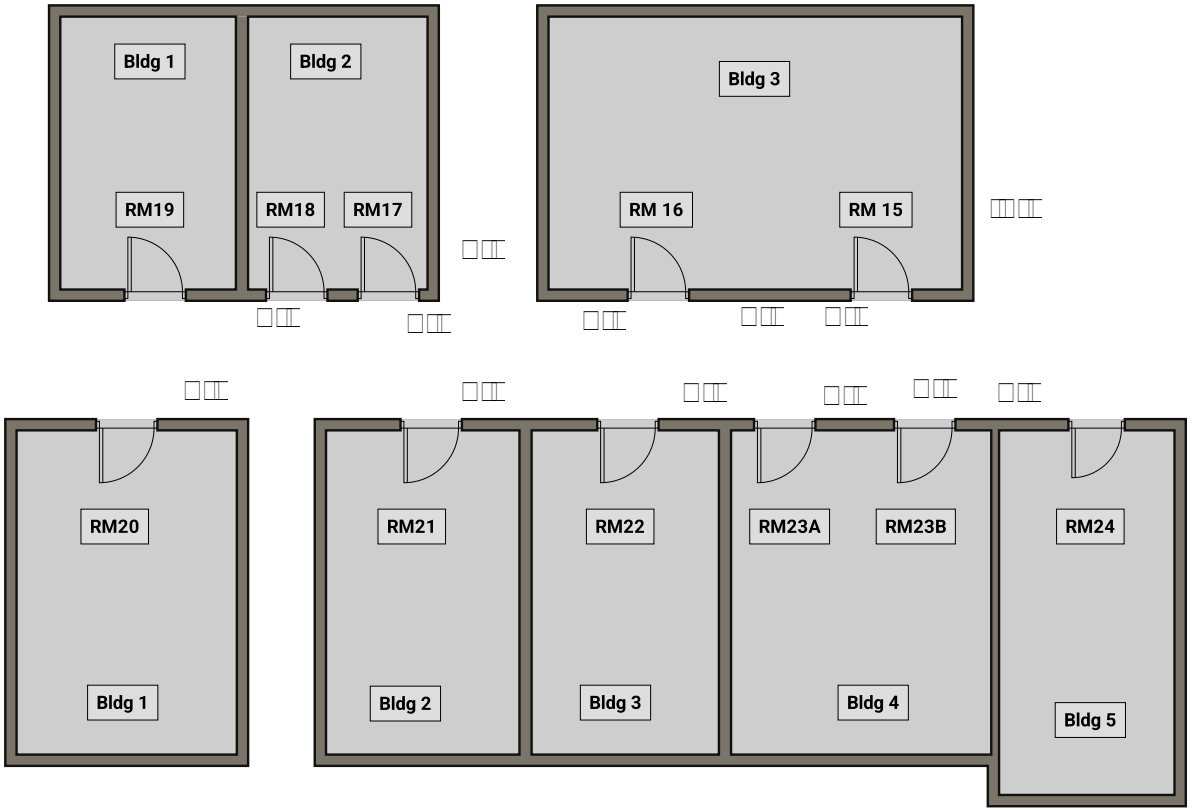
Project Name: 1388 PATCHETT DRIVE, NEWMAN

Customer PO:
EMSL Sales Rep: Callum McMillan
Received: 07/29/2026 09:35
Reported: 07/31/2026 09:51

Michael Chapman Laboratory Manager or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. QC sample results are within quality control criteria and met method specifications unless otherwise noted. All results for soil samples are reported on a dry weight basis, unless otherwise noted.

Analysis following EMSL SOP for the Determination of Environmental Lead by FLAA. The laboratory has a reporting limit of 0.0064% by wt., based upon a minimum sample weight of 0.25g submitted to the lab, and is not responsible for any result or reporting limit provided in mg/cm2 since it is dependent upon an area value provided by non-lab personnel. A "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty and definitions of modifications are available upon request. Results in this report are not blank corrected unless specified.



lead Based Paint Bulk Sampling Location

1388 Patchett Drive
Newman, CA 95360

Attachment C

DVBE REQUIREMENTS
SECTION 010421

PART 1 – GENERAL

1.0 DVBE QUALIFICATION

A. **GENERAL**: The Owner requires that all contracts funded by the Office of Public School Construction include stated goals for Disabled Veteran Business Enterprise (DVBE) participation.

B. **GOALS**: State law requires that State contracts have participation goals of 3 percent for DVBE as defined in Public Contract Code 10115.1.

PLEASE READ THESE DVBE REQUIREMENTS CAREFULLY. FAILURE TO COMPLY WITH THE DVBE BID REQUIREMENT WILL CAUSE YOUR BID TO BE DEEMED NONRESPONSIVE AND INELIGIBLE FOR AWARD OF THIS CONTRACT.

C. **CONTRACT GOALS/GOOD FAITH EFFORTS**: In order to be responsive to the DVBE requirement, the bidder must be responsive to at least one of the following two alternatives. (Note: The bidder has the option of satisfying **both** (A) and (B) to maximize responsiveness to the goals):

1. **Alternative A**: The bidder meets or exceeds the participation goals of 3 percent DVBE participation for the proposed contract by one of the following:
   a. The bidder is a DVBE and committed to performing not less than 3 percent of the contract amount with its own forces. If a bidder meets these provisions, Box A of Part II on the Prime Bidder Certification Form should be checked. If DVBE status is claimed form OSMB11 must be completed and submitted.
   b. The bidder is committed to use DVBE's for not less than 3 percent of the contract amount. If bidder meets these provisions, Box C of Part II on the Prime Bidder Certification Form should be checked.

Please Note: DVBE main subcontractors declared by the prime bidder on the Prime Bidder Certification must also submit letter of certification from Department of General Services (DGS) to certify status. DVBE subordinate subcontractors must also submit letter of certification from DGS.

2. **Alternative B**: The bidder makes a good faith effort to meet the participation goals by performing all of the following by the bid/proposal submission date (if bidder meets this provision, the Prime Bidder Good Faith Effort Worksheet must be completed and submitted with the Prime Bidder Certification Form in the bidder's proposal):

a. The bidder contacts State Agencies, Federal Agencies, and local DVBE organizations for purpose of identifying DVBE and submits copies of all correspondence or listings of contact to the Owners. Also, the bidders substantiates that contacts were made with other State and Federal Agencies and with local DVBE organizations to identify potentially responsible and responsive DVBE contractors. (Refer to the Prime Bidder Good Faith Effort Worksheet, Part I).

b. The bidder advertises in published trade papers and papers devoted to DVBE contracting and provide copies of the same to school district, unless time constraints imposed by the school district, as permitted by law, do not allow for that advertising. (Refer to Prime Bidder Good Faith Effort Worksheet, Part II).

c. The bidder sends invitations to bid to available DVBE subcontractors and provides a list of the DVBE that were solicited. (Refer to Prime Bidder Good Faith Effort Worksheet, Part III).

d. The bidder shall include a statement indicating that available DVBE on the above list were considered and reasons for not selecting any of them. (Refer to Prime Bidder Good Faith Effort Worksheet, Part III).

Final determination of DVBE goal attainment or a good faith effort by the bidder shall be at the Owner's sole discretion.

D. **SUBSTITUTIONS**: If awarded the contract(s), the successful bidder/vendor must use the DVBE subcontractor and/or supplier proposed in its final bid/proposal unless the contractor requested substitution from the Owner prior to the execution of the contract and the district has approved such substitution. At a minimum, the request must include:

1. A written explanation of the reason for the substitution.
2. The identity of the person or firm substituted.
3. Satisfactory evidence that the DVBE participating goals certified in the original bid proposal will still be met after the substitution.

The Owner's approval or disapproval of a substitution request should not be construed as an excuse for noncompliance with any other provision of law, including but not limited to the Subletting and Subcontracting Fair Practices Act or any other contract requirements relating to substitution of subcontractors.

Failure to adhere to the DVBE participation proposed by the successful bidder/vendor may be cause for contract termination and recovery of damages under the rights and remedies due the Owner in the default section of the contract.

E. **CONTRACT AUDITS**: Contractor agrees that the Owner has the right to review, obtain and copy all records pertaining to performance of the contract. Contractor agrees to provide the Owner with any relevant information requested and shall permit the Owner access to its premises upon reasonable notice for purposes of interviewing employees and inspecting records. The Contractor shall maintain records for a period of at least three years after final payment under the contract.

2.0 DVBE FORMS

A. **GENERAL**: Complete the appropriate DVBE Certification Forms included on the following pages and submit as directed in Section 00042 – NOTICE TO CONTRACTORS.

DESCRIPTION	**TO BE COMPLETED BY**
Prime Bidder Certification	Prime Bidder of DVBE Participation
Subcontractor Certification	Subcontractor of DVBE Participation
Prime Bidder Good Faith Effort Worksheet	Prime Bidder

B. **FAILURE TO COMPLY WITH THE DVBE BID REQUIREMENT WILL CAUSE YOUR BID TO BE DEEMED NONRESPONSIVE AND INELIGIBLE FOR AWARD OF CONTRACT**.

C. **ADDITIONAL INFORMATION:**

1. Identification: Assistance in the identification of registered DVBE businesses is available through the Office of Small Business and DVBE Services at (800) 559-5529.

END OF SECTION

PRIME BIDDER CERTIFICATION OF DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION

To be completed by the Prime Bidder

PART I – IDENTIFICATION INFORMATION		
BIDDER'S NAME	BUSINESS ADDRESS	TELEPHONE NUMBER
SCHOOL DISTRICT	COUNTY	APPLICATION NO.

PART II – METHOD OF COMPLIANCE WITH DVBE PARTICIPATION GOALS – Include this form and any other applicable documents listed in this table with your bid/proposal. Read the three columns in the table below as sentences from left to right. Check the appropriate box to indicate your method of committing the contract dollar amount.

NOTE: *Architectural, engineering, environmental, land surveying or construction management firms must indicate their method of compliance by marking the appropriate box A, B, C, or D after selection by the District and before the contract is signed.*

YOUR BUSINESS ENTERPRISE	**AND YOU**	**AND YOU**
A. ☐ *is Disabled Veteran owned and your forces, will perform at least 3 percent of this contract*	*will include a copy of your DVBE letter from the Office of Small Minority Business (OSBCR).*	
B. ☐ *is Disabled Veteran owned* ***but is unable*** *to perform the 3 percent of this contract with your forces*	*will use DVBE subcontractors/ suppliers to bring the contract participation to at least 3 percent*	*will include a copy of each DVBE's letter from OSBCR (including yours, if applicable).*
C. ☐ *is* ***not*** *Disabled Veteran owned*	*will use DVBE subcontractors/ suppliers for at least 3 percent of this contract*	
D. ☐ *is unable to meet the required participation goals*	*will complete a Good Faith Effort to obtain DVBE participation*	*will include the Prime Bidder's Good Faith Effort Worksheet.*

Note: An Office of Small Business, Certification and Resources (OSBCR) letter must be attached for each DVBE participating in the contract. The DVBE letter is obtained by application through the OSBCR and must be provided at the time of bid opening. If the letter is not provided, the bid may be deemed nonresponsive and may be ineligible for award of the contract.

Continued on reverse side

PART III – DVBE DOLLAR PARTICIPATION OF BID/PROPOSAL – *Architectural, engineering, environmental, land surveying or construction management firms complete this part **after** selection by the district and before the contract is signed.*

Show deductive alternate(s) in parenthesis. For more alternates/base bids, use a separate page to show items.

A. If your business enterprise is a DVBE, list in the appropriate column the total dollar amount of your bid to be performed by your own participation.

B. List all your DVBE subcontractors/suppliers. Enter in the appropriate column the dollar amount for each of your subcontractors/suppliers.

C. Enter the total of Lines A and B for each column.

D. Enter the dollar amount of the bid/proposal to be performed by **non**-DVBE firms. Note: This line is the sum of the prime and subcontractor(s) **non**-DVBE dollar participation.

E. Enter the sum of the column totals from Line C and Line D. Note: Please be aware that the final determination of DVBE compliance is made based on the contract amount resulting from the district's acceptance or rejection of alternates.

	BASE BID/PROPOSAL	**ALTERNATE #1**	**ALTERNATE #2**	**ALTERNATE #3 OR BASE BID B**	**ALTERNATE #4 OR BASE BID C**	**ALTERNATE #5** (Modernization or Reconstruction Only)
A. Prime Bidder, *if DVBE (own participation)*	$	$	$	$	$	$
B. DVBE Subcontractor or Supplier						
1.						
2.						
3.						
4.						
C. Subtotal (A & B)						
D. Non-DVBE						
E. Total Bid						

PRIME BIDDER GOOD FAITH EFFORT WORKSHEET

This worksheet is to be used to assist the Prime Bidder in meeting the 3% DVBE participation goal

BIDDER'S NAME	BUSINESS ADDRESS	CONTACT PERSON
TELEPHONE NUMBER	OWNER	COUNTY

GENERAL INSTRUCTIONS:

This worksheet is to be used to assist you in meeting the 3 percent DVBE participation goal. If specific information is not provided for Parts I through III, you do not meet the test of the "Good Faith Effort" and cannot so certify. If you are qualifying based on a "Good Faith Effort" you must include this form with your bid/proposal to the Owner.

PART I – CONTACTS

To identify DVBE subcontractors/suppliers for participation in your bid/proposal, contact must be made with each of the following categories. It is recommended that you contact several DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
1.			
2. The Office of Small Business and DVBE Services has a searchable database of Disabled Veteran Enterprises at: https://caleprocure.ca.gov/pages/PublicSearch/supplier-search.aspx?psNewWin=true			
3. DVBE Organizations (*List*):			
4. Write "recorded message" in this column, if applicable.			

PART II – ADVERTISEMENTS *You must make at least two (2) advertisements, one (1) in a paper that focuses on DVBE and one (1) in a trade paper. Advertisements should be published at least 14 days prior to bid/proposal opening; if you cannot advertise 14 days prior, advertise as soon as possible and provide an explanation. (Advertisements must be published in time to allow for a reasonable response). Advertisements must include that your firm is seeking DVBE participation, the project name and location, your firm's name, your firm's contact person, and phone number.*

Attach copies of advertisements to this form.

FOCUS/TRADE PAPER NAME	CHECK ONE		DATE OF ADVERTISEMENT
	TRADE	FOCUS	

PART III – DVBE SOLICITATIONS *List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use a separate page and attach to this form.*

IF THE DVBE…..	THEN…..	AND…..
Was selected to participate	Check "yes" in the "SELECTED" column, include the applicable dollar amount in Part III of the Prime Bidder Certification	Include a copy of their DVBE letter from OSBCR.
Was **not** selected to participate	Check "no" in the "SELECTED" column	State why in the "REASON NOT SELECTED" column.
Did not respond to your solicitation	Check the "NO RESPONSE" column	

DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASON NOT SELECTED *This section must be completed*	NO RESPONSE
	YES	NO		

IMPORTANT NOTE:

Please be aware that certification of the "Good Faith Effort" may only be made if you fully complete Parts I, II, and III on both sides of this form. A copy of this form must be retained by you and may be subject to a future audit.

CERTIFICATION

I, _____ certify that I am the bidder's Chief Executive Officer and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. In making this certification, I am aware of Section 12650 *et seq.* of the Government Code providing for the imposition of treble damages for making false claims.

SIGNATURE OF CHIEF EXECUTIVE OFFICER	DATE

ALTERNATE BIDS
SECTION 012300

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. This Section includes a description of Alternate Work and Bid Items that correspond to the Bid Form.

1.2 RELATED REQUIREMENTS

A. Bid Documents.

B. Owner-Contractor Agreement: Alternates accepted by Owner for incorporation into the Work.

C. Sections of Specifications applicable to Alternate Bid Items.

1.3 PROCEDURES

A. Alternates will be exercised at Owner's option.

B. The owner has the right to accept any of the alternate bids, at the amount indicated on the form of proposal, throughout the project time frame.

C. Coordinate related work and modify surrounding work as required to complete Work, including each Alternate, when acceptance is designated in Owner-Contractor Contract.

D. **BASE BID**: The Base Bid is to complete all the work as indicated within the Plans and Specifications, not including any additive alternates.

E **ALTERNATE BIDS**

1. ALTERNATE BID NO.1 - DEDUCTIVE:

   The Contractor is to state the amount to be **deducted from** the Base Bid if the following work is eliminated:

a. Delete the seal coat of existing asphalt.

END OF SECTION

SUBSTITUTIONS
SECTION 012500

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special (or Supplementary) Conditions and Division 1 Specifications Section, apply to this Section.

B. All substitutions shall be made in accordance with DSA IR A-6.
   1. Changes to or affecting the Structural, Access Compliance or Fire and Life Safety portion of the project shall be submitted as a CCD.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

B. All substitutions and Requests for Information (RFI's) that affect Structural Safety, Fire and Life Safety, Access Compliance or Energy (as applicable) shall be submitted to the Division of the State Architect for review and approval.

C. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1, Section - 013300"Submittals" specifies requirements for submitting the Contractor's construction schedule and the submittal schedule.

1.3 DEFINITIONS

A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

B. Substitution resulting in changes to the contract documents shall be issued as a CCD per the requirements of General Conditions article 12.2.

C. Substitutions: Changes in products, materials, equipment and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions.
   1. Substitutions resulting in changes to he contract documents shall be issued as a CCD per the requirements of General Conditions article 12.2.

D. The following are not considered to be requests for substitutions:
   1. Substitutions requested during the bidding period and accepted by Addendum prior to award of the Contract are included in the Contract Documents and are not subject

to requirements specified in this Section for substitutions.

2. Revisions to the Contract Documents requested by the Owner or the Architect.

3. Specified options of products and construction methods included in the Contract Documents.

4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

A. Substitution Request Submittal: The Architect will consider requests for substitution if received within thirty five (35) days after commencement of the work. Requests received more than thirty five (35) days after commencement of the work may be considered or rejected at the discretion of the Architect.

1. Submit three (3) copies of each request for substitution for consideration. Submit requests on the "Substitution Request Form" attached.

2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.

3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information as appropriate. Information must be highlighted and project specific.
   a. Coordination information, including a list of changes or modifications needed to other parts of the work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed substitution.
   b. A detailed comparison of significant qualities of the proposed substitution with those of the work specified. Significant qualities may include elements, such as performance, weight, size, durability and visual effect.
   c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   d. Samples, where applicable or requested.
   e. A statement indicating the substitution's effect on the contractor's construction schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall contract time.
   f. Cost information, including a proposal of the net change, if any in the contract sum.

g. The contractors certification that the proposed substitution conforms to requirements in the contract documents in every respect and is appropriate for the application indicated.

h. The contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one (1) week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within two (2) weeks of receipt of the request, or one (1) week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order, field order or approved submittal as deemed appropriate by the Architect.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Conditions: The Architect will receive and consider the contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. The Architect will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the contract documents are not required.

2. Proposed changes are in keeping with the general intent of the contract documents.

3. The request is timely, fully documented, and properly submitted.

4. The specified product or method of construction cannot be provided within the contract time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the work promptly or coordinate activities properly.

5. The request is directly related to an "or equal" clause or similar language in the contract documents.

6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations after deduction additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner and similar considerations.

7. The specified product or method of construction cannot receive necessary approval by the governing authority and the requested substitution can be approved.

8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the contractor certified that the substitution will overcome the incompatibility.

9. The specified product or method of construction cannot be coordinated with other materials and where the contractor certifies that the proposed substitution can be coordinated.

10. The specified product or method of construction cannot provide a warranty required by the contract documents and where the contractor certifies that the proposed substitution provides the required warranty.

11. Where a proposed substitution involves more than one prime contractor, each contractor shall cooperate with the other contractors involved to coordinate the work, provide uniformity and consistency and ensure compatibility of products.

B. The contractor's submittal and the Architect's acceptance of shop drawings, product data or sample for construction activities not complying with the contract documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

PART 3 - EXECUTION

A. The attached two page form will be reproduced and sequentially numbered by the Contractor for any and all proposed substitutions. No other forms will be accepted.

SUBSTITUTION REQUEST FORM

To: TPH Architects
519 McHenry Avenue
Modesto, CA 95351

PLEASE CHECK THE APPROPRIATE BOX BELOW:

☐ Substitution Request Prior to Award (During Bid Period)
- ☐ Product or System Substitution
- ☐ Design Change Substitution

☐ Substitution Request After Award of the Contract
- ☐ Product or System Substitution
- ☐ Design Change Substitution

(Contractor Awarded the Contract for this Project shall assign the numbers below - leave blank if submitted during the Bid Period)

SUBSTITUTION REQUEST # _____

WE HEREBY SUBMIT FOR YOUR CONSIDERATION THE FOLLOWING PRODUCT OR METHOD AS SUBSTITUTION FOR THE SPECIFIED OR DRAWING ITEM FOR THIS PROJECT:

PROJECT: _____

SPECIFIED ITEM: _____

_____	_____	_____	_____
Specification Section #	Page #	Paragraph #	Description

- OR -

DRAWING ITEM: _____

_____	_____	_____
Drawing Number	Detail Cut Number	Description

PROPOSED CREDIT IF ANY: _____

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 request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents which the proposed substitution will require for it's proper installation,

The undersigned certifies: (Modifications by the submitter to the following list is cause for automatic rejection without further review)

1. The proposed substitution does not affect dimensions shown on drawings or code requirements indicated.
2. The undersigned will compensate the Architect at a rate of $90.00 an hour for review, investigation and comments whether or not the request is approved for changes required to the building design, including engineering design, detailing and construction costs caused by the requested substitution. The Architect is herein defined as any of those firms or individuals listed by reference on the Drawings, including all Consultants identified herein.
3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service pans will be locally available for the proposed substitution.
5. Attach information for a minimum of three projects where the substitution has been used locally within a 200 mile distance of this project, including names, addresses and telephone numbers of Owners who have accepted this product into their projects.
6. Attach all cost data with explanations if different from Specified or Drawing item, include in that explanation a discussion on a quality of proposed substitution and cost differential.
7. The undersigned will pay for any subsequent changes in incorporating the proposed substitution that were not apparent at the time of approval into the Work, including compensation to the Architect as described in Item 2 above.

The undersigned states that the function, appearance and quality are equivalent or superior to the specified or drawing item.

Submitted By (Bidder, Contractor or Sub-Contractor)

Signature _____

Firm _____

Address _____

_____

Date _____

Telephone _____

Additional Signature required:
(The Contractor if submitted after the Award)

Signature _____

Firm _____

☐ Accepted
☐ Accepted as Noted
☐ Not accepted
☐ Received Past Time Period Allowed by Public Contract Code #3400

By _____

Date _____

Remarks _____

_____

_____

Below is for the use of the Design Consultant only:

CONTRACTOR'S REQUEST FOR INFORMATION
SECTION 01 2613

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes general requirements for Contractor's Requests for Information (RFI).
   1. Procedure for shop drawings, product data and samples submittals are specified in accordance with Section 01 3300.
   2. Procedure for substitutions are specified in accordance Section 01 2500.

1.2 CONTRACTOR'S REQUESTS FOR INFORMATION

A. Submit a Request for Information to the Architect when:
   1. An unforeseen condition or constructibility question occurs.
   2. Questions regarding information in the Contract Documents arise.
   3. Information not found in the Contract Documents is required.

B. When possible, request such clarification either verbally or in writing at the next scheduled Project meeting.
   1. When the RFI is answered at the Project meeting, number the RFI and enter the response into the meeting minutes.
   2. When the urgency of the need, or the complexity of the item makes clarification at the next scheduled Project meeting impractical, prepare and submit a formal written RFI to the Architect without delay.

C. RFI received directly from a subcontractor will be returned to the Contractor unprocessed.

D. RFI’s that affect structural safety, fire and life safety , access compliance or energy (as applicable) shall be submitted to the Division of the State Architect for review and approval.

1.3 SUBMITTAL

A. Submit RFI’s within a reasonable time frame so as not to interfere with, or impede the progress of the Work.
   1. Keep the number of RFI’s to a minimum.
   2. When the number and frequency of RFI’s submitted becomes unwieldy, the Architect may require the Contractor to abandon the process and submit requests as either submittal, substitution or requests for change.

3. When an answer to an RFI has an effect on cost or time, notify the Architect in accordance with the Contract Documents when the RFI is received. Notification shall occur prior to commencing such work, so that the change order process can be initiated.
4. When submitting an RFI, alert the Architect, in writing, to the time available before the response will cause an impact to the Project.

B. When submitted in writing, submit the RFI in quadruplicate as follows:
1. Submit a legible written request (FAX is acceptable) on a standard CSI or AlA preprinted form or another form approved in advance by the Architect. Include the following information:
a. Project name, as listed on the Contract Documents, Architect's project number or other identifying number, if any.
b. Date.
c. Name, address, telephone and FAX numbers of the Contractor.
d. Number and title of affected Specification Section or Sections.
e. Drawing numbers and detail references, as appropriate.
f. Clear, concise explanation of information or clarification requested.
g. Blank, lined spaces for Architect's written response.

C. Each page of each attachment to the RFI shall bear the RFI number in the lower right corner.

D. Number submitted RFI'S consecutively.

E. Sign and stamp all RFI forms. RFI from subcontractors or material suppliers shall be submitted through, and be reviewed by the Contractor prior to submittal to the Architect.

F. Unanswered RFI will be returned with a stamp or notation "NOT REVIEWED".

G. Prepare and maintain an RFI Log. Update on a weekly basis. Log RFI number, brief description of content or subject discussed, date submitted, and date answered. Keep log current and furnish copy when so requested by the Architect.

H. Allow a minimum of 5 working days for review and response time; the response time will be increased if more information is required, when the RFI is submitted out-of-sequence, or if in the opinion of the Architect, more time is needed to answer the RFI.

1.4 QUALITY ASSURANCE

A. Carefully study the Contract Documents to assure that the requested information is not available therein.
1. RFI which requests information available in the Contract Documents may not be answered by the Architect.

2. Before submitting RFI to the Architect, verify that the information requested is not indicated in the Contract Documents, or cannot be determined from a careful review of same.

B. In all cases where a RFI is issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay-out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI which fails to include a suggested solution will not be answered.

C. Do not use RFI for the following purpose:
1. To request approval of submittals.
2. To request approval of substitutions.
3. To request changes to the Contract Documents and to confirm action taken by the Contractor for requested changes/substitutions to the Contract Documents.

D. If the Contractor believes that a clarification by the Architect may result in a change in Contract price, the Contractor shall not proceed with the work indicated by the RFI until a Change Order or other acceptable tracking device is prepared and approved.
1. If the Contractor believes that a clarification by the Architect results in additional cost, the Contractor shall identify in the RFI the basis of the Contractor's bid as it relates to the RFI.
2. Answered RFI shall not be construed as approval to perform extra work.

END OF SECTION

APPLICATION AND CERTIFICATE FOR PAYMENT
SECTION 012900

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. This Section specifies administrative and procedural requirements governing applications for payment.

B. Related work:
   1. Division 1 for construction and submittal schedule.

1.2 SCHEDULE OF VALUES

A. Coordinate preparation of the schedule of values with preparation of the Contractor's construction schedule.

B. General:
   1. Correlate line items in the schedule of values with other required administrative schedules and forms, including:
      a. Construction schedule.
      b. Application for payment form.
      c. List of subcontractors.
      d. Schedule of allowances.
      e. Schedule of alternates.
      f. List of products.
      g. List of principal suppliers and fabricators.
      h. Schedule of submittals.

   2. Submit the schedule of values to the Architect at the earliest feasible date, but in no case later than 7 days before the date scheduled for submittal of the initial application for payment.

   3. Where the Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

C. Format and content: Use the Project Manual table of contents as a guide to establish the format for the schedule of values.
   1. Include the following on the schedule of values:
      a. Project name and location.
      b. Contractor's name and address.
      c. Project number.

d. Architect's name.
e. Date of submittal.

2. Arrange the schedule of values in a tabular form with separate columns to indicate the following for each item listed:
   a. Generic name.
   b. Related Specification Section.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that have affected value.
   g. Dollar value.
   h. Percentage of Contract Sum to the nearest 1/100 percent, adjusted to total100 percent.

3. Provide a breakdown of the Contract sum in sufficient detail to facilitate continued evaluation of applications for payment and progress reports. Break principal subcontract amounts down into several line items.

4. Round amounts off to the nearest whole dollar. The total shall equal the Contract Sum.

5. For each part of the Work where an application for payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the schedule of values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

6. For unit cost allowances, show line item value of unit cost allowances as a product of unit cost times measured quantity as estimated from the best indication in the Contract Documents.

7. For margins of cost, show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in applications for payment. Each item in the schedule of values and applications for payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
   a. At the Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the schedule of values or distributed as general overhead expense.

8. Update and resubmit the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract sum.

1.3 APPLICATIONS FOR PAYMENT

A. General: Each application for payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the District.
   1. The initial application for payment, the application for payment at time of Substantial Completion, and the final application for payment involve additional requirements.

B. Payment application times: Unless otherwise indicated in the Agreement, the date for each progress payment is the 15th day of each month. The period of construction work covered by each application for payment is the period ending 15 days prior to the date for each progress payment and starting the day following the end of the preceding period.

C. Payment application forms: Unless forms are provided by the District, use AlA Document G702 and Continuation Sheets G703 as the form for application for payment.

D. Application preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the District. Incomplete applications will be returned without action.
   1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions have been made.

   2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

E. Transmittal:
   1. Submit 3 executed copies of each application for payment to the Architect so that they are received within 24 hours; one copy shall be complete, including waivers of lien and similar attachments, when required.

   2. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.

F. Waivers of mechanics lien: With each application for payment, submit waivers of mechanics lien from every entity who may lawfully be entitled to file a mechanics lien arising out of the Contract, and related to the work covered by the payment.
   1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.

   2. When an application shows completion of an item, submit final or full waivers.

   3. The District reserves the right to designate which entities involved in the Work must submit waivers.

4. Waiver delays:
   a. Submit each application for payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.

   b. Submit final application for payment with or preceded by final waivers from every entity involved with performance of work covered by the application who could lawfully be entitled to a lien.

5. Submit waivers of lien on forms, and executed in a manner, acceptable to District.

G. Initial application for payment: Administrative actions and submittals that must precede or coincide with submittal of the first application for payment include the following.
   1. List of subcontractors.

   2. List of principal suppliers and fabricators.

   3. Schedule of values.

   4. Contractor's construction schedule (preliminary if not final).

   5. Schedule of principal products.

   6. Schedule of unit prices, when applicable.

   7. Submittal schedule (preliminary if not final).

   8. List of Contractor's staff assignments.

   9. List of Contractor's principal consultants.

   10. Copies of building permits.

   11. Copies of authorizations and licenses from governing authorities for performance of the Work.

   12. Initial progress report.

   13. Report of pre-construction meeting.

   14. Certificates of insurance and insurance policies.

   15. Performance and payment bonds, if required.

   16. Data needed to acquire District's insurance.

17. Initial settlement survey and damage report, if required.

H. Application for payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an application for payment reflecting any Certificates of Partial Substantial Completion issued previously for District occupancy of designated portions of the Work.

I. Administrative actions and submittals that shall precede or coincide with the application submitted for Substantial Completion, include the following:
   1. Occupancy permits and similar approvals.

   2. Warranties (guarantees) and maintenance agreements.

   3. Test/adjust/balance records.

   4. Maintenance instructions.

   5. Meter readings.

   6. Start-up performance reports.

   7. Change-over information related to District's occupancy, use, operation and maintenance.

   8. Final cleaning.

   9. Application for reduction of retainage, and consent of surety.

   10. Advice on shifting insurance coverages.

   11. List of incomplete work, recognized as exceptions to Architect's Certificate of Substantial Completion.

J. Final payment application: Administrative actions and submittals which must precede or coincide with submittal of the final payment application for payment include the following.
   1. Completion of Project closeout requirements.

   2. Completion of items specified for completion after Substantial Completion.

   3. Assurance that unsettled claims will be settled.

   4. Assurance that work not complete and accepted will be completed without undue delay.

5. Transmittal of required Project construction records to District.

6. Certified property survey.

7. Proof that taxes, fees and similar obligations have been paid.

8. Removal of temporary facilities and services.

9. Removal of surplus materials, rubbish and similar elements.

10. Change of door locks to District's access.

END OF SECTION

PROJECT COORDINATION
SECTION 013113

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the work. Coordinate construction operations included under different Sections that depend on each other for proper sequence installation, connection and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
3. Make provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work in required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the work. Such administrative activities include, but are not limited to the following:

1. Coordination with District requirements.
2. Preparation of schedules.
3. Installation and removal of temporary facilities.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components. Prepare coordination drawings for underground utilities and submit to Architect for review.

1. Show the relationship of components shown on separate shop drawings.
2. Indicate required installation sequences.
3. Submit coordination drawings and comply with requirements contained in Section 01300 “Submittals”.

B. Staff Names: Within fifteen (15) calendar days of commencement of construction operations, submit a list of the Contractor’s principal staff assignments, including the superintendent and other personnel in attendance at the project site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at substantial completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Supervise construction operations to assure that no part o f the construction, completed or in progress, in subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to the following:

1. Excessive static or dynamic loading.
2. Air contamination or pollution.
3. Solvents or chemicals.
4. Soiling, staining, and corrosion.
5. Bacteria or rodent and insect infestation.
6. Combustion.
7. Electrical current.
8. High-speed operation.
9. Contact between incompatible materials.
10. Destructive testing.
11. Unprotected storage.
12. Improper shipping or handling.
13. Theft or vandalism

END OF SECTION

PROJECT MEETINGS
SECTION 013119

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to the following:
   1. Preconstruction conferences.
   2. Preinstallation conferences.
   3. Progress meetings.
   4. Coordination meetings.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1, Section - 013113 "Project Coordination" for procedures for coordinating project meeting with other construction activities.
   2. Division 1, Section - 013300 "Submittals" for submitting the Contractor's Construction Schedule.

1.3 PRECONSTRUCTION CONFERENCE

A. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and Architect, but no later than fifteen (15) calendar days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: Authorized representatives of the Owner, Architect and their consultants; the Contractor and its superintendent; major subcontractors; manufacturer; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress, including the following:
   1. Tentative construction schedule.
   2. Critical work sequencing.
   3. Designation of responsible personnel.
   4. Procedures for processing field decisions and Change Orders.
   5. Procedures for processing Application for Payment.
   6. Distribution of Contract Documents.

7. Submittal of Shop Drawings, Product Data and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Parking availability.
11. Office, work and storage areas.
12. Equipment deliveries and priorities.
13. Safety procedures.
14. First aid.
15. Security.
16. Housekeeping.
17. Working hours.

1.4 PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the Project Site before each construction activity that requires coordination with other construction.

B. Attendees: The Installer and representatives or manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.
   1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
      a. Contract Documents.
      b. Related Change Orders.
      c. Major Deliveries.
      d. Shop Drawings, Product Data and quality control samples.
      e. Possible conflicts and compatibility issues.
      f. Time schedules and weather problems.
      g. Manufacturer's recommendations and warrantee requirements.
      h. Safety.
      i. Inspecting and testing requirements.
      j. Required performance results.
      k. Recording requirements.
      l. Protection.
   2. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned including to the Owner and the Architect and Inspector of Record.
   3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of work and reconvene the conference at the earliest feasible date.

1.5 PROGRESS MEETINGS

A. Conduct progress meetings at the project site at regular intervals. Notify the Owner and the Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the project and authorized to conclude matters relating to the work.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.

2. Review the present and future needs of each entity present, including the following:
   a. Interface requirements.
   b. Time and project sequence.
   c. Status of submittals.
   d. Deliveries.
   e. Hazards and risks.
   f. Housekeeping.
   g. Quality and work standards.
   h. Change Orders.
   i. Documentation of information for payment requests.
   j. Status of record documents.
   k. Testing and Inspections.

D. Reporting: No later than three (3) days after each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form of progress since the previous meeting and report.

1. Schedule Updating: Revise the Contractor's Construction Schedule on a monthly basis where revisions to the schedule have been made or recognized. Issue the revised schedule as needed.

1.6 COORDINATION MEETINGS

A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings for the General Contractor and various trades are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance, the Architect, Project Inspector, and to others affected by decisions or actions resulting from each meeting.

PART 2- PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Note Applicable)

END OF SECTION

CONSTRUCTION SCHEDULES
SECTION 013200

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Provide projected construction schedules for all work.

   2. Revise periodically as required.

B. Use the schedules for planning, coordinating and monitoring work under the Contract, including activities of all subcontractors, equipment vendors and suppliers.

1.2 FORM OF SCHEDULES

A. Prepare Construction Schedule in the form of a Critical Path Method (CPM).
   1. Provide diagram showing critical path, and a tabulation of activities.

   2. Indicate all significant activities of Project including each trade or operation, submittals of shop drawings, construction of mockups, equipment data, procurement of materials and required approvals, by the Contractor, District where appropriate, Architect, and government agencies.

1.3 SUBMITTALS

A. Within 15 days after issuance of Notice to Proceed, provide to Architect, for review, 2 copies of a preliminary construction schedule sufficiently complete to indicate sequence of operations and durations performed within the specified Contract time. Should proposed schedule be based upon less time than the maximum time allowed, this fact will not prejudice Contractor's right to time specified.

B. Within 30 days after issuance of Notice to Proceed, provide the Architect 2 copies of the construction schedule consisting of required functions or activities, tabulation of activities, and critical path.

C. Submit updated schedule with Application for Payment thereafter until the Project is completed, provide the Architect 2 copies of an updated, reconciled schedule showing work progress.

D. Submittal of the complete, reconciled, updated schedule must be attached with the request for payment and will be a condition for progress payments.

E. Prepare and submit revised schedule when:
   1. Changes to Contract affect Contract completion time.

   2. "Slippage" occurs because of procurement delays, rain, strikes and other delays.

   3. Activities are modified from previous submittal.

   4. Delay on initial non-critical items is of such magnitude as to change course of critical path.

1.4 PREPARATION OF SCHEDULE

A. Show sequence of activities planned, their interdependence, and time estimated to perform each activity. In developing schedule, each significant activity shall be represented and identified by number, giving start and finish of each. Clearly indicate the series of activities which determine duration of Project and referred to as "Critical Path."

B. Tabulation of activities, either manual or machine run, shall be furnished showing the following information for each activity.
   1. Designation.

   2. Duration.

   3. Earliest start time.

   4. Latest start time.

   5. Earliest finish time.

   6. Latest finish time.

   7. Identification of activities on critical path.

C. Based on work flow of activities, tabulation of activities and critical path, prepare schedule to horizontal scale of time accumulated from start to finish of work with calendar dates for events and with percentage of completion directly related to scheduled performance time.

D. Schedule shall be a composite reflection of exact job requirements needed to carry out all phases of work and to complete work in compliance with Contract Documents.

E. Provide a narrative report to define:
   1. Problem areas, anticipated delays, and impact on the schedule.

2. Corrective action recommended, and its effect.

1.5 REVIEW BY ARCHITECT, AND UPDATING

A. Submit 2 prints of the schedule for review within stipulated time limit. One print will be returned marked for correction.

B. After corrections (if required), submit 4 signed copies of construction schedule, marked in color to show current progress, monthly. Mark each activity on which work has been started to show actual progress. Show actual progress by drawing a line to the point on each activity to which work has progressed at the end of reporting period.

C. During course of Project, any change proposed by Contractor to accepted critical path shall be subject to review by the Architect.

END OF SECTION

SUBMITTALS
SECTION 013300

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including but are not limited to:

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Shop Drawings and Product Data.

B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Applications for payment.
2. Performance and payment bonds.
3. Insurance certificates.
4. List of Subcontractors, including name, address and telephone number, and identify portion of work responsibility.

1.3 DEFINITIONS

A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

1. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
      a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
   3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
      a. Allow one (1) week for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
      b. If an intermediate submittal is necessary, process the same as the initial submittal.
      c. Allow one (1) week for reprocessing each submittal.
      d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
   1. Provide a space approximately 4" x 5" (100 by 125mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken. **The submittal will be returned to the Contractor, without action, if the Contractor does not indicate he has first reviewed the material.**
   2. Include the following information on the label for processing and recording action taken:
      a. Project name.
      b. Date.
      c. Name and address of Architect.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Number and title of appropriate Specification Section.
      i. Drawing number and detail references, as appropriate.

1.5 CONTRACTORS CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit within 30 days after the date established for "Commencement of the Work".
   1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values."
   2. Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
   3. Secure time commitments for performing critical elements of the Work from parties involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
   4. Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
   5. Indicate completion of the work within the allotted time of the contract.

B. Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing and installation.

C. Area Separation: Provide a separate time bar to identify each major construction area for each major portion of the work. Indicate where each element in an area must be sequenced or integrated with other activities.

D. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, Project Inspector, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
   1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

E. Schedule Updating: Update the schedule monthly or after an event or activity, when revisions have been recognized or made. Issue the updated schedule concurrently with next construction meeting.

1.6 SUBMITTAL SCHEDULE

A. Develop a complete schedule of submittals. Submit the schedule within ten (10) days of the contract.
   1. Coordinate submittal schedule with the list of subcontractors, schedule of values and the list of products as well as the contractor's construction schedule.

2. Prepare the schedule in chronological order. Provide the following information:
   a. Scheduled date for the first submittal.
   b. Related section number.
   c. Submittal category (Shop drawings, product data or samples).
   d. Name of the subcontractor.
   e. Description of the part of the work covered.

B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, Project Inspector, subcontractors and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.
   1. When revision are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

1.7 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Architect at weekly intervals.
   1. List of subcontractors working on site.
   2. Approximate count of personnel at the site by trade.
   3. High and low temperatures, general weather conditions.
   4. Accidents and unusual events.
   5. Project meetings, coordinate meetings, and significant decisions.
   6. Stoppages, delays, shortages and losses.
   7. Emergency event and followup procedures (when appropriate).
   8. Orders and requests of governing authorities.
   9. RFI's, Change Orders, ASI's received, implemented.
   10. Services connected, disconnected.
   11. Visitor Log; name of company and purpose of visit.
   12. Equipment or system tests and startups.
   13. Partial completion, occupancies.

1.8 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
   1. Dimensions.
   2. Identification of products and materials included by sheet and detail number.

3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" (215 by 280 mm) but no larger than 36" x 48" (890 by 1220 mm).

C. The Contractor shall review, approve and submit to the Architect Shop Drawings and submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work.

D. The Contractor shall not perform work requiring submittal and review of Shop Drawings until the respective submittal has been reviewed by the Architect. Such work shall be in accordance with submittals.

E. By approving and submitting Shop Drawings, the Contractor represents he has determined and verified materials, field measurements and field construction criteria and has checked and coordinated the information contained within the submittals with the requirements of the work and of the Contract Documents.

F. Initial Submittal: Submit six (6) blue- or black-line print for the Architect's review. The Architect will review and return three (3) copies print.

G. One of the prints returned shall be marked-up and maintained as a "Record Document".

H. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.9 PRODUCT DATA

A. Collect product data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves.
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
a. Manufacturer's printed recommendations.
b. Compliance with recognized trade association standards.
c. Compliance with recognized testing agency standards.
d. Application of testing agency labels and seals.
e. Notation of dimensions verified by field measurement.
f. Notation of coordination requirements.
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

3. Submittals: Submit seven (7) copies of each required submittal; submit four (4) copies where required for maintenance manuals. The Architect will retain one, and will return the other marked with action taken and corrections or modifications required.
    a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
    a. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
    b. Do not permit use of unmarked copies of Product Data in connection with construction.

C. The Contractor shall review, approve and submit to the Architect Shop Drawings and submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work.

D. The Contractor shall not perform work requiring submittal and review of Shop Drawings until the respective submittal has been reviewed by the Architect. Such work shall be in accordance with submittals.

E. By approving and submitting Shop Drawings, the Contractor represents he has determined and verified materials, field measurements and field construction criteria and has checked and coordinated the information contained within the submittals with the requirements of the work and of the Contract Documents.

1.10 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal and shop drawing, mark to indicate action taken, and return promptly.
    1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Architect will stamp each submittal and shop drawing with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
    1. Furnish as Submitted: When the Architect marks a submittal “Furnish as Submitted”: work covered by the submittal may proceed with the installation/component as shown.
    2. Furnish as Corrected: When the Architect marks a submittal “Furnish as Corrected”, the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.

3. Revise and Resubmit: When the Architect marks a submittal “Revise and Resubmit”, do not proceed with work covered by the submittal. Do not purchase, fabricate, deliver or any other activity until submittal has been accepted. Revise or prepare a new submittal in accordance with the notations; resubmit without delay.
    a. Do not use or allow others to use, submittals marked “Revise and Resubmit" at the Project site or elsewhere where Work is in progress.
4. Rejected: When submittals or shop drawings are marked “Rejected”, do not proceed with that part of the work covered by the submittal. Prepare a new submittal in accordance with these Contract Documents and Specifications.
    a. Do not permit submittals marked "Rejected" to be used at the Project site, or elsewhere where Work is in progress.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

DEFINITIONS AND STANDARDS
SECTION 014200

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements pertaining to reference standards and specifications listed in the Project Manual.

B. Work specified by reference to a published standard or specification of a government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall comply with, or exceed the minimum standards of quality for materials and workmanship established by the designated standard or specification.

C. Unless the Contract Documents indicate otherwise:
   1. Where conflict exists between referenced documents and Contract Documents, or between referenced documents, the one having more stringent requirements applies.
   2. Refer requirements that are different but apparently equal and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding with the affected work.

D. Where both a standard and a brand name are specified for a product in the Project Manual, the proprietary product named shall conform to or exceed the requirements of the specified reference standard. The listing of a trade name in a Project Manual shall not be construed as warranting that such product conforms to the respective reference standard.

E. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entities' construction activity.

F. Copies of standards:
   1. Copies of applicable referenced standards are not bound in the Project Manual.
   2. Where copies of standards are needed for superintendence and quality control of the Work, obtain a copy or copies directly from the publication source and maintain in an orderly manner at the Project Site, available to the Contractor's personnel, Subcontractors. District and Architect.

G. The applicable edition of the reference standard and specification, except as listed in subparagraphs 1 and 2 below, is the latest date of issue 30 days before bids are received, when bids are requested, or on effective date of the Agreement if there is no bid.
   1. Where a publication date follows the standard.
   2. Issues listed in governing building code and regulations supersede the above requirements.

H. No provisions of any referenced standards or specifications, whether or not specifically incorporated by reference in the Contract Documents, shall be effective to change the duties and responsibilities of the District, the Architect, or Contractor, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor to assign to any of them any responsibility, duty or authority for safety precautions or procedures, or to supervise or direct the performance of the Work.

I. When so required by the Architect during the course of the Work, or by the Contract Documents, deliver to the Architect 3 copies of an affidavit or certificate, signed by the material manufacturer or supplier, stating that the material furnished conforms to the specification or standard specified.

J. For acronyms and full name of same, and for addresses and telephone number of the associations, societies and institutes referenced in the Specifications, refer to "Sources of Construction Information" published by, and available from the Construction Specification Institute (703.684.0300), "Encyclopedia of Associations" by Gale Research, or "National Trade & Professional Associations of the US" by Columbia Books.

END OF SECTION

CONTRACTOR QUALITY CONTROL
SECTION 014500

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for quality control of the Work, including test and inspection procedures.

B. Related work:
   1. Divisions 2 through 16 for specific test procedures to be performed in compliance with this Section.

1.2 ADMINISTRATIVE STAFF

A. Provide a competent and adequate staff for the administration, coordination, supervision, and superintendence of the Work.

B. Do not change key members of this staff without the consent of the District, unless such staff members prove to be unsatisfactory to the Contractor and cease to be in his employ. If the Contractor intends to change a key staff member, he shall give the District written notice at least 15 days prior to the intended change.

C. Key staff members shall be full time employees, stationed at the site.

D. Project staff shall include, but shall not be limited to, the following:
   1. Project Manager: The person who has responsibility for the prosecution of the work and who has the authority to act in matters for the coordination, direction, and technical administration of the work. Prior to commencement of the work, provide the District with the name of the project manager.

   2. Superintendent: The person who shall be in attendance at the Project site during the 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. Additional staff: In addition to the general project superintendent required above, provide the services of coordinating engineer for HVAC, Plumbing, Fire Protection, Electrical, and Pool Work: The full time person who has the responsibility for the coordination of the mechanical and electrical work with the work of other trades, for the review of mechanical and electrical shop drawings, for the resolution of conflicts and interferences between trades, for directing adjustments in the work that shall be required to comply with the Contract Documents, and for commissioning the

mechanical and electrical systems. This individual shall have previous experience in coordinating these areas of work on projects of similar scale and complexity.

1.3 CONTRACTOR QUALITY CONTROL SYSTEM

A. Establish a quality control system to perform sufficient inspections and tests of all items of Work, including that of all subcontractors, to ensure conformance with the Contract Documents for materials, workmanship, construction, finish, functional performance and identification.

B. Quality control system shall ensure that the Work complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.

C. Apply, install, connect, erect, use, clean, adjust, and condition articles, materials and equipment in compliance with their manufacturer latest published instructions, unless more restrictive or stringent requirements are specified in the Specifications.
   1. When specified or requested, furnish the Architect 2 copies of such printed instructions prior to introduction of such items.

   2. If product manufacturer instructions are in conflict with the Contract Documents, notify the Architect for clarification before proceeding.

   3. Keep a clean, legible copy of the various product manufacturers instructions applicable to the Work at the Project site.

D. Certificates:
   1. When specified, deliver to the Architect 2 signed certificates from suppliers of materials, equipment and manufactured items stating that such materials and manufactured items meet or exceed the standards specified.

   2. In lieu of such certification, the Contractor may submit reports of current tests made and attested by a reputable and recognized testing laboratory.

1.4 CONTRACTOR ASSISTANCE

A. Cooperate with individual or firm performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the individual or firm sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
   1. Providing access to the work to be tested or inspected and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

   2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

4. Providing the individual or firm with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

5. Providing security and protection of samples and test equipment at the Project site.

1.5 VERIFICATION OF CONDITIONS

A. Prior to installation of any product, inspect existing supports and assemblies to receive materials to be installed and arrange for correction of defects in the existing workmanship, material or conditions that may adversely affect work to be installed.

B. Installation of materials will constitute acceptance of existing conditions as being in proper condition to receive the materials to be applied and waiver of claim that existing conditions are defective as pertains to warranty requirements.

C. Where the Specifications require a product to be installed under the supervision or inspection of the material manufacturer or its representative, manufacturer or its representative shall also inspect the work in place and issue a letter to Architect verifying that this procedure was followed without exception.

1.6 INSTALLER QUALIFICATIONS

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

1.7 MANUFACTURER FIELD SERVICES

A. An experienced, competent, and authorized representative of the manufacturer of each item of equipment for which field services are required in the Specifications shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation.

B. In each case, the representative shall revisit the job-site as often as necessary until all problems are corrected and the equipment installation and operation are satisfactory, in the opinion of the Architect.

C. Each manufacturer representative shall furnish to the Architect a written report certifying that the equipment has been properly installed, and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.

D. All costs for these services shall be included in the Contract.

END OF SECTION

TESTING AND INSPECTION
SECTION 014520

PART 1 - GENERAL

1.1 SUMMARY

A. Work included: Testing laboratory services and inspections required during the course of construction, as specified herein. The Conditions of the Contract and the other sections of Division 1 apply to this section as fully as if repeated herein.

1.2 TESTING LABORATORY

A. Testing and inspection will be performed by an independent testing laboratory selected by and paid for by the Owner and approved by the Architect and DSA.

B. Testing and inspection services which are performed shall be in accordance with requirements of the California Building Code 2022 Edition, and as specified herein. Testing and inspection services shall verify that work meets the requirements of the Contract Documents.

C. Test reports shall be signed by a Registered Civil Engineer licensed in the State of California.

1.3 PAYMENTS

A. Costs of initial testing and inspection, except as specifically modified hereinafter, or specified otherwise in technical sections, will be paid for by the Owner, providing such testing and inspection indicates compliance with the Contract Documents. Initial tests and inspections are defined as the first tests and inspections as hereinafter specified.

B. In the event a test or inspection indicated failure of a material or procedure to meet requirements of Contract Documents, costs for retesting and reinspection will be paid by the Owner and back charged to the Contractor.

C. Additional tests and inspections are not herein specified but requested by Owner or Architect, will be paid for by Owner, unless results of such tests and inspections are found to be not in compliance with the Contract Documents, in which case the Owner will pay all costs for initial testing as well as retesting and reinspection and back charge the Contractor.

D. Costs for additional tests or inspections required because of change in materials being provided or change of source or supply shall be paid by the Contractor direct to the Testing Laboratory.

E. Costs for work which is required to correct deficiencies shall be borne by the Contractor.

F. Cost of testing which is required solely for the convenience of Contractor in his scheduling and performance of work shall be borne of the Contractor.

PART 2 - PRODUCTS

2.1 TESTING SERVICES

A. The Owner's representative may require that testing be performed to determine that materials meet specified requirements, such testing may include, but is not necessarily limited to:

1. Soil Compaction.

2. Concrete and Mix Design, aggregates and cement.

3. Weighmaster Certificate.

4. Concrete Compression Tests.

5. Rebar.

6. Post Installed Concrete Anchors - Epoxy and Expansion.

7. Steel Shop Fabrication Welding.

8. Steel Field Welding.

END OF SECTION

TEMPORARY FACILITIES
SECTION 015000

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish required temporary facilities as shown or specified herein plus such facilities as required for proper performance of the Contract. Locate temporary facilities where directed and maintain in a safe and sanitary condition at all times until completion of the Contract. The Conditions of the Contract and the other sections of Division 1 apply to this section as fully as if repeated herein.

1.2 QUALITY ASSURANCE

A. Comply with governing regulation and utility company regulations and recommendations. Comply with pollution and environmental protection regulations for use of water and energy, for discharge of wastes and storm drainage from project site, and for control of dust, air pollution and noise.

PART 2- PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TEMPORARY SANITARY FACILITIES

A. Provide adequate temporary sanitary conveniences for the use of employees and persons engaged on the work, including subcontractors and their employees, as required by law, ordinances, or regulation of public authorities having jurisdiction.

B. Maintain sanitary facilities in a clean and sanitary condition during the entire course of the work.

3.2 TEMPORARY ELECTRIC FACILITIES

A. Provide and maintain during the progress of the work, electrical power and wiring requirements to facilitate the work of all trades and services connected with the work. Coordinate with District power source.

B. Contractor is to provide temporary electrical service or generators for power during construction until building panels are energized. Work is to conform with C.E.C. requirements.

3.3 TEMPORARY WATER

A. Make arrangements and pay costs for water required for construction purposes. Furnish and install piping or hoses to carry water to points needed on the project. Water used on the project shall be potable water. Closest availability of water shall be coordinated with the District and located on site.

B. Provide adequate fire protection for the duration of work in accordance with local codes, ordinances and Governing Regulations.

C. The Contractor shall take necessary precaution to guard against and eliminate possible fire hazards and to prevent damage to construction work, building materials, equipment, and public property. The Contractor shall be responsible for providing, maintaining and enforcing fire protection methods.

3.4 CONSTRUCTION EQUIPMENT

A. Contractor shall erect, equip, and maintain construction equipment in accordance with applicable statutes, laws, ordinance, rules and regulations of authority having jurisdiction.

B. Contractor shall provide, maintain and remove upon completion of the work all temporary rigging, scaffolding, hoisting equipment, rubbish chutes, barricades around openings and excavations, ladders, fences and other temporary work as required for all work hereunder.

C. Temporary work shall conform to requirements of State, County, and local authorities and underwriters which pertain to operation, safety and fire hazard. Contractor shall furnish and install items necessary for conformity with such requirements, whether or not called for under the separate divisions of these specifications.

3.5 FENCES AND BARRICADES

A. Construct and maintain fences, planking, barricades, lights, shoring, and warning signs as indicated on the drawings and as required by local authorities and State safety ordinances and as required to protect the Owner's property from injury or loss and as necessary for the protection of the public as follows:

1. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Install in a manner that will prevent people from easily entering the site, except by the entrance gates.
    a. Provide open mesh, chainlink fencing 6' high (minimum) with posts set in a compacted mixture of gravel and earth. Enclose the entire construction site including the staging area.

3.6 STORAGE

A. Operations of the contractor, including storage of materials, shall be confined to areas approved. Contractor shall be liable for damage caused by him during such use of property of the Owner or other parties. Contractor shall save the Owner, its officers and agents, and the Architect and his employees free and harmless from liability of any nature or kind arising from any use, trespass, or damage occasioned by his operations on premises of third persons.

B. Provide lockable storage containers for the security of materials and equipment as deemed appropriate by the Contractor.

3.7 TEMPORARY JOB OFFICE

A. Contractor shall provide and maintain, in good condition, on the site two (2) temporary job offices of suitable size (minimum 8' x 20') for himself, Owner's Representative and Inspector of Record. Job office shall be weatherproof and secure and shall be provided with adequate lighting, heat and ventilation.

3.8 TEMPORARY TELEPHONE SERVICE

A. Contractor shall make arrangements and pay costs, including service and toll charges, until final acceptance of the project, for temporary telephone service in the temporary job offices, for use by the Contractor, the Owner, the Architect, the Inspector and their representatives for purposes related to the work.

3.9 PROJECT IDENTIFICATION AND TEMPORARY SIGN

A. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage a sign company to provide a project specific sign. Sign to be 4' x 8' x 3/4" MDO plywood.

NEWMAN-CROWS LANDING UNIFIED SCHOOL DISTRICT

Von Renner Elementary School

Classroom Building

OWNER
Newman-Crows Landing USDistrict
1223 Main Street
Newman, CA 95360

Superintendent:
Justin Pruett

Board Members:
Don Cabral, President
Frank Rivas, Clerk
Maribel Cerutti
Lyzette Gonzalez
Derek Wach

ARCHITECT
TPH Architects.
519 McHenry Avenue
Modesto, CA 95354

Electrical Engineer

Mechanical Engineer

Civil Engineer

Structural Engineer

Landscape Architect

Contractor

3.10 ENVIRONMENTAL PROTECTION

A. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted or that other undesirable effects might result. Use of tools and equipment that produce noise shall comply with OSHA regulations.

3.11 FIRE AND SAFETY PLAN

A. Contractor is responsible for development of fire safety for personnel and property during the course of construction. Comply with CFC Chapter 33 for precautionary action and safety measures as needed.

3.12 REMOVAL AT COMPLETION

A. Upon completion of the work, or prior thereto, when so directed by the Architect, Contractor shall remove temporary facilities, structures and installation from the Owner's property. Similarly, return exterior areas utilized for temporary facilities to substantially their original state, or when called for on the drawings, complete the areas as shown or noted. Sanitary facilities shall be properly disinfected and evidence removed from the site.

END OF SECTION

CONSTRUCTION WASTE MANAGEMENT
SECTION 015240

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:
   1. Recycling nonhazardous construction waste.
   2. Disposing of nonhazardous construction waste.

1.2 DEFINITIONS

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

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

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

1.3 ACTION SUBMITTALS

A. Construction Waste Management Plan: Submit plan to the Local Jurisdiction at the time of permit pickup.

B. Waste Management Worksheet: Submit worksheet to the Local Jurisdiction at the time of permit final.

C. Construction Waste Management Acknowledgment: Submit Acknowledgment to the Local Jurisdiction at permit final.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Conduct construction waste management activities in accordance with 2022 California Green Building Standard Code Section 5.408, the local jurisdictions' Solid Waste Division Requirements, and all other applicable laws and ordinances.

B. Preconstruction Conference: Review methods and procedures related to waste management including, but not limited to, the following:
   1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
   2. Review requirements for documenting quantities of each type of materials that will be salvaged, recycled, or disposed of as waste.
   3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
   4. Review procedures for periodic waste collection and transportation of recycling and disposal facilities.
      a. King County Solid Waste Divisions Report of Co-mingled Recycling Facilities.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
   1. Material category.
   2. Generation point of waste.
   3. Total quantity of waste in tons.
   4. Quantity of waste salvaged, both estimated and actual in tons.
   5. Quantity of waste recycled, both estimated and actual in tons.
   6. Total quantity of waste recovered (salvaged plus recycled) in tons.
   7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

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

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

1.6 CONSTRUCTOIN WASTE MANAGEMENT PLAN (CWM)

A. Waste Identification: Indicate on form included at the end of Part, anticipated types and quantities of construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

B. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

C. The Contractor is to divert from land fill a minimum of 65% (by weight) of construction waste by means of recycling, compost and/or salvage of the non-hazardous construction debris.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

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

B. Training: Train workers, subcontractors, and supplies on proper waste management procedures, as appropriate for the Work occurring at Project site.
1. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

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

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

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
   1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
      a. Inspect containers and bins for contamination and remove contaminated materials if found.
   2. Stockpile processed materials on-site without intermixing with other materials. Place grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   3. Stockpile materials away from construction area. Do not store with in drip line of remaining trees.
   4. Store components off the ground and protect from the weather.
   5. Remove recyclable waste off Owners's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

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

B. Wood Materials:
   1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
   2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

Construction Waste Management Plan – CW 1

Project Name: _____

Project Location: _____

Building Permit Number: _____

Project Square Feet: _____

Contractors Name: _____

Contractor's Telephone Number: _____

Owners Name: _____

Owner's Telephone Number: _____

This construction waste management plan is hereby submitted to comply with Section 4.408.2 of the 2022 California Green Building Standards Code.

The purpose of this plan is to identify and outline the methods to be used as the minimum requirements for a construction waste management plan when the local jurisdiction does not have a construction and demolition waste management ordinance per Section 4.408.2.

1. The method of waste tracking to be used on this project will be: (Check one box.)

   ☐ **Volume** ☐ **Weight**

   ☐ **Four pounds per square feet** ☐ **Recycling Facility**

2. Construction waste generated on this project for transport to a recycling facility will be: (Check appropriate box.)

   ☐ **Sorted on-site (Source-separated)**

   ☐ **Bulk mixed (Single stream)**

3. The facility (or facilities) where the construction waste material will be taken is:

   Name of Facility: _____

   Address: _____

   Facilities Telephone: _____

   (Attach separate sheet for additional facilities)

4. The following construction methods will be used to reduce the amount of waste generated: (Check all that apply.)

   ☐ Efficient design (dimensions of building components are designed to available material sizes or standard sizes).

   ☐ Careful and accurate material ordering.

   ☐ Careful material handling and storage.

   ☐ Panelized or prefabricated construction.

   ☐ Other

   _____

   ☐ Other

   _____

5. Waste reduction and recycling strategies shall be discussed at periodic project meetings. Each new _____ that comes onto the site shall be provided with a copy of the Construction Waste Management Plan (CWMP), which shall also be posted in the project office. The _____

   shall also instruct all _____ as to the location and proper use of debris boxes for disposal of construction waste materials.

6. Every effort shall be made to use recycling and/or reuse (diversion) measures to reduce the amount of construction waste and other materials sent to landfills. Whenever possible, site-sorted debris boxes shall be used to segregate construction waste materials to maximize the diversion rate.

7. The _____shall provide debris boxes for materials sorted on-site (source-separated) and/or bulk mixed (single stream) waste for all construction related waste generated on this project. Mixed construction waste shall be taken to a recycling facility that has a diversion rate of at least 50 percent.

   In the event that a _____ provides their own debris box, they shall be responsible for providing the

   _____ with a monthly report of the total Recycled and Reused (Diverted) and the total Non-Recycled (Disposed) materials to be included in the project's overall waste management/waste reduction program.

8. Any _____ hauling away packaging or waste materials shall notify the _____ of the amount of these materials and how they will be disposed of (reused, recycled, salvaged, or taken to landfill).

9. Identified below are the construction waste materials that will be reused and/or recycled during the course of this project and how they will be diverted:

Material	Diversion Method: (Recycle/Reuse)

(See Construction Waste Management Worksheets for examples of common materials.)

10. The _____ shall track the total amount of construction waste leaving the project by weight or by volume and supply the _____ with copies of tickets or detailed receipts from all loads of construction waste removed from the jobsite.

11. The _____ shall monitor the process of waste management, recycling, and reuse of construction waste materials to ensure compliance with the CWMP during the course of the project.

12. The _____ shall ensure that all supporting documentation which demonstrates compliance with the waste management plan is provided to the local enforcement agency upon completion of the project.

***** Insert title of appropriate party or responsible person, which may include, but not be limited to: *Contractor(s), Subcontractor(s), Project Manager(s), Superintendent(s), Supplier(s), or Waste Hauler(s).*

Construction Waste Management Plan (CWMP) Acknowledgment - CW 7

Project Name:	
Project Location:	
Project Manager:	
Waste Hauler:	
Facility:	

[illegible]

C[illegible]M[illegible]

By signing below, I acknowledge that I have read the CWMP for this project and agree to my responsibilties to follow the procedures in this plan.

Date	Company	Foreman Name	Signature

R[illegible]

FIELD ENGINEERING
SECTION 017123

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for field engineering.

1.2 GENERAL

A. The survey furnished by the District will identify the existing benchmarks, existing grades, trees, and other improvements.

B. Be responsible for the accuracy of the building lines and levels, including ancillary structures and other improvements on the site.

C. Employ an independent civil engineer or licensed surveyor, acceptable to the District and Architect, who is not a regular employee of the Contractor and who has no interest in the Contract, to establish building control points.

1.3 SETTLEMENT MONITORING

A. Program: Provide a proposed program, in writing, for settlement monitoring prior to the start of excavation or foundation work.

B. Readings:
   1. As a minimum, have the surveyor take readings of the work and adjacent property at a minimum number of points as specified below:
      a. Adjacent existing buildings: 2 points for each building or structure; horizontal and vertical control.

   2. Additional monitoring points may be established as the Contractor determines to be necessary.

   3. Have readings taken weekly until the work is substantially complete.

C. Reports: Record settlement readings and submit them in the form of a report to the District and the Architect monthly.

1.4 LOCATING THE WORK/VERIFICATION

A. As the Work proceeds, verify all grades, lines, levels, and dimensions indicated on the Drawings, and report errors or inconsistencies to the Architect in writing.

B. Do not proceed until errors and inconsistencies are corrected.

C. Establish control points and benchmarks adequate for the use of all trades for reference so that all parts of the Work will be at the required location(s) and within the tolerances specified, or standard with the industry when not specified.

D. Benchmarks:
   1. Remove, re-establish and relocate control points and benchmarks as necessitated by construction progress.

   2. Replace benchmarks that have been damaged and displaced.

   3. Maintain such control points and benchmarks in an undisturbed condition until final completion and final acceptance by the District of the Project as a whole.

E. As soon as practicable, the civil engineer or surveyor shall verify the layout and the Contractor shall furnish certified original drawings of the survey showing exact locations of all portions of the Project.
   1. Work that is not correctly located shall be relocated or altered to conform to the Contract Drawings, as the Architect may direct.

   2. Additional copies of the survey shall be furnished to the District at his request.

END OF SECTION

CUTTING AND PATCHING
SECTION 017329

1. 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, Inspector, Inspections, and Tests, Integration of Work, Nonconforming Work, and Correction of Work, and Uncovering Work;

B. Special Conditions;

C. Hazardous Materials Procedures and Requirements;

D. Hazardous Materials Certification;

E. Lead-Based Paint Certification;

F. Imported Materials Certification.

1.02 CUTTING AND PATCHING:

A. No cutting of structural members is allowed without prior written consent.

B. Contractor shall be responsible for all cutting, fitting, and patching, including associated excavation and backfill, required to complete the Work or to:
   (1) Make several parts fit together properly.

   (2) Uncover portions of Work to provide for installation of ill-timed Work.

   (3) Remove and replace defective Work.

   (4) Remove and replace Work not conforming to requirements of Contract Documents.

   (5) Remove Samples of installed Work as specified for testing.

   (6) Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

(7) Attaching new materials to existing remodeling areas – including painting (or other finishes) to match existing conditions.

C. In addition to Contract requirements, upon written instructions from the District, Contractor shall uncover Work to provide for observations of covered Work in accordance with the Contract Documents; remove samples of installed materials for testing as directed by District; and remove Work to provide for alteration of existing Work.

D. Contractor shall not cut or alter Work, or any part of it, in such a way that endangers or compromises the integrity of the Work, the Project, or work of others.

1.03 SUBMITTALS:

A. Prior to any cutting or alterations that may affect the structural safety of Project, or work of others, and well in advance of executing such cutting or alterations, Contractor shall submit written notice to District pursuant to the applicable notice provisions of the Contract Documents, requesting consent to proceed with the cutting or alteration, including the following:

(1) The work of the District or other trades.

(2) Structural value or integrity of any element of Project.

(3) Integrity or effectiveness of weather-exposed or weather-resistant elements or systems.

(4) Efficiency, operational life, maintenance or safety of operational elements.

(5) Visual qualities of sight-exposed elements.

B. Contractor's Request shall also include:

(1) Identification of Project.

(2) Description of affected Work.

(3) Necessity for cutting, alteration, or excavations.

(4) Affects of Work on District, other trades, or structural or weatherproof integrity of Project.

(5) Description of proposed Work:

(a) Scope of cutting, patching, alteration, or excavation.

(b) Trades that will execute Work.

(c) Products proposed to be used.

(d) Extent of refinishing to be done.

(6) Alternates to cutting and patching.

(7) Cost proposal, when applicable.

(8) The scheduled date the Contractor intends to perform the Work and the duration of time to complete the Work.

(9) Written permission of other trades whose Work will be affected.

1.04 QUALITY ASSURANCE:

A. Contractor shall ensure that cutting, fitting, and patching shall achieve security, strength, weather protection, appearance for aesthetic match, efficiency, operational life, maintenance, safety of operational elements, and the continuity of existing fire ratings.

B. Contractor shall ensure that cutting, fitting, and patching shall successfully duplicate undisturbed adjacent profiles, materials, textures, finishes, colors, and that materials shall match existing construction. Where there is dispute as to whether duplication is successful or has been achieved to a reasonable degree, the District's decision shall be final.

1.05 PAYMENT FOR COSTS:

A. Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of the District, its consultants, including but not limited to the Construction Manager, the Architect/Engineer, the Project Inspector(s), Engineers, and Agents, will be paid by Contractor and/or deducted from the Contract by the District.

B. District shall only pay for cost of Work if it is part of the original Contract Price or if a change has been made to the contract in compliance with the provisions of the General Conditions. Cost of Work performed upon instructions from the District, other than defective or nonconforming Work, will be paid by District on approval of written Change Order. Contractor shall provide written cost proposals prior to proceeding with cutting and patching.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Contractor shall provide for replacement and restoration of Work removed. Contractor shall comply with the Contract Documents and with the Industry Standard(s), for the type of Work, and the Specification requirements for each specific product involved. If not specified, Contractor shall first recommend a product of a manufacturer or appropriate trade association for approval by the District.

B. Materials to be cut and patched include those damaged by the performance of the Work.

PART 3 – EXECUTION

3.01 INSPECTION:

A. Contractor shall inspect existing conditions of the Site and the Work, including elements subject to movement or damage during cutting and patching, excavating and backfilling. After uncovering Work, Contractor shall inspect conditions affecting installation of new products.

B. Contractor shall report unsatisfactory or questionable conditions in writing to District as indicated in the General Conditions and shall proceed with Work as indicated in the General Conditions by District.

3.02 PREPARATION:

A. Contractor shall provide shoring, bracing and supports as required to maintain structural integrity for all portions of the Project, including all requirements of the Project.

B. Contractor shall provide devices and methods to protect other portions of Project from damage.

C. Contractor shall, provide all necessary protection from weather and extremes of temperature and humidity for the Project, including without limitation, any work that may be exposed by cutting and patching Work. Contractor shall keep excavations free from water.

3.03 ERECTION, INSTALLATION AND APPLICATION:

A. With respect to performance, Contractor shall:

(1) Execute fitting and adjustment of products to provide finished installation to comply with and match specified tolerances and finishes.

(2) Execute cutting and demolition by methods that will prevent damage to other Work, and provide proper surfaces to receive installation of repairs and new Work. Exposed over-cuts (overcutting) of concrete/asphalt is not allowed without written approval of District.

(3) Execute cutting, demolition excavating, and backfilling by methods that will prevent damage to other Work and damage from settlement.

B. Contractor shall employ original installer or fabricator to perform cutting and patching for:

(1) Weather-exposed surfaces and moisture-resistant elements such as roofing, sheet metal, sealants, waterproofing, and other trades.

(2) Sight-exposed finished surfaces.

C. Contractor shall execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes as shown or specified in the Contract Documents including, without limitation, the Drawings and Specifications.

D. Contractor shall fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Contractor shall conform to all Code requirements for penetrations or the Drawings and Specifications, whichever calls for a higher quality or more thorough requirement. Contractor shall maintain integrity of both rated and non-rated fire walls, ceilings, floors, etc.

E. Contractor shall restore Work which has been cut or removed. Contractor shall install new products to provide completed Work in accordance with requirements of the Contract Documents and as required to match surrounding areas and surfaces.

F. Contractor shall refinish all continuous surfaces to nearest intersection as necessary to match the existing finish to any new finish.

END OF SECTION

CLEANING
SECTION 017423

PART 1 - GENERAL

1.1 SUMMARY

A. Throughout the construction period, maintain the site in a standard of cleanliness as described in this Section.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 DUST CONTROL

A. Take appropriate actions daily to check the spread of dust and dirt to avoid the creation of a nuisance within the construction area (fenced area) and surrounding area. Do not use water if it results in hazardous or objectionable conditions, such as ice, flooding or pollution. Comply with all dust regulations imposed by local air pollution agencies.

B. Coordinate all clean up operations outside of the construction are with District through the Inspector.

3.2 PROGRESS CLEANING

A. General:

1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.

3. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.

4. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

5. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

6. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Re-stack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.2-A-1 above.

7. Maintain the site in a neat and orderly condition at all times.

3.3 FINAL CLEANING

A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Section 017423, Part 3.2 above.

C. Site:

1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.

2. Completely remove resultant debris.

D. Interior Surfaces:

1. Interior:
   a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
   b. Remove all traces of splashed material from adjacent surfaces.
   c. Remove paint droppings, spots, stains and dirt from finished surfaces.

2. Glass: Clean inside and outside.

3. Polished Surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the Manufacturer of the material being polished.

4. Tile floors shall be mopped clean.

5. Carpets are to be vacuumed.

E. Schedule final cleaning as approved by the Architect to enable Owner to accept a completely clean Work.

3.4 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION

PROJECT CLOSEOUT
SECTION 017700

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:

1. Inspection procedures
2. Project record documents submittal.
3. Operation and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Division 2 through 33.

1.3 COMPLETION AND FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting inspection for completion complete the following. List exceptions in the request.

1. Advise the Owner of pending insurance changeover requirements.

2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

3. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates and similar releases.

4. Submit record documents and similar final record information.

5. Deliver tools, spare parts, extra stock and similar items.

6. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.

7. Complete startup testing of systems and submit all testing reports and complete instructions of the Owner's operation and maintenance personnel.

8. Complete final cleanup requirements, including touch up painting.

9. Touch up and otherwise repair and restore marred, exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the certificate of completion following inspection or advise the contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Architect will repeat inspection when requested and assured that the work is substantially complete.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

A. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

B. Submit a copy of the Architect/Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by the Architect/Engineer.

1.5 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire resistant location. Provide access to record documents for the Architect's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where shop drawings are used, record a cross-reference at the corresponding locations on the contract drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the work.
2. Mark new information that is important to the Owner but was not shown on the contract drawings or shop drawings.

3. Not related change order numbers where applicable.

4. Organize record drawing sheets into manageable sets (ie.: plumbing, mechanical and electrical). Bind sets with durable paper cover sheets; print suitable titles, dates and other identification on the cover of each set.

C. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size (two copies of all information). Bind properly indexed data in individual, heavy duty, two inch (2"), three (3) ring, vinyl covered binders with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information.

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended “turn around” cycles.
6. Inspection procedures.
7. Shop drawings and product data.
8. Fixture lamping schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operations and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner’s personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer’s representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Identification systems.

6. Control sequences.
7. Warranties and bonds.
8. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.2 FINAL CLEANING

A. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

END OF SECTION

OPERATING AND MAINTENANCE MANUALS
SECTION 017800

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Compilation of product data and related information appropriate for District's maintenance and operation of products furnished under the Contract.

   2. Instruction of District's personnel in the maintenance of products and in the operation of equipment and systems.

B. Related work:
   1. Section 013300 for submittals of shop drawings, product data and sample.

   2. Section 017700 for contract closeout submittals.

   3. Section 017833 for submittals of warranties and bond.

   4. Section 099000 for painting.

   5. Section 131100 for swimming pool requirements.

1.2 SUBMITTALS

A. Preliminary:
   1. Submit 2 copies of proposed manual or manuals to the Architect for review and approval at least 15 days prior to request for final inspection or acceptance.

   2. Show general arrangement, nature of contents in each portion, and proposed method of binding and covering for the manual.

B. Final:
   1. Following instruction of operating and maintenance personnel, make necessary revisions of the manual.

   2. Submit specified number of copies of approved data in final form at final inspection or acceptance.

1.3 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel trained and experienced in maintenance and operation of the described products.

1.4 FORMAT

A. Prepare data in the form of an instruction manual for use by District's personnel.

B. Text: 20 lb. white bond paper, 8-1/2 -inch x 11 -inch

C. Drawings: Provide reinforced punched binder tab. Bind drawings with text.
   1. Fan-fold larger drawings to size of text pages.

D. Flyleaf: For each separate product or each piece of operating equipment provide the following.
   1. Brief description of product, and major component parts of equipment.

   2. Indexed tabs.

E. Cover: Identify each volume with typed or printed tile OPERATING AND MAINTENANCE INSTRUCTIONS. List the following.
   1. Title of Project.

   2. Identity of separate structures as applicable.

   3. A brief and general identification of the subject matter covered in the manual.

F. Binders:
   1. Commercial quality D-ring type 3-ring binders with durable vinyl covers.

   2. When multiple binders are used, correlate the data into related groupings.

G. Labels: Provide front and end spine labels for each manual clearly identified with the following information.
   1. OPERATING AND MAINTENANCE INSTRUCTION

   2. Name and address of Work

   3. Name of Contractor General subject of the manual Space for approval date

1.5 CONTENT OF MANUAL

A. Table of contents:
   1. List of each product required to be included, indexed to the content of the volume.

   2. List, with each product, the name, address and telephone number of (a) subcontractor and installer, (b) maintenance contractor, as appropriate, and (c) local source of supply for parts and replacement.

B. Product data:
   1. Include only those sheets pertinent to the specific product.

   2. Annotate each sheet to clearly identify the data applicable to the installation. Delete references to inapplicable information.

C. Drawings: Supplement product date with drawings as necessary to illustrate the following.
   1. Relations of component parts of equipment and systems.

   2. Project record drawings shall not be used as maintenance drawings.

D. Instructions: Written text as required to supplement product data for the particular installation.

E. Copy of each warranty, guaranty, bond, and service contract issued. Provide information sheet for District's personnel, giving the following information:
   1. Proper procedures in the event of failure or emergency.

   2. Instances which might affect the validity of warranties, guaranties, or bonds.

1.6 MANUAL FOR MATERIALS AND FINISHES

A. Instructions for care and maintenance including:
   1. Manufacturer's recommendation for types of cleaning agents and methods.

   2. Cautions against cleaning agents and methods, which may be detrimental to the product.

   3. Recommended schedule for cleaning and maintenance.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Content, for each unit of mechanical equipment and system, as appropriate:
   1. Description of unit and component parts:
      a. Function, normal operating characteristics, and limiting conditions.
      b. Performance curves, engineering data and tests.
      c. Complete nomenclature and commercial number of all replaceable parts.

   2. Operating procedures:
      a. Start-up, break-in, routine and normal operating instructions.
      b. Regulation, control, stopping, shutdown and emergency instructions. c. Summer and winter operating instructions.

   3. Maintenance procedures:
      a. Routine operations.
      b. Guide to "trouble-shooting."
      c. Disassembly, repair and reassembly.
      d. Alignment, adjusting and checking.

   4. Servicing and lubrication schedule: List of lubricants required.

   5. Manufacturer's printed operating and maintenance instructions.

   6. Description of sequence of operation by control manufacturer.

   7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
      a. Predicted life of parts subject to wear.
      b. Items recommended to be stocked as spare parts.

   8. Control diagrams by manufacturer of controls as installed in Project.

   9. Coordination drawings of color-coded piping diagrams as installed by each subcontractor.

   10. Charts of valve tag numbers with the location and function of each valve.

   11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.

B. Content, for each electric and electronic system, appropriate:
   1. Description of system and component parts:
      a. Function, normal operating characteristics, and limiting conditions.
      b. Performance curves, engineering data and test.

c. Complete nomenclature and commercial number of replaceable parts.

2. Circuit directories of panelboards:
   a. Electrical service.
   b. Controls.
   c. Communications.

3. As-installed color-coded wiring diagrams.

4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.

5. Maintenance procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting."
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.

6. Manufacturer's printed operating and maintenance instructions.

C. Prepare and include additional data when the need for such data becomes apparent during instruction of District's personnel.

1.8 INSTRUCTION OF DISTRICT'S PERSONNEL

A. Prior to final inspection or acceptance, instruct District's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment, and systems installed in Project.

B. Provide services of factory-trained instructors from the manufacturer of each major item of equipment or system.

C. Operating and maintenance manual shall constitute the basis of instruction.

D. Review contents of manual(s) with personnel in full detail to explain all aspects of operations and maintenance.

END OF SECTION

PROJECT RECORD DOCUMENTS
SECTION 017823

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for preparation, maintenance and delivery of record documents.

1.2 SUBMITTALS

A. Deliver record documents and transparencies to Architect at completion of Project.

B. Accompany submittal with transmittal letter, in duplicate, containing date, Project title and number, Contractor's name and address, title and number of each record document, certification that each document as submitted is complete and accurate, and signature of Contractor or its authorized representative.

PART 2- PRODUCTS NOT USED.

PART 3 - EXECUTION

3.1 DOCUMENT MAINTENANCE

A. Maintain one copy of the following in Contractor's field office at the site:
   1. Contract Drawings, including the Building Department stamped set.
   2. Specifications and Addenda.
   3. Reviewed shop drawings.
   4. Bulletins and change orders, field change authorization and notice of clarification, and other modifications to Contract.
   5. Field test records.

B. File record documents apart from constructions documents and maintain in clean, dry, legible condition. Make record documents available for review by the District and Architect during regular business hours.

C. Do not use record documents for construction purpose.

D. Record documents will be subject to a monthly review by the Architect prior to approval of each progress payment.

3.2 RECORDING

A. Clearly label each document "PROJECT RECORD".

B. Keep record documents current.

C. Record and properly dimension deviations on the record drawings within 24 hours after work in affected area is completed. Dimensions shall be accurate to within 1 -inch
   1. Use a fine felt or nylon tip pen with waterproof colored ink for marking.

   2. Legibly mark to record actual construction of the following:
      a. Depths of various elements of foundation in relation to first floor level.

      b. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Cut-off points and point of connections of utilities.

      c. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

      d. Field changes of dimension and detail.

      e. Changes made by Change Order, Field Change Authorization and Notice of Clarification.

      f. Details not on original Contract Drawings.

      g. Do not permanently conceal any work until required information has been recorded.

D. Legibly mark-up each Section of the Specifications to record the following:
   1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment installed.

   2. Changes made by change order, field change authorization and notice of clarification.

   3. Other matters not originally specified.

E. Maintain shop drawings as record documents. Legibly annotate to record changes made after approval.

3.3 RECORD TRANSPARENCIES

A. At completion of Project, obtain from Architect and pay for a set of Mylar transparencies of all affected Contract Drawings.

B. Incorporate on transparencies, all changes noted on record set in black ink. This requirement applies to all the disciplines. An experienced, competent draftsman shall perform work.

C. Identify documents as "RECORD DRAWINGS".

3.4 CAD FILES

A. For the work listed below, submit record shop drawings prepared electronically using the latest version of AutoCAD.

B. Each of the work listed below shall be included in its own layer (or layers) within the electronic file. Provide CD with these files to the Architect for forwarding to the District.

C. Index each files with layering reference guide and reference file matrix.

D. Work to be included in CAD files:
   1. HVAC.
   2. Plumbing.
   3. Fire protection.
   4. Lighting.
   5. Fire alarm.
   6. Electrical power.

END OF SECTION

WARRANTIES AND BONDS
SECTION 017833

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:
   1. Compile specified warranties and bonds, and specified service and maintenance contracts.

   2. Review submittals to verify compliance with Contract Documents.

   3. Submit to Architect for review and forwarding to District as specified in Section 017700.

B. Related work:
   1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.

   2. General closeout requirements are included in Section 017700.

   3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in Sections of Divisions 2 through 33.

   4. Certifications and other commitments and agreements for continuing services to District are specified elsewhere in the Contract Documents.

C. Disclaimers and limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.

1.2 WARRANTY REQUIREMENTS

A. Related damages and losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

B. Reinstatement of warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement cost:
   1. Upon determination that work covered by a warranty has failed, replace or rebuild the affected work to an acceptable condition complying with requirements of Contract Documents.

   2. Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the District has benefited from use of that work through a portion of its anticipated useful service life.

D. District's recourse:
   1. Written warranties made to the District are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on obligations, rights, or remedies.

   2. The District reserves the right to reject warranties and to limit selections to products with warranties not in confiict with requirements of the Contract Documents.

E. The District reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.3 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds, and service and maintenance contracts executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Submit 2 original signed copies required.

C. Furnish a typed table of contents, in orderly sequence, with the following complete information for each item:
   1. Product or assembly.

   2. Firm, with name of principal, address and telephone number.

   3. Scope.

   4. Date of beginning of warranty, bond or service and maintenance contract.

   5. Duration of warranty, bond or service maintenance contract.

6. Provide information for proper procedure to be followed in case of failure, and in instances which may affect the validity of warranty or bond.

7. Name of responsible principal of Contractor, and address and telephone number.

1.4 FORM OF SUBMITTALS

A. Prepare and bind in commercial quality D-ring type 3-ring binders with durable vinyl covers.

B. Format:
   1. Size: 8-1/2 -inch by 11 -inch; punch sheets for standard 3-ring binder. Refer to warranty sample form below. Fold larger sheets to fit into binders.

   2. Cover: Provide spine label clearly identified with WARRANTIES AND BONDS, title of Project and Contractor's name typed or printed.

1.5 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during construction, submit documents within 10 days after inspection and acceptance. Otherwise make submittals as specified in Section 017700.

B. For items whose acceptance is delayed materially beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.6 WARRANTY FORM

A. Submit warranties on the form attached to this Section; this applies to Contractor and all subcontractors.

WARRANTY FORM
(Contractor's or Subcontractor's Letterhead)

Warranty for _____
We hereby warrant that all materials and equipment for the _____
which we have installed at: _____
are new unless otherwise specified, and that all work is of good quality, free from faults and defects and in conformance with the contract documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective.

If, within one year after the date of substantial completion of the work or designated portion thereof or within one year after acceptance by the District of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the contract documents, any of the work is found to be defective or not in compliance with the contract documents, we agree to correct it promptly after receipt of a written notice from the District to do so unless the District has previously issued a written acceptance of such condition. This obligation shall survive termination of the contract.

If we fail to comply with the above paragraph within 7 days after receipt of written notice from the District to do so, or fail to pursue such compliance with diligence we, jointly and severally, do hereby authorize the District to proceed to have the defects repaired and made good at our sole expense including compensation for the architect's additional services made necessary by such default, and we will honor and pay the costs and charges for it together with interest at the maximum rate then permitted by governing state law, upon demand. If we fail to fulfill the preceding obligations, and if the District brings action to enforce this warranty, we agree to pay the District's reasonable attorney's fees incurred in connection therewith.

This warranty is for _____ year(s).

SUBCONTRACTOR:_____
Business Name

Signed: _____ Print Name: _____
Date: _____

COUNTER SIGNED
GENERAL CONTRACTOR: _____
Business Name

Signed: _____ Print Name: _____
Date:_____

END OF SECTION

GEOTECHNICAL INVESTIGATION REPORT
SECTION 02 2600

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. A Geotechnical Services Report (File No. 6389-001.00P) was conducted for the site by Raney Geotechnical Inc., dated October 15, 2025.

B. The report is attached in this section, see following pages. Copies are also available upon request at the office of the Architect, TPH Architect, 519 McHenry Ave, Modesto, CA 95354.
   1. It is the responsibility of the Earthwork sub-Contractor to obtain this information before the project is bid..

C. Comply with all requirements/recommendations of the Geotechnical Services and additional requirements of Specification Sections 310000, 310505, as well as DSA approved Project Drawings.

END OF SECTION

RANEY GEOTECHNICAL INC

October 15, 2025

Mr. Matt Vargas
Newman-Crows Landing Unified School District
mvargas@nclusd.k12.ca.us

Geotechnical Engineering and Geologic Hazards Report
VON RENNER ELEMENTARY SCHOOL CLASSROOM BUILDING
1388 Patchett Drive
Newman, California 95360
File No. 6389-001.00P

INTRODUCTION

Our firm has completed this Geotechnical Engineering and Geologic Hazard Study for the proposed classroom building to be located at the existing Von Renner Elementary School campus in Newman, California. The purposes of this investigation have been to explore the existing soil, geologic, and groundwater conditions at the site, and to provide geologic hazards and geotechnical engineering conclusions and recommendations for use by the other members of the design team for design and construction of the proposed project. This report presents the results of our study.

Scope of Services

Our scope of services for this project included the following tasks:

1. perform a site reconnaissance;
2. review of United States Geological Survey (USGS) topographic maps, aerial photographs and available groundwater data;
3. obtained a drilling permit from Stanislaus County Environmental Health department;
4. perform subsurface explorations including, retaining a private utility locator, and the drilling and sampling of two borings to depths of about 15 to 51½ feet below the existing ground surface (bgs);
5. collect representative bulk samples of soils;
6. perform laboratory testing of selected soil samples;

7. performed engineering analyses; and,
8. preparation of this report.

We also retained the services of GEOCON Consultants, Inc. to prepare a Geologic Hazards Evaluation to meet the requirements of the California Geological Survey (CGS).

Figures and Attachments

This report contains a Site Plan showing the boring locations as Plate 1 and the Logs of Soil Borings as Plates 2 and 3. A Unified Soil Classification System is included on Plate 4, which includes nomenclature used to describe the soils. Laboratory test results are included as Plates 5 through 8.

Appendix A includes a *Geologic Hazards Evaluation* prepared by GEOCON Consultants, Inc. (GEOCON) for the site. Appendix B contains the results of the liquefaction analysis.

Field Exploration and Laboratory Testing

As part of our study for the proposed improvements, our field exploration included the drilling and sampling of two soil borings (B1 and B2) at the approximate locations shown on Plate 1.

The borings were performed on September 20, 2024 to depths of about 15 to 51½ feet below existing site grades utilizing a CME-55 HT truck-mounted drilling rig equipped with six-inch-diameter solid flight augers. At various intervals, soil samples were recovered with either a 2inch outside (O.D.), 1½-inch inside diameter (I.D.), standard penetration test split spoon sampler or a 2½-inch O.D., 2-inch I.D., modified California split-spoon sampler. The samplers were driven by an automatic 140-pound hammer freely falling 30 inches. The number of blows of the hammer required to drive the 18-inch-long samplers each six-inch interval were recorded. The sum of the blows required to drive the sampler the lower 12-inch interval is designated the penetration resistance or "blow count" for that particular drive.

The modified California samples were retained in 2-inch diameter by 6-inch long, thin-walled brass tubes contained within the sampler. After recovery, the field representative visually classified the soil recovered in the tubes. After the samples were classified, the ends of the tubes and plastic bags were sealed to preserve the natural moisture contents.

In addition to the driven samples, representative bulk samples of near-surface soils also were collected and retained in plastic bags. Driven and bulk samples were taken to our laboratory for additional soil classification and selection of samples for testing.

Selected undisturbed soil samples were tested to determine dry unit weight (American Society of Testing and Materials [ASTM] D2937) and natural moisture content (ASTM D2216). The results of these tests are included on the boring logs at the depth each tested sample was obtained.

Four representative soil samples were subjected to Plasticity Index testing (ASTM D4318); the results of this test are presented on Plate 5.

Two representative samples of the near-surface soil were subjected to Expansion Index testing (ASTM D4829); the results of this test are presented on Plate 6.

Two representative samples of the near-surface soil were subjected to Hydrometer Analysis testing (ASTM D422); the results of this test are presented on Plate 7.

One sample of representative near-surface soil was submitted to Sunland Analytical to determine the soil pH and minimum resistivity (California Test 643), Sulfate concentration (California Test 417), and Chloride concentration (California Test 422). The test results is presented in Plate 8.

Proposed Construction

We understand the project consists of the design and construction of a new slab-on-grade classroom building. We understand the building will cover up to about 9700 square feet in plan area. Associated development is anticipated to consist of underground utilities and concrete sidewalks.

Grading plans were not available; however, based on the existing site topography, we anticipate excavations and fills on the order of two to three feet will be required for development of the site, excluding underground utilities.

FINDINGS

Site Description

The project site is located at the existing Von Renner Elementary School located at 1388 Patchett Drive in Newman, California. Specifically, the area of improvement is located at the center west end of the campus. The property is bounded to the north by Patchett Drive, beyond which is existing residential development; to the south by existing residential development and Janet H. Carlsen Park; and to the east and west by existing residential development.

At the time of our field exploration in September of 2025, the area of the proposed structure is occupied by existing single-story modular buildings and asphalt concrete pavements. Underground and overhead utilities were observed near the vicinity of the project area.

Based on our observations, the site is generally flat. Review of a *United States Geological Survey* (*USGS) 7.5-Minute Series Topographic Map of the Newman Quadrangle*, dated 2021, indicates the existing ground surface at the site is approximately +95 feet relative mean sea level (msl) referencing the North American Vertical Datum of 1988 (NAVD88).

Historical Aerial Photograph Review

Review of historic aerial photographs from 1957, 1958, 1961, 1963, 1967, 1971, 1982, 1984, 1999, 2005, and every year from 2009 through 2023. In 1957, the property appears to be occupied by land used for agricultural purposes. Construction of the school site began in 1958 and appears to have been finished by 1964. The modular buildings occupying the project site can first be seen in an aerial photograph of 1999. Between 1999 and 2023 the site has remained essentially the same. At the time of our field reconnaissance in September 2025, the site has remained relatively unchanged since 2023.

Soil Conditions

Two exploratory borings (B1 and B9) were performed on September 20, 2025 at the approximate locations shown on Plate 1.

The borings were performed within existing asphalt concrete surfaces and the asphalt thicknesses encountered was about three inches thick. The aggregate base encountered beneath the asphalt concrete ranged from about 2½ to three inches thick.

The soil conditions beneath the existing pavements at the boring locations generally consist of medium stiff to very stiff lean clay with varying sand content to about 10 to 12 feet bgs at the boring locations. At location B2, we encountered medium dense, silty sand beneath the clay to the explored 15-foot depth of the boring. At location B1, beneath the near surface clay is medium dense, poorly graded sand with silt underlain by medium stiff to very stiff, silty lean clay with sand and gravel to the explored 51½ feet of the boring.

Following completion of the drilling and sampling at the boring locations, the boreholes were backfilled with a slurry of neat cement and water in accordance with Stanislaus Environmental Health Department's requirements and sealed with non-shrink concrete patch painted with black dye.

For specific information regarding the soil conditions at a specific exploration location, please refer to the Logs of Soil Borings, Plates 2 and 3.

Groundwater

Groundwater was initially encountered at about 35 feet bgs at location B1 and fell to about 40 feet bgs shortly after drilling. Groundwater was not encountered to the explored 15-foot depth of boring B2. Note that the borehole may not have been left open long enough for groundwater to reach equilibrium.

To supplement the groundwater data, we reviewed available groundwater data published by the California Department of Water Resources from a monitoring well (07S09E20D001M) located about 1-mile northeast of the site. Ground surface elevation at the well is indicated to be about +84 feet msl which is about 11 feet lower than the project site's elevation. Groundwater measurements at the DWR well have a "high" groundwater elevation of about +73 feet NAVD88 in July 2007, which is about 11 feet bgs at the well location. Groundwater measurements at the DWR well recorded a "low" groundwater elevation of about +72 feet NAVD88 in March 2007, which is about 12 feet bgs at the well location. Based on this data and results of our field explorations, groundwater elevations in the vicinity of the site have fluctuated from about 11 to 40 feet below the existing ground surface.

Geologic Hazards

Geologic hazards specific to the site as outlined in CGS Note 48 are included in the report prepared by GEOCON and included in Appendix A. Refer to the GEOCON report for additional information regarding geologic hazards at the site.

CONCLUSIONS

Seismic Design - 2022 CBC/ASCE 7-16 Seismic Design Criteria

The 2022 California Building Code (CBC) references the American Society of Civil Engineers (ASCE) Standard 7-16 for seismic design. To assist with the structural design of this project, we have provided seismic design parameters for the 2022 CBC; which have been determined based on the sites locations and the web interface developed by the Structural Engineers Associate of California (SEAOC) and the Office of Statewide Health Planning and Development (OSHPD). Based on the soil conditions encountered at the boring locations, including blow counts, a Site Class D is considered appropriate for the site.

A ground motion hazard analysis is required for structures on Site Class D sites with S_1 greater than or equal to 0.2 unless the following exception is used per *ASCE 7-16 Supplement 3*. A ground motion hazard analysis is not required where the value of the parameter S_{M1} determined by ASCE 7-16 Equation 11.4-2 is increased by 50% for all applications of S_{M1} and the resulting

value of the parameter S_{D1} determined by ASCE 7-16 Equation 11.4.4 is used for all applications of S_{D1} in ASCE 7-16.

The seismic design parameters summarized below in Table 1 may be used for seismic design of the planned improvements at the sites. Note that the values of S_{M1} and S_{D1} in the table below have been increased by 50% per *ASCE 7-16 Supplement 3*.

Table 1: 2022 CBC Seismic Design Parameters

Latitude: 37.3084° N Longitude: 121.0272° W	ASCE 7-16 Table/Figure	2022 CBC Figure/Section/Table	Factor/ Coefficient	2022 CBC Values
0.2-second Period MCE	Figure 22-1	Figure: 1613.2.1(1)	S_S	1.139 g
1.0 second Period MCE_R	Figure 22-2	Figure: 1113.2.1(2)	S_1	0.393 g
Soil Class	Table 20.3-1	Section: 1613.2.2	Site Class	D
Site Coefficient	Table 11.4-1	Table: 1613.2.3 (1)	F_a	1.044*
Site Coefficient	Table 11.4-2	Table: 1613.2.3(2)	F_v	1.907
Adjusted MCE Spectral Response Parameters	Equation 11.4-1	Equation: 16-36	S_{MS}	1.189 g
	Equation 11.4-2	Equation: 16-37	S_{M1}	1.124 g**
Design Spectral Acceleration Parameters	Equation 11.4-3	Equation: 16-38	S_{DS}	0.793 g
	Equation 11.4-4	Equation: 16-39	S_{D1}	0.749 g**
Seismic Design Category	Table 11.6-1	Table: 1613.2.5(1)	Risk Category I to IV	D
	Table 11.6-2	Table: 1613.2.5(2)	Risk Category I to IV	D

Notes: MCE_R = Risk-Targeted Maximum Considered Earthquake; g = gravity
* Determined by linear interpolation per Table 11.4.2 of ASCE 7-16
** Value has been increased by 50% per the Exception of Section 11.4.8 of ASCE 7-16.

Liquefaction Potential

Liquefaction is a soil strength loss phenomenon that typically occurs in loose, saturated cohesionless soils as a result of strong ground shaking during earthquakes. The potential for liquefaction at a site usually is determined based on the results of a subsurface soil investigation and the groundwater conditions beneath the site. Hazards to buildings associated with

liquefaction include shallow and deep foundation bearing capacity failure, lateral spreading of soil, and differential settlement of soils below foundations, all of which can contribute to structural damage or collapse.

A liquefaction analysis to determine factors of safety against liquefaction was performed for the soil and groundwater conditions encountered at B1 performed during our field explorations.

Seismic Settlement

Although it is our opinion that the potential for liquefaction of soils beneath the site is relatively low due to the presence of clay as the predominant soil type, we performed a liquefaction analysis of data obtained from the blow counts measured at boring B1 and a conservative high groundwater level of 11 feet below the ground surface during a seismic event. A fines content of 7.7 percent was obtained based on laboratory testing of a representative soil sample within the potentially liquefiable soil layer from about 12 to 27 feet below the existing ground surface. The boring was analyzed using LiqSVs (Version 2.3.2.9) liquefaction assessment software developed by GeoLogismiki and the liquefaction analyses were performed utilizing the National Center for Earthquake Engineering Research (NCEER) methodology.

A high groundwater level of 11 feet below the existing ground surface and an existing groundwater level of 35 feet below the ground surface were used in our analysis based on our groundwater levels encountered during the subsurface exploration. Both input parameters are required to perform the analysis. A peak ground acceleration (PGA) of 0.53 g was used in the liquefaction analysis based on Equation 11.8-1 of ASCE 7-16. A mode magnitude earthquake of 6.30 was used for this analysis using the 2008 USGS National Seismic Hazard Mapping Project (NSHMP) Probabilistic Seismic Hazard Analysis (PSHA) Interactive Deaggregation web site. The results of the liquefaction analysis indicates the soil layers below the site have a factor of safety against liquefaction of at least 1.0.

Liquefaction potential at the site was also evaluated based on the Liquefaction Potential Index (LPI). The LPI is a measure of the liquefaction potential based on an analysis of the entire vertical soil profile, and not just discrete layers (Iwasaki, 1986; Toprak and Holzer, 2003). Factors taken into consideration for the LPI calculations include: thickness of the liquefied layer; proximity of the liquefied layer to the surface; and, the factor of safety. The LPI ranges from 0 to 100 with the value zero representing no liquefaction potential. Surface manifestations of liquefaction occur at LPI ≥ 5. The LPI for the soil conditions at boring B1 was calculated to be 1.59, indicating the potential for liquefaction during the design seismic event (mode magnitude earthquake of 6.3 and a PGA of 0.53 g) is not probable.

The results of the liquefaction analysis at boring B1 indicates a calculated seismic settlement of 1.2 inches. The settlement estimate calculated is between depths of about 12 to 18 feet below the existing ground surface. Given the depth of the estimated settlements calculated, the geology of the site, and the relatively stiff, clayey soils encountered above and below the sand layer from 12 to 28 feet below the existing ground surface, seismic settlement at the site is anticipated to be negligible. However, for life safety design purposes, total seismic settlement of 1.2 inches should be used. Differential seismic settlement of ½ inch over 50 feet or the least dimension of the structure should be assumed for design purposes. As noted previously, the presence of non-liquefiable soil layers overlying and interbedded within the liquefiable layers will likely mitigate the impact of seismically induced settlement at the ground surface.

The potential for dry sand seismic settlement was also evaluated for soils above the groundwater table. The upper 12 feet of the existing ground surface was generally observed to be relatively stiff, cohesive soils. Therefore, dry sand seismic settlement at the site is not anticipated.

Based on the results of our analysis, shown below, it is our opinion that the potential for loss of bearing capacity (strength) beneath the prepared building pads is very low and does not need to be further mitigated in the design of the structure, provided the recommendations of this report are incorporated into the design of the building. To further evaluate the potential for loss of bearing capacity beneath the prepared building pads, a conservative residual shear strength ratio of estimated to be 0.2 within the potentially liquefiable layer at depths of 12 to 20 feet below the existing ground surface.

At depths greater than 20 feet below the ground surface, the potential loss of bearing capacity underneath the proposed structure is considered negligible based on the zone of influence of the foundation not extending that deep.

Using a value of 0.20 and conservatively neglecting cohesion, we calculated a liquefied friction angle of 8.5 degrees using the following equation:

$$S_{u(liq)} / \sigma' = c + \tan \varphi_{liq}'$$

c = cohesion (neglected)
φ_{liq}' = liquefied friction angle

Based on a friction angle of 11 degrees, we calculated a liquefied ultimate bearing capacity of about 3168 pounds per square foot (psf) at a depth of 12 feet below the existing ground surface using Figure 1 of Chapter 4, Section 2.2.a of the Naval Facilities Engineering Command (NAVFAC) Design Manual 7.02 – Foundations and Earth Structures.

$$q_{ult,liq} = cNc + (\gamma_{1'}D_1N_q + \gamma_{2'}D_2N_q) + \tfrac{1}{2}\gamma BN_\gamma$$

γ_1' = 110 pcf from 0 to 11 feet
γ' = 57.4 pcf from 11 to 12 feet (assumed to be in groundwater at a depth below 11 feet)
D_1 = 11 foot
D_2 = 1 feet
N_q = 2.5 (Based on Figure 1 of NAVFACE Design Manual 7.02)

The values of cNc and $\frac{1}{2}\gamma BN_\gamma$ are conservatively neglected in our analysis.

Due to the depth of the potentially liquefiable layer and an ultimate bearing capacity of at least 3000 psf at the top of the potentially liquefiable layer (12 feet below the existing ground surface), in our opinion, the liquefied ultimate bearing capacity will be greater than the design allowable bearing capacity of 2000 psf noted later in this report. Therefore, the foundation bearing capacity will not exceed the liquefied ultimate bearing capacity following a seismic event and the subgrade soils are considered capable of supporting foundations immediately following a seismic event.

The site is relatively flat and sloping ground is not located in the immediately vicinity of the site. Therefore, lateral spread due to liquefaction is not anticipated at the site or in the vicinity.

Copies of the output files for the liquefaction analysis, including the results of the 2008 USGS NSHMP PSHA Interactive Deaggregation, are provided in Appendix B.

Soil Expansion Potential

Laboratory test results on soil samples at boring locations B1 and B2 indicate these materials possess low plasticity indexes between 10 and 17 when tested in accordance with the ASTM D4318 test method as shown in Plate 5. Additional laboratory test performed on the soil samples indicate these materials were found to have “very low” or “low” expansion potential when tested in accordance with ASTM D4318 test method as shown in Plate 6.

Based on the laboratory test results and the soil conditions encountered at the site, special site preparation or foundation design to mitigate the effects of expansive soils will not be required for development of this site.

Bearing Capacity

The results of our study indicate the undisturbed site soils can provide adequate support for the proposed improvements provided the recommendations of this report are carefully followed. Clearing operations to remove vegetation and remnants of any existing improvements (i.e., hardcourts, classrooms, etc.) will disturb the underlying materials and create loose and variable

soil conditions. Disturbed soils must be excavated to expose a firm base and the excavations widened, as necessary to provide equipment access, and backfilled with engineered fill to provide uniform support for the planned structures. Engineered fill that is properly placed and compacted as recommended in this report will be capable of supporting the proposed structures and pavements.

Effect of New Construction on Existing Development

There are existing buildings and other improvements (e.g., pavements, exterior flatwork, underground utilities, etc.) adjacent to the planned buildings. We assume that the buildings are supported on conventional shallow foundations (isolated spread and/or continuous footings). For excavations that will encroach within a one horizontal to one vertical (1H:1V) projection from the bottom of the existing building foundations, stabilizing the existing buildings and/or other improvements using an underpinning system that supports the existing foundations may be required should be evaluated by the Geotechnical Engineer in coordination with the design team.

Groundwater Effect on Development

Free groundwater was initially encountered at about 35 feet bgs at location B1 performed at the site on September of 2025. Review of available groundwater data revealed the groundwater elevation at nearby monitoring wells has a historic high of about 11 feet below the existing ground surface.

Groundwater levels at the site should be expected to fluctuate throughout the year based on variations in seasonal precipitation, local pumping, and other factors. Locally perched shallower groundwater may be encountered.

Based on current explorations performed at the site and historical groundwater data, we do not anticipate excavations within about 10 feet of the existing ground surface to encounter permanent groundwater, although locally perched water could be encountered and require localized dewatering (depending on the time of year). If perched is encountered, the use of sumps or submersible pumps could be used as methods to lower the groundwater level.

If excavations extend deeper than about 10 feet below the ground surface, dewatering may be required. The dewatering method used will depend on the soil conditions, depth of the excavation and amount of groundwater present within the excavation. Dewatering, if required, should be the contractor's responsibility. The dewatering system should be designed and constructed by a dewatering contractor with local experience. We recommend the selected dewatering system lower the groundwater level to at least two feet below the bottom of the proposed excavations.

Seasonal Water

During the wet season, infiltrating surface runoff water will create a saturated surface condition. It is probable that grading operations attempted following the onset of winter rains and prior to prolonged drying periods will be hampered by high soil moisture contents, especially due to the low permeability of the near-surface soils and underlying clay soils. Such soil, intended for use as engineered fill, will likely require a prolonged period of dry weather and/or considerable aeration to reach a moisture content suitable to achieve required compaction. This should be considered in the construction schedule for the project.

Soils beneath existing pavements will likely be at an elevated moisture content regardless of the time of year and will require drying before compaction or use as fill. Such soils, intended for use as engineered fill, will require considerable aeration and/or drying to reach a moisture content that will permit the soils to be properly compacted. This should be considered in the construction schedule for the project.

Typical remedial measures include discing and aerating the soils during dry weather, mixing the soils with dryer materials, removing and replacing the soils with an approved fill material, stabilization with a geogrid reinforcement, and/or mixing the soils with an approved hydrating agent such as a lime or cement product. Our firm should be consulted prior to implementing any remedial measure to observe the unstable subgrade condition and provide site-specific recommendations.

Excavation Conditions

The surface and near-surface soils should be readily excavatable with conventional construction equipment. Subsurface remnants from previous development, if any, at the site can be slow to excavate with a standard, rubber-tired backhoe; however, experience has shown that excavators can remove these materials with moderate effort.

Based on the borings performed at the site, excavations associated with building foundations, shallow trenches for utilities, and other excavations less than five feet deep associated with the planned construction, should stand vertically for short periods of time (i.e., less than one day) required for construction.

Excavations deeper than five feet that will be entered by workers should be sloped, braced, or shored in accordance with current Occupational Safety and Health Administration (OSHA) regulations. The contractor must provide an adequately constructed and braced shoring system in accordance with federal, state, and local safety regulations for individuals working in an excavation that may expose them to the danger of moving ground.

Excavated materials should not be stockpiled directly adjacent to an open trench to prevent surcharge loading of the trench sidewalls. Excessive truck and equipment traffic also should be avoided near open trenches. If material is stored or heavy equipment is operated near an excavation, stronger shoring would be needed to resist the extra pressure due to the superimposed loads.

Soil Suitability for Engineered Fill Construction

The existing on-site soils are considered suitable for use as engineered fill provided that they do not contain significant quantities of organics, rubble and deleterious debris, and are at a proper moisture content to achieve the desired degree of compaction.

Existing pavements (asphalt concrete and concrete) and concrete improvements within areas to be removed and replaced may be broken up and pulverized for use as fill. Asphalt and Portland cement concrete rubble may be used as fill provided it is processed into fragments less than three inches in largest dimension, is mixed with soil to form a compactable mixture, and is approved by the Owner. Note that reuse of the pulverized materials is only acceptable from a geotechnical perspective and should be approved by the Owner prior to use.

Clean aggregate base materials recovered from pavement demolition, if any, may be used in engineered fill construction. The existing asphalt concrete may be pulverized and used as engineered fill and/or aggregate sub-base outside the planned building footprints provided the material is pulverized to less than three inches in largest dimension and mixed to form a compactable mixture.

Preliminary Soil Corrosion Potential

One sample of near-surface soil was submitted to Sunland Analytical Lab of Rancho Cordova, California for testing to determine minimum resistivity, pH, and chloride and sulfate concentrations to help evaluate the potential for corrosive attack upon reinforced concrete and buried metal. The results of the corrosivity testing are summarized in Table 2. A copy of the corrosion test reports is presented on Plate 8.

Table 2: Corrosion Test Results

Sample Location	Depth (feet)	Soil Type	Analyte / Test Method			
			pH	Chloride Content (ppm)	Sulfate Content (ppm)	Resistivity (ohm-cm)
			CA DOT 643 Modified*	CA DOT 422	CA DOT 417	CA DOT 643 Modified*
B1	0 – 5	CL	7.47	20.7	33.1	960

Notes: * = Small cell method CA DOT = California Department of Transportation
Ω-cm = Ohm-centimeters ppm = Parts per million

The California Department of Transportation Corrosion and Structural Concrete Field Investigation Branch, Corrosion Guidelines, Version 3.2, dated March 2021, considers a site to be corrosive to foundation elements if one or more of the following conditions exists for the representative soil and/or water samples taken: has a chloride concentration greater than or equal to 500 ppm, sulfate concentration greater than or equal to 2000 ppm, or the pH is 5.5 or less.

Based on the above test results, the on-site soils are not considered corrosive to buried metal or to concrete for the samples tested. However, the relatively low resistivity value indicates the on-site soils may be moderately to highly corrosive to unprotected metal.

Table 19.3.1.1 – Exposure Categories and Classes, of American Concrete Institute (ACI) 318-19, Section 19.3 – Concrete Durability Requirements, as referenced in Section 1904.1 of the 2022 CBC, indicates the severity of sulfate exposure for the samples tested is Exposure Class S0. Exposure Class S0 is assigned for conditions where the water-soluble sulfate concentration in contact with concrete is low and injurious sulfate attack is not a concern. The project structural engineer should review the requirements of ACI 318 and determine their applicability to the site.

Raney Geotechnical, Inc. are not corrosion engineers. Therefore, if it is desired to further define the soil corrosion potential at the site a corrosion engineer should be consulted.

RECOMMENDATIONS

General

The recommendations presented below are appropriate for typical construction in the late spring through fall months. The on-site soils likely will be saturated by rainfall in the winter and early spring months and will not be compactable without drying by aeration or chemical treatment. Should the construction schedule require work to continue during the wet months, additional recommendations can be provided, as conditions dictate.

Site preparation should be accomplished in accordance with the provisions of this report. A representative of the Geotechnical Engineer should be present during all earthwork operations to evaluate compliance with the recommendations included in this report. The Geotechnical Engineer of Record referenced herein should be considered the Geotechnical Engineer that is retained to provide geotechnical engineering observation and testing services during construction.

Site Clearing

The site should be cleared of all surface and subsurface debris; remnants of prior structures, if any; utilities to be relocated or abandoned, including trench backfill and associated pipe bedding material, if any; and, any other items designated for removal. Where practical, site clearing should extend at least two feet beyond the limits of the planned improvement areas.

Existing trees designated for removal, if any, should include the entire rootball and roots larger than ½-inch in diameter. Adequate removal of debris and roots may require laborers and handpicking to clear the subgrade soils to the satisfaction of the Geotechnical Engineer's on-site representative.

Depressions resulting from removal of the above items, as well as any loose, soft, or saturated soils should be cleaned out to firm native soil and backfilled with engineered fill in accordance with the recommendations in this report. It is important that the Geotechnical Engineer's representative be present on a periodic basis during clearing operations to verify adequate removal of the surface and subsurface items, as well as the proper backfilling of resulting excavations.

Subgrade Preparation

Structural areas to receive fill, remain at-grade or achieved by excavation, should be scarified to a depth of at least 12 inches. The scarified soil should be thoroughly moisture conditioned to at least optimum and compacted to at least 90 percent relative compaction. Relative compaction and optimum moisture should be based on the maximum dry density as determined in accordance with the ASTM D1557 Test Method.

The upper six inches of final pad grade should be thoroughly moisture conditioned to at least the optimum moisture content, and uniformly compacted to at least 90 percent of the ASTM D1557 maximum dry density.

If unstable soil conditions are encountered during subgrade preparation, stabilizing the subgrade soils may be required to achieve a stable pavement subgrade. Typical recommendations for stabilizing unstable soil subgrades include: cross-rip, blade, and aerate; removal and replacement; geogrid stabilization; and/or, chemical treatment. Stabilization

recommendations will depend on the actual conditions encountered at the time of construction and should be determined by the project team, including the Geotechnical Engineer. Typically geogrid stabilization of isolated unstable areas is the most efficient stabilization technique and considered the most likely stabilization option at the site.

Site clearing and compaction operations should be performed in the presence of the Geotechnical Engineer's representative who will evaluate the performance of the subgrade under compactive load and identify loose or unstable soils that could require additional subgrade preparation.

Engineered Fill

On-site soils are considered suitable for use in engineered fill construction, provided they do not contain significant concentrations of organic materials, rubble debris, or particles greater than three inches in maximum dimension.

Imported fill materials, if required, should be compactable granular materials with an Expansion Index of 20 or less; an organic content less than five percent; do not contain particles greater than three inches in maximum dimension, and be within a compactable moisture content. Additionally, import fill materials that will be used within pavement areas should be non-expansive and have a minimum Resistance value of 20 when tested in accordance with California Test 301.

Imported fill should be observed and approved by the Geotechnical Engineer at least three business days prior to being transported to the site. Also, if import fills are required (other than aggregate base), the contractor must provide appropriate documentation that the import is clean of known contamination and within acceptable corrosion limits.

Engineered fill should be placed in lifts not exceeding six inches in compacted thickness with each lift being uniformly moisture conditioned to at least the optimum moisture content and compacted to not less than 90 percent of the maximum dry density per ASTM D1557.

Permanent excavation and fill slopes should be constructed no steeper than two horizontal to one vertical (2H:1V) and should be vegetated as soon as practical following grading to minimize erosion. As a minimum, the following erosion control measures should be considered: placement of straw bale sediment barriers or construction of silt filter fences in areas where surface run-off may be concentrated. Slopes should be over-built and cutback to design grades and inclinations.

A representative of the Geotechnical Engineer should be present during site preparation and all grading operations to observe and test the fill to verify compliance with these recommendations and the project specifications.

Utility Trench Backfill

Bedding of utilities and initial backfill should be in accordance with the manufacturer's recommendations for the pipe materials selected.

Utility trench backfill should be placed in relatively thin lifts, uniformly moisture conditioned to at least the optimum moisture content and mechanically compacted to at least 90 percent of the ASTM D1557 maximum dry density. The actual lift thickness should be determined in the field based on material type and compaction equipment used. Utility trench backfill should be continuously observed and tested during construction.

Underground utility trenches, which are aligned nearly parallel with foundations, should be located at least three feet from the outer edge of foundations. Trenches should not encroach into the zone extending outward at a one horizontal to one vertical (1H:1V) inclination below the bottom of the foundations.

Foundation Design

The proposed structure may be supported upon a conventional shallow foundation system with an interior slab-on-grade lower floor, provided the building pad areas are prepared and constructed in accordance with the recommendations of this report. isolated spread foundations extending at least 18 inches into the final subgrade level, as measured from lowest adjacent soil grade. Continuous foundations should be at least 12 inches wide; isolated spread foundation should maintain a minimum 18-inches in plan dimension.

Foundations bearing on undisturbed native soils and/or engineered fill may be sized for maximum vertical compressive loads utilizing a maximum allowable soil bearing pressures of 2000 pounds per square foot (psf) for dead plus live load; this bearing value may be increased by one-third to include the effects of seismic or wind forces. The weight of foundation concrete extending below lowest adjacent soil grade may be disregarded in sizing computations.

We recommend that all foundations be adequately reinforced to provide structural continuity, mitigate cracking, and enable spanning of local soil irregularities. Reinforcement should be determined by the project structural engineer.

Resistance to lateral displacement of shallow foundations may be computed using an ultimate friction factor of 0.30 multiplied by the effective vertical load on each foundation. Additional lateral resistance may be achieved using an ultimate passive earth pressure against the vertical projection of the foundation equal to an equivalent fluid pressure of 250 psf per foot of depth. These two modes of resistance should not be added unless the passive earth pressure component is reduced by 50 percent. The upper one foot of passive resistance should be

neglected if the area in front of the foundation does not contain flatwork or pavement for at least five lateral feet from the outside edge of the foundation.

Interior Floor Slab Support

Interior concrete slab-on-grade floors should be at least four inches thick and contain reinforcement for crack control. Final reinforcement and joint spacing should be determined by the project structural engineer. Proper and consistent location of the reinforcement near mid-slab is essential to its performance.

Floor slabs should be underlain by a layer of free-draining crushed rock, serving as a deterrent to migration of capillary moisture. The crushed rock layer should be between four and six inches thick and graded such that 100 percent passes a one-inch sieve and no appreciable amount passes a No. 4 sieve. Additional moisture protection may be provided by placing a vapor retarder membrane (at least 10-mils thick) directly over the crushed rock. The membrane should meet or exceed the minimum specifications as outlined in ASTM E1745 and be installed in strict conformance with the manufacturer's recommendations.

Floor slab construction over the past 30 years or more has included placement of a thin layer of sand or pea gravel over the vapor retarder membrane. The intent of the sand or pea gravel is to aid in the proper curing of the slab concrete and to protect the membrane prior to concrete placement. However, debate over excessive moisture vapor emissions from floor slabs includes concern for water trapped within the sand or pea gravel. Consequently, we consider the use of the sand or pea gravel layer as optional and not required from a geotechnical perspective. The concrete curing benefits should be weighed against efforts to reduce slab moisture vapor transmission.

The recommendations presented above are intended to mitigate any significant soils-related cracking of the slab-on-grade floors. More important to the performance and appearance of a Portland cement concrete slab is the quality of the concrete, the workmanship of the concrete contractor, the curing techniques utilized, and the spacing of control joints.

Floor Slab Moisture Penetration Resistance

It is likely that floor slab subgrade soils will become saturated at some time during the life of the structures, especially when the slab is constructed during the wet seasons, or when constantly wet ground or poor drainage conditions exist adjacent to the structures. For this reason, it should be assumed that the interior slab intended for moisture-sensitive floor coverings or materials, require protection against moisture or moisture vapor penetration.

Standard practice includes placing a layer of gravel/crushed rock and a vapor retarder membrane (and possibly a layer of sand/pea gravel) as discussed above. Recommendations contained in this report concerning foundation and floor slab design are presented as minimum requirements only from the geotechnical engineering standpoint.

It is emphasized that the use of gravel/crushed rock and membrane below the slab will not "moisture proof" the slab, nor will it assure that slab moisture transmission levels will be low enough to prevent damage to floor coverings or other building components. It is emphasized that we are not slab moisture proofing or moisture protection experts. The sub-slab gravel/crushed rock and vapor retarder membrane simply offers a first line of defense against soil-related moisture. If increased protection against moisture vapor penetration of the slab is desired, a concrete moisture protection specialist should be consulted. The design team should consider all available measures for slab moisture protection. It is commonly accepted that maintaining the lowest practical water-cement ratio in the slab concrete is one of the most effective ways to reduce future moisture vapor penetration of the completed slabs.

Exterior Flatwork

Areas to receive exterior concrete flatwork (i.e., sidewalks) should be moisture conditioned to at least the optimum moisture content and uniformly compacted to at least 90 percent relative compaction prior to concrete placement. Proper moisture conditioning of the subgrade soils is considered essential to the performance of exterior flatwork. Exterior flatwork should be underlain by at least four inches of aggregate base uniformly compacted to not less than 90 percent relative compaction.

Exterior flatwork concrete should be at least four inches thick and consideration should be given to thickening the outside edge of the flatwork to twice the slab thickness and reinforcing the slabs with rebar for crack control. Practices recommended by the Portland Cement Association (PCA) for proper placement and curing of concrete should be followed during exterior concrete flatwork construction.

Expansion joints should be provided to allow for minor vertical movement of the flatwork. Exterior flatwork should be constructed independent of the perimeter building foundation and isolated column foundations by the placement of a layer of felt material between the flatwork and the foundation.

Areas adjacent to new exterior flatwork should be landscaped to maintain more uniform soil moisture conditions adjacent to and under the flatwork. We recommend that final landscaping plans not allow fallow ground adjacent to exterior concrete flatwork.

Site Drainage

Final site grading should be accomplished to provide positive drainage of surface water away from structures and prevent ponding of water adjacent to foundations, slabs, or pavements. The grade adjacent to houses should be sloped away from foundations at a minimum two percent slope for a distance of at least five feet, where possible.

Roof gutter downspouts and surface drains should drain onto pavements or be connected to rigid non-perforated piping directed to an appropriate drainage point away from the buildings. Ponding of surface water should not be allowed adjacent to buildings or pavements. Landscape berms, if planned, should not be constructed in such a manner as to promote drainage toward structures.

Geotechnical Engineering Observation and Testing During Earthwork Construction

Site preparation should be accomplished in accordance with the recommendations of this report. Geotechnical testing and observation during construction is considered a continuation of our geotechnical engineering investigation. Raney Geotechnical, Inc. should be retained to provide testing and observation services during site clearing, preparation, earthwork, and foundation construction at the project to verify compliance with this geotechnical report and the project plans and specifications, and to provide consultation as required during construction. These services are beyond the scope of work authorized for this investigation; however, we would be pleased to submit a proposal to provide these services upon request.

In the event that Raney Geotechnical, Inc. is not retained to provide geotechnical engineering observation and testing services during construction, the Geotechnical Engineer retained to provide these services should indicate in writing that they agree with the recommendations of this report or prepare supplemental recommendations as necessary. A final report by the "Geotechnical Engineer" should be prepared upon completion of the project.

Additional Services

We recommend that Raney Geotechnical, Inc. be retained to review the final plans and specifications to determine if the intent of our recommendations has been implemented in those documents. We would be pleased to submit a proposal to provide these services upon request.

LIMITATIONS

Our recommendations are based upon the information provided regarding the proposed project, combined with our analysis of site conditions revealed by the field exploration and laboratory testing programs. We have used our engineering judgment based upon the information

provided and the data generated from our study. This report has been prepared in substantial compliance with generally accepted geotechnical engineering practices that exist in the area of the project at the time the report was prepared. No warranty, either express or implied, is provided.

If the proposed construction is modified or re-sited; or, if it is found during construction that subsurface conditions differ from those we encountered at the boring locations, we should be afforded the opportunity to review the new information or changed conditions to determine if our conclusions and recommendations must be modified.

We emphasize that this report is applicable only to the proposed construction and the investigated site and should not be utilized for construction on any other site.

The conclusions and recommendations of this report are considered valid for a period of three years. If design is not completed and construction has not started within three years of the date of this report, the report must be reviewed and updated as necessary.

o0o

The following Plates are attached and complete this report:

Plate 1 – Plot Plan
Plates 2 and 3 – Logs of Borings
Plate 4 – Unified Soil Classification System
Plate 5 – Atterberg's Limits Test Results
Plate 6 – Expansion Index Test Results
Plate 7 – Grain Size Distribution Test Results
Plates 8 – Corrosion Test Results

Appendix A - GEOCON Consultants, Inc. *Geologic Hazards Evaluation* Report
Appendix B - Liquefaction Analysis Results

Very truly yours,

RANEY GEOTECHNICAL, INC

Guang H. Zhu
Staff Engineer

Matthew S. Moyneur
Senior Engineer





PROJECT NUMBER: 6389-001.00P

NOTES:

1. BORING LOCATIONS SHOWN ARE APPROXIMATE.
2. PREPARED FROM A SITE PLAN BY TPH ARCHITECTS AND A 5/20/2023 GOOGLE EARTH IMAGE.

KEY:

B1 BORING LOCATION AND NUMBER

PROPOSED STRUCTURE

Von Renner Elementary - 2514

SEPTEMBER 2026

SITE PLAN

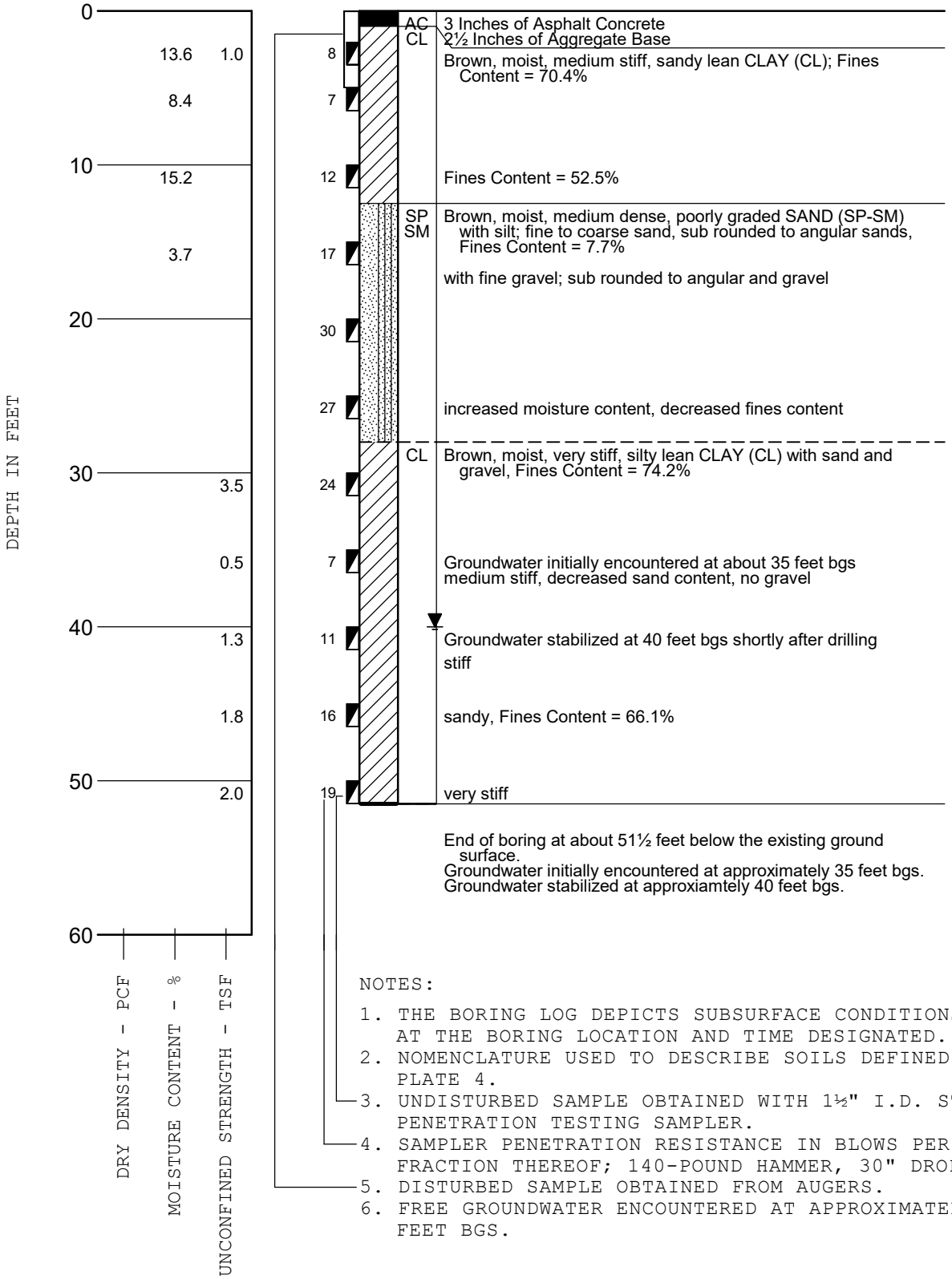
02 2600 - 21

PLATE 1

PROJECT NUMBER: 6389-001.00 PROJECT NAME: Von Renner ES Classroom Building
DRAWN BY: HZ DATE: 9/20/2025

BORING 1

DRILLED: 9/20/25



NOTES:

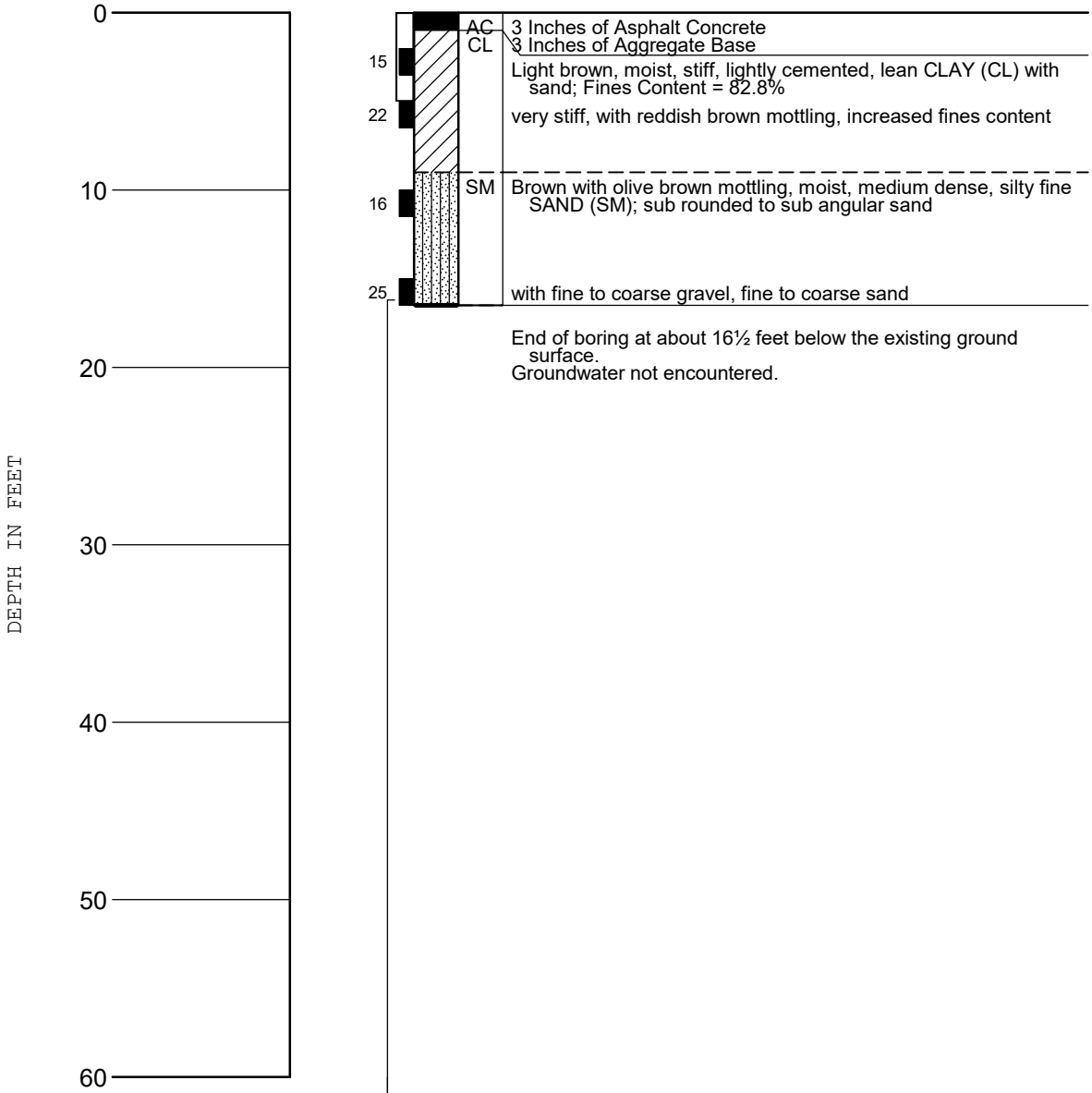
1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 4.
3. UNDISTURBED SAMPLE OBTAINED WITH 1½" I.D. STANDARD PENETRATION TESTING SAMPLER.
4. SAMPLER PENETRATION RESISTANCE IN BLOWS PER FOOT OR FRACTION THEREOF; 140-POUND HAMMER, 30" DROP.
5. DISTURBED SAMPLE OBTAINED FROM AUGERS.
6. FREE GROUNDWATER ENCOUNTERED AT APPROXIMATELY 35 FEET BGS.

LOG OF BORING

PROJECT NUMBER: 6389-001.00 PROJECT NAME: Von Renner ES Classroom Building
DRAWN BY: HZ DATE: 9/20/2025

BORING 2

DRILLED: 9/20/25



NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 4.
3. UNDISTURBED SAMPLE OBTAINED WITH 2" I.D. MOD. CALIFORNIA SAMPLER.
4. SEE ADDITIONAL NOTES ON PLATE 2.
5. FREE GROUNDWATER NOT ENCOUNTERED.

LOG OF BORING

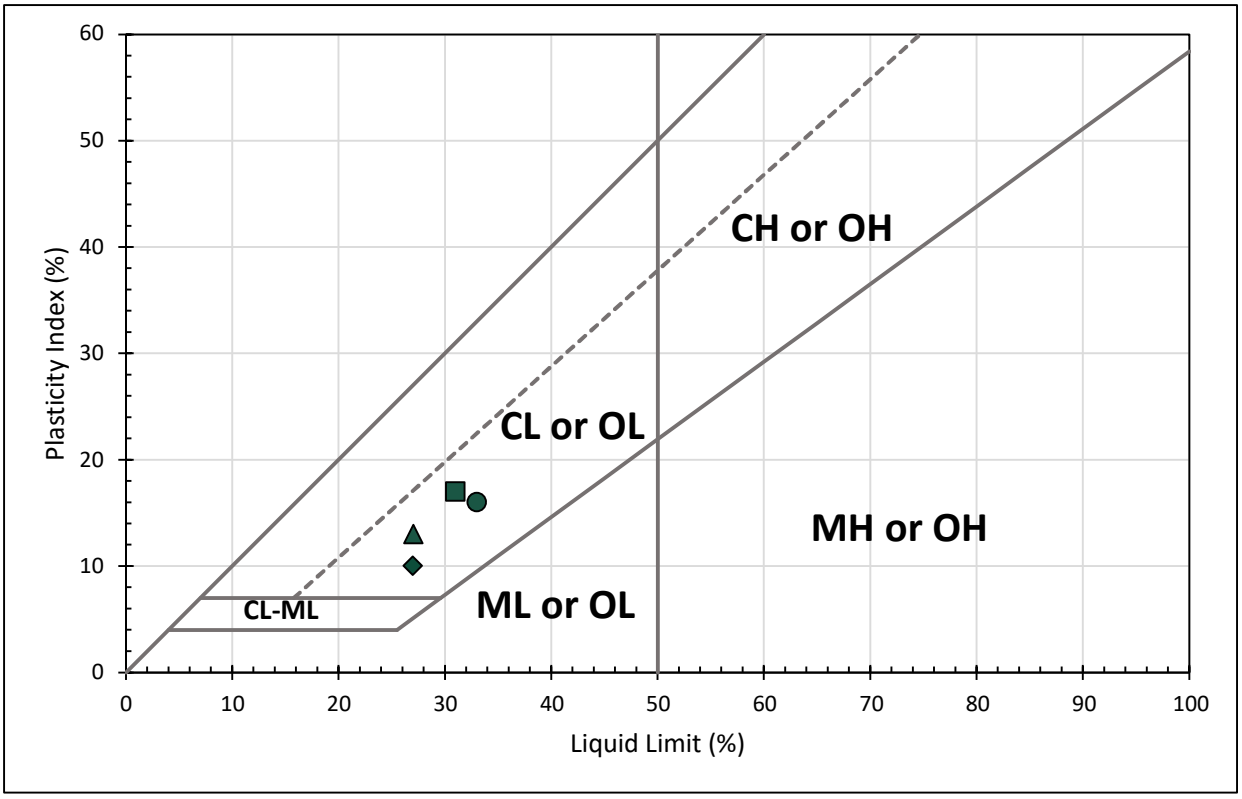
PROJECT NUMBER: 6389-001.00
PLATE NUMBER: 4

GRAPH	SYMBOL	DESCRIPTION	MAJOR DIVISIONS		
	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES	CLEAN GRAVELS WITH LESS THAN 5% FINES	GRAVEL AND GRAVELLY SOILS	COARSE GRAINED SOILS MORE THAN 50% LARGER THAN NO. 200 SIEVE
	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES			
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	GRAVELS WITH MORE THAN 12% FINES	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES			
	SW	WELL GRADED SANDS, GRAVELLY SANDS	CLEAN SANDS WITH LESS THAN 5% FINES	SANDS AND SANDY SOILS	
	SP	POORLY GRADED SANDS, GRAVELLY SANDS			
	SM	SILTY SANDS, SAND-SILT MIXTURES	SANDS WITH MORE THAN 12% FINES	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES			
	ML	INORGANIC SILTS, ROCK FLOUR, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	LIQUID LIMIT LESS THAN 50	SILTS AND CLAYS	FINE GRAINED SOILS MORE THAN 50% SMALLER THAN NO. 200 SIEVE
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS			
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY			
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTS, ELASTIC SILTS	LIQUID LIMIT GREATER THAN 50	SILTS AND CLAYS	
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS			
	OH	ORGANIC CLAYS AND ORGANIC SILTS OF MEDIUM TO HIGH PLASTICITY			
	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT	HIGHLY ORGANIC SOILS		

UNIFIED SOIL CLASSIFICATION SYSTEM

RANEY GEOTECHNICAL INC

Atterberg Limits
ASTM D4318



Symbol	Sample No.	Depth	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS
▲	B1	0-5'	27	14	13	CL
■	B1	30'	27	17	10	CL
◆	B1	45'	31	14	17	CL
●	B2	0-5'	33	17	16	CL

Project Number: 6389-001.00

Plasticity Index Data

Expansion Index Tests
ASTM D4829

Sample Location: B1
Material Description: Brown, sandy lean CLAY (CL)
Method: ASTM D4829

Depth (ft)	Initial Moisture Content (%)	Final Moisture Content (%)	Dry Density (pcf)	Expansion Index
0 – 5	9.4	18.7	109.6	19

Sample Location: B2
Material Description: Brown, lean CLAY (CL) with sand
Method: ASTM D4829

Depth (ft)	Initial Moisture Content (%)	Final Moisture Content (%)	Dry Density (pcf)	Expansion Index
0 – 5	10.1	23.0	105.3	37

Classification of Expansive Soil

Expansion Index	Expansion Potential
0-20	Very Low
21-50	Low
51-90	Moderate
91-130	High
Above 130	Very High

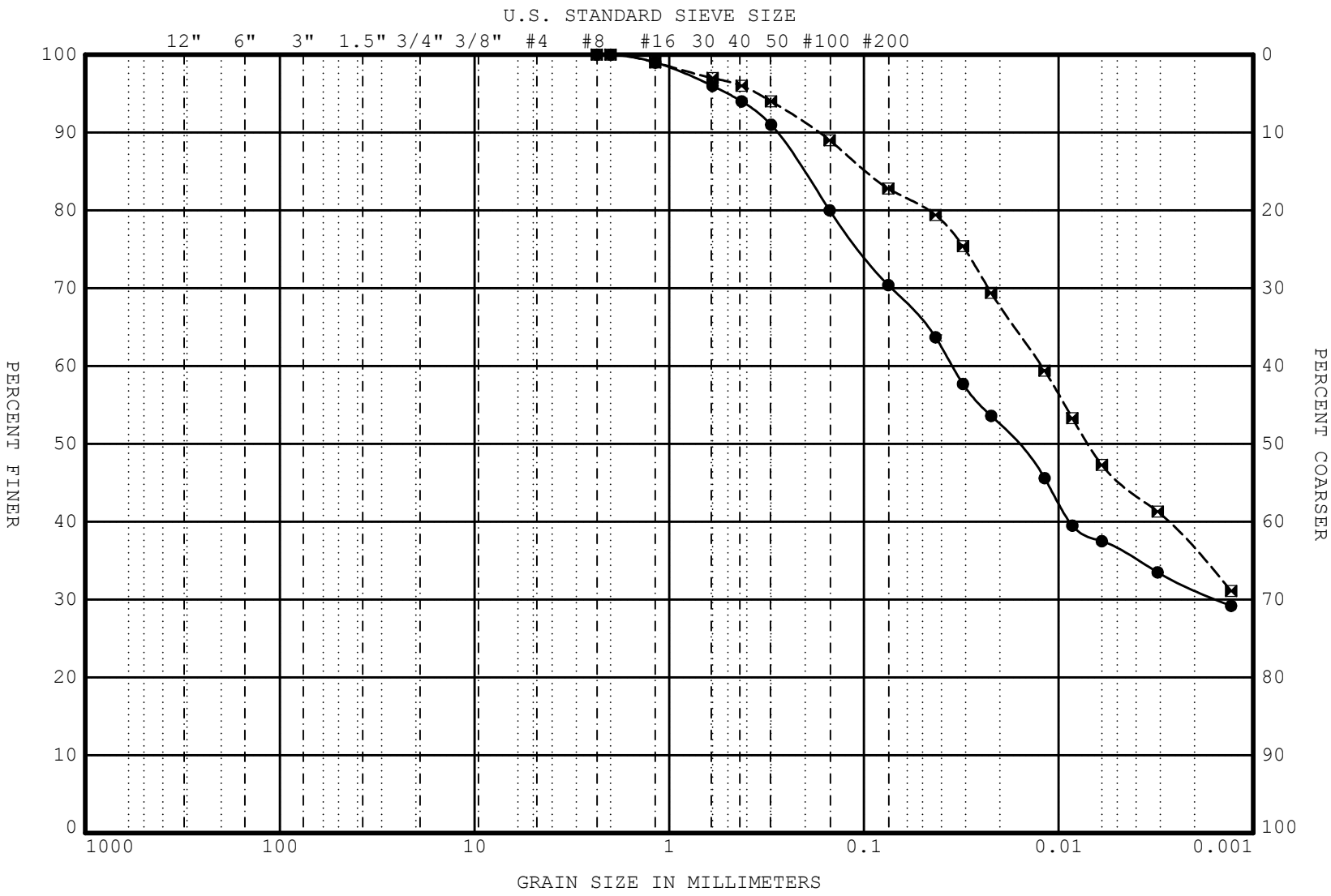
Project Number: 6389-001.00

EXPANSION INDEX DATA

PROJECT NUMBER: 6389-001.00

PROJECT NAME: Von Renner ES Classroom Building

SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	BORING 1	0-5'	CL	
⧓	BORING 2	0-5'	CL	



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

GRAIN SIZE DISTRIBUTION

PLATE 7

RANEY GEOTECHNICAL INC

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 09/26/2025
Date Submitted 09/22/2025

To: Hao Zhu
Raney Geotechnical
3140 Beacon Blvd.
West Sacramento, CA 95691

From: Gene Oliphant, Ph.D. \ Ty Bui
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 6389-001.00 Site ID : B1(0-5').
Thank you for your business.

* For future reference to this analysis please use SUN # 96607-197520.

EVALUATION FOR SOIL CORROSION

Soil pH	7.47		
Minimum Resistivity	0.96 ohm-cm (x1000)		
Chloride	20.7 ppm	00.00207	%
Sulfate	33.1 ppm	00.00331	%

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

Project Number: 6389-001.00

SOIL CORROSION POTENTIAL

APPENDIX A

GEOCON Consultants, Inc. *Geologic Hazards Evaluation* Report

Project No. S3161-05-01
October 14, 2025

VIA ELECTRONIC MAIL

Matthew Moyneur, PE, GE
Raney Geotechnical, Inc.
3140 Beacon Blvd
West Sacramento, California 95691

Subject: GEOLOGIC HAZARDS EVALUATION
VON RENNER ELEMENTARY SCHOOL CLASSROOM BUILDING
1388 PATCHETT DRIVE
NEWMAN, CALIFORNIA

Mr. Moyneur:

In accordance with our Agreement with Raney Geotechnical, Inc. (Raney) dated August 11, 2025, we performed a geologic hazards evaluation for the proposed new classroom building at the existing Von Renner Elementary School campus in Newman, California.

The purpose of our study was to evaluate the surface and subsurface conditions at the site based on subsurface information provided by Raney and prepare a *Geologic Hazards Evaluation* that meets the current California Geological Survey (CGS) review guidelines. Based on our evaluation, the primary geologic hazard that may impact the project is possible seismic-induced soil liquefaction. Further evaluation and mitigation of this geologic hazard should be addressed in the project geotechnical report.

The accompanying report presents our findings and conclusions from our study. Please contact us if you have any questions concerning the contents of this report.

Respectfully submitted,

GEOCON CONSULTANTS, INC.

Lauren A. Herbert, EIT, GIT
Senior Staff Engineer

Thomas C. DeSimone, PG, CEG
Senior Geologist



Jeremy J. Zorne, PE, GE
Senior Engineer



TABLE OF CONTENTS

GEOLOGIC HAZARDS EVALUATION PAGE

1.0 INTRODUCTION AND PURPOSE 1
1.1 Scope of Services 1
2.0 SITE AND PROJECT DESCRIPTION 2
2.1 Site Location and Description 2
2.2 Project Description 2
2.3 Current Topography 2
3.0 SOIL AND GEOLOGIC CONDITIONS 2
3.1 Site and Regional Geology 2
3.2 Older Alluvium 3
4.0 GROUNDWATER 3
5.0 SEISMICITY AND GEOLOGIC HAZARDS 4
5.1 Mapped Geologic Hazard Zones 4
5.2 Regional Active Faults / Surface Fault Rupture Hazard 4
5.3 Seismicity 5
5.4 Liquefaction and Seismic Settlement 6
5.5 Lateral Spreading 7
5.6 Unsaturated Seismic Settlement 7
5.7 Landslides and Slope Stability 7
5.8 Tsunamis and Seiches 8
5.9 Flooding and Dam Failure Inundation 8
5.10 Expansive Soil 8
5.11 Soil Corrosion Potential 8
5.12 Volcanic Activity 8
5.13 Naturally Occurring Asbestos 9
5.14 Oil Fields & Methane Zones 9
5.15 Radon 9
6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS 10
7.0 REFERENCES 11

FIGURES
Figure 1, Vicinity Map
Figure 2, Aerial Site Map
Figure 3, Proposed Development Plan
Figure 4, Topographic Map
Figure 5, Regional Geologic Map
Figure 6, Cross-Section A-A'
Figure 7, Regional Fault Map
Figure 8, Regional Seismicity Map
Figure 9, FEMA Flood Hazard Map

PHOTOGRAPHS
Photos 1 and 2

APPENDIX A
Boring Logs and excerpt from Liquefaction Analysis (Raney, 2025)

GEOLOGIC HAZARDS EVALUATION

1.0 INTRODUCTION AND PURPOSE

This report presents the results of our geologic hazards evaluation for the proposed new classroom building at the existing Von Renner Elementary School campus in Newman, California. The approximate site location is depicted on the Vicinity Map, Figure 1.

Per the Division of the State Architect (DSA) requirements (DSA IR A-4.13), a *Geologic Hazards Evaluation* subject to review by the California Geological Survey (CGS) is required for the project.

The purpose of our study was to evaluate the subsurface conditions at the site based on subsurface data and laboratory test results from Raney and perform a *Geologic Hazards Evaluation* that meets the current CGS review guidelines.

1.1 Scope of Services

To prepare this report, we performed the following scope of services:

- Reviewed geologic maps, aerial photographs and other literature pertaining to the site to aid in evaluating geologic hazards present at or near the site.
- Performed a site reconnaissance in conjunction with Raney's field investigation to review project limits and site geological conditions.
- Analyzed the boring logs and other relevant data provided by Raney and prepared this report to summarize our findings, conclusions, and recommendations with respect to the geologic hazards associated with this project.

A Vicinity Map is presented as Figure 1 and an Aerial Site Plan is presented as Figure 2. Approximate locations of the proposed new building and exploratory borings performed by Raney are shown on the Proposed Development Plan, Figure 3. A Topographic Map is presented as Figure 4 and a Geologic Map is presented as Figure 5. A Geologic Cross Section, based on the results of Raney's field investigation and published geologic mapping, is presented as Figures 6. A Regional Fault Map is presented as Figure 7 and a Regional Seismicity Map is presented as Figure 8. Lastly, a FEMA Flood Hazard Map is presented as Figure 9. Boring logs and an excerpt from the liquefaction hazard analysis prepared by Raney are presented in Appendix A.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Location and Description

The existing Von Renner Elementary School campus consists of Stanislaus County Assessor Parcel Number 026-015-018, totaling approximately 10.4 acres, located at 1388 Patchett Drive in Newman, California. Site coordinates are 37.308628 degrees north and 121.027096 degrees west. The site is bounded on each side by residential subdivisions, set apart by Patchett Drive to the north, and by Sandy Creek Drive and Walnut Creek Drive to the south. The current site configuration is shown on the Site Plan, Figure 2. At the time of our field reconnaissance, the site was developed with modular and permanent classroom buildings, asphalt-paved hardcourts, mature trees and landscaping, and perimeter fencing. Current site conditions are shown in Photos 1 and 2.

2.2 Project Description

Based on the site plan prepared by TPH Architects, dated July 25, 2025, we understand that the project consists of constructing a new 9,700 square foot classroom building to replace the existing modular buildings within the western portion of the campus. We understand that the classroom building will be constructed at-grade, with no retaining walls or below-ground basements planned at this time. We anticipate the project will also include the construction of other ancillary facilities, improvements, and underground utility infrastructure. Approximate locations and configuration of proposed site improvements are shown on the Proposed Development Plan, Figure 3.

2.3 Current Topography

The United States Geological Survey (USGS) topographic map of the Newman Quadrangle (USGS, 2018) depicts the topography of the site and vicinity as generally flat with an elevation of approximately 90 feet above mean sea level (MSL), relative to the North American Vertical Datum of 1988 (NAVD88). A portion of the USGS Topographic Map showing the site location is presented as Figure 4.

3.0 SOIL AND GEOLOGIC CONDITIONS

We identified soil and geologic conditions by reviewing referenced geologic literature (Section 7.0), reviewing subsurface information provided by Raney, and performing a geologic reconnaissance of the site and immediate surrounding area.

3.1 Site and Regional Geology

The site is located within the southern portion of the Great Valley Geomorphic Province of California, more commonly referred to as the San Joaquin Valley. The San Joaquin Valley is a broad depression

bounded by the Sierra Nevada mountain range to the east, the Coast Ranges to the west, and the Sacramento - San Joaquin delta to the north. The valley has been filled with a thick sequence of sediments derived from weathering of the adjacent mountain ranges resulting in a stratigraphic section of Cretaceous, Tertiary, and Quaternary deposits.

Based on the *Geologic Map of the Orestimba Peak and Newman Quadrangles*, compiled by Dibblee, T.W., 2007, the site is located on the west side of the San Joaquin Valley and is underlain by Quaternary Alluvium (map symbol Qa), which is described as alluvium consisting of gravel, sand, and clay within valley areas formed by rivers and streams emanating from the Coast Ranges to the west.

Subsurface conditions encountered during Raney's field investigation at the site are generally consistent with the mapped geology of the area. A portion of the geologic map covering the site vicinity is presented as Figure 5, Regional Geologic Map. A generalized Geologic Cross-Section of the site is presented as Figure 6.

3.2 Quaternary Alluvium

In each boring performed by Raney on September 20, 2025, alluvium was encountered to the maximum depth explored of approximately 51½ feet. The alluvium generally consisted of interbedded layers of medium stiff to very stiff sandy lean clay (CL), loose to medium dense silty sand (SM) and sand with silt (SP-SM).

Soil conditions described in the previous paragraphs are generalized. The exploratory boring logs by Raney are presented in Appendix A.

4.0 GROUNDWATER

Raney encountered groundwater in Boring B1 performed on September 20, 2025 at a depth of approximately 40 feet.

We reviewed available depth-to-groundwater data on the California Department of Water Resources (DWR) Sustainable Groundwater Management Act (SGMA) Data Viewer (https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels). The SGMA Data Viewer website indicates that depth to groundwater at and near the site ranges from approximately 40 to 50 feet (Spring 2025). This is consistent with our experience in the area as well as the findings of Raney's subsurface explorations. Further review of data from a well located approximately one mile east of the site indicates groundwater elevation ranged between approximate elevations of 73 feet and 80 feet from

1982 through 2008, corresponding of depths of 11 feet to 18 feet bgs at the site. Based on the available data, for the purposes of this report the historic high depth to groundwater is approximately 11 feet.

It should be noted that fluctuations in the level of groundwater may occur due to variations in precipitation, temperature, and other factors. Depth to groundwater can also vary significantly due to localized pumping, irrigation practices, and seasonal fluctuations. Therefore, it is possible that groundwater may be higher or lower than the levels observed during the investigation and/or reported herein.

5.0 SEISMICITY AND GEOLOGIC HAZARDS

5.1 Mapped Geologic Hazard Zones

According to our review of the CGS Information Warehouse website, (https://maps.conservation.ca.gov/cgs/informationwarehouse/regulatorymaps/) as well as other published literature, the site is not located within a mapped geologic hazard zone associated with seismic hazards, landslides, liquefaction, tsunami/seiche, or surface fault rupture.

5.2 Regional Active Faults / Surface Fault Rupture Hazard

The numerous faults in California include Holocene-active, pre-Holocene (Quaternary), and inactive faults (pre-Quaternary). The criteria for these major groups were developed by the California Geological Survey (CGS, formerly known as the California Division of Mines and Geology) for the Alquist-Priolo Earthquake Fault Zone Program (CGS, 2018). By definition, a Holocene-active fault is one that has had surface displacement within Holocene time (about the last 11,700 years). A pre-Holocene fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive.

The site is not within a state-designated Alquist-Priolo Earthquake Fault Zone for surface fault rupture hazards (CGS, 2025). No Holocene-active or pre-Holocene faults with the potential for surface fault rupture are known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low.

According to the Fault Activity Map of California by the California Geological Survey (CGS, https://maps.conservation.ca.gov/cgs/fam/), the closest fault with historic displacement is the Calaveras Fault which ruptured in 1979 about 35 miles southwest of the site. According to the United

States Geological Survey's 2008 National Seismic Hazard Map (USGS, https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/), the closest mapped Holocene-active fault is the Ortigalita Fault of the Ortigalita Fault System, located approximately 13.5 miles southwest of the site. The closest mapped pre-Holocene (Late Quaternary) fault, and also the closest fault of any age to the site is the San Joaquin Fault, located approximately 2.1 miles west-southwest of the site. We have prepared Table 1 using the USGS National Seismic Hazard Maps website. Table 1 lists faults and fault systems within 50 miles of the site that are considered capable of producing earthquakes with a moment magnitude (MW) of 6.5 or greater. Additional faults within the vicinity of the site are shown in the Regional Fault Map, Figure 7.

TABLE 1
FAULT SYSTEMS WITHIN 50 MILES OF THE SITE

Fault Name	Approximate Distance	Maximum Earthquake Magnitude (Mw)
	Miles	
Great Valley 8	3.6	6.8
Great Valley 7	12.5	6.9
Ortigalita	13.5	7.1
Great Valley 9	14.3	6.8
Greenville Connected	31.2	7.0
Calaveras; CN+CC+CS	32.0	7.0
Quien Sabe	32.3	6.6
Great Valley 10	38.1	6.5
N. San Andreas; SAO+SAN+SAP+SAS	42.4	8.1
Zayante-Vergeles	43.0	7.0
Monte Vista-Shannon	45.2	6.5
Hayward-Rodgers Creek; RC+HN+HS	46.4	7.3

5.3 Seismicity

As with all of California, the site has experienced historic earthquakes from various regional faults, although the local site region has a history of relatively low seismicity in comparison with more active seismic regions such as the San Francisco Bay Area or southern California.

An examination of available historic data from the California Geological Survey's Historical Earthquake Online Database (CGS, https://maps.conservation.ca.gov/cgs/historicearthquakes/) suggests that the site may have experienced ground shaking equivalent to Modified Mercalli Intensity (MMI) of VI. The most intense earthquake ground shaking likely resulted from an earthquake in Mariposa County on April 10, 1881, with an epicenter located approximately 21 miles northwest of the site. The earthquake had approximate Richter Scale Magnitudes of 6.3 and was felt as far away

as Yuba City to the north and Fresno to the south. Additionally, an earthquake occurred on June 11, 1903, with an epicenter about 43 miles west-southwest of the site. The earthquake had an approximate Richter Scale Magnitude of 6.1 and resulted in ground shaking in the site vicinity equivalent to a Modified Mercalli Intensity (MMI) of V. Additional earthquakes in the vicinity of the site are shown in the Regional Seismicity Map, Figure 8.

We used the USGS Unified Hazard Tool (USGS, 2023) to determine the deaggregated seismic source parameters including controlling magnitude and fault distance. The USGS estimated modal magnitude is 6.3 and the estimated Peak Ground Acceleration (PGA) for the Maximum Considered Earthquake (MCE) with a 2,475-year return period is 0.58g.

While listing PGA is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the site. The site could be subjected to ground shaking in the event of an earthquake along the faults mentioned above or other area faults.

5.4 Liquefaction and Seismic Settlement

Liquefaction is a phenomenon in which loose, saturated, cohesionless soil deposits located beneath the groundwater table lose strength when subjected to intense and prolonged ground shaking. The seismic excitation increases pore water pressure creating a buoyant effect of the loose soil. When liquefaction occurs, building foundations may sink or tilt and differential ground settlement may occur. Other effects may include sand boils (ground loss) and lateral spreading if the liquefiable soil is located adjacent to a steep free face. The areas that have the greatest potential for liquefaction are those in which the water table is less than 50 feet below ground surface and the soils are predominately clean, poorly graded sand deposits of loose to medium-dense relative density.

The site is not located in a currently established State of California Seismic Hazard Zone for liquefaction.

However, based on the presence of cohesionless sand beneath the site, the site may be susceptible to seismic-induced liquefaction. The liquefaction analysis performed by Raney (2025) utilized a conservatively high groundwater depth of 11 feet below ground surface based on historic well data in the vicinity of the site. The results of the analysis indicate that lenses of sandy soil at depths of approximately 12 to 28 feet in the B1 location have low potential for liquefaction (see Appendix A). Raney estimates total liquefaction settlement of approximately 1¼ inches, and differential settlement is anticipated to be approximately ½-inch over a distance of 50 feet.

Consequences (secondary effects) of liquefaction may include loss of soil bearing capacity for shallow foundations, ground loss (sand boils), lateral slope displacements (lateral spreading) and ground surface settlement. For loss of bearing capacity, the liquefiable layer must be close to the ground surface and within the zone of influence of the foundation. The shallowest potentially liquefiable layer is approximately 11 feet deep, which is below the primary zone of influence of the proposed shallow foundations.

The Liquefaction Potential Index (LPI) is an index used to assess liquefaction hazard of surficial geologic units. LPI was originally developed in Japan to estimate the potential of liquefaction to cause foundation damage at a site (Iwasaki 1978). The index assumes that the severity of liquefaction is proportional to the:

1. thickness of the liquefied layer;
2. proximity of the liquefied layer to the surface; and
3. amount by which the factor safety (FS) is less than 1.0, where FS is the ratio of the liquefaction resistance to the load imposed by the earthquake.

Researchers (Toprak and Holzer) correlated surface manifestations of liquefaction with LPI for the 1989 Loma Prieta, California, earthquake and concluded that sand boils occur primarily where LPI is greater than 5. The estimated LPI at this site is approximately 1.3 in Boring B1. Based on these criteria, there is a low potential for sand boils (ground loss) due to a liquefaction event.

5.5 Lateral Spreading

Because the site topography is generally flat and level and there is no adjacent free-face or sloping geometry, lateral spreading resulting from liquefaction is not anticipated and is not considered to be a hazard for the site.

5.6 Unsaturated Seismic Settlement

Strong seismic shaking can induce settlement of unsaturated, loose sandy soil. Based on the results of Raney's subsurface investigation, the upper 50 feet of soil primarily consists of medium stiff to very stiff clayey soil interbedded with medium dense sandy soils with gravel. Because of this, unsaturated seismic settlement due to seismic shaking is not anticipated and is not considered to be a hazard for the site.

5.7 Landslides and Slope Stability

The site has not been evaluated with respect to seismic landslide hazard by CGS, and no landslide data are available on the California Department of Conservation interactive Landslide Inventory map (https://maps.conservation.ca.gov/cgs/lsi/). The site is relatively flat and level and there are no significant slopes on or adjacent to the site. Therefore, landslides and slope instability are not hazards for the site.

5.8 Tsunamis and Seiches

The site is located approximately 55 miles from the Pacific Ocean and is not located near any large body of water. Therefore, tsunamis (seismic sea waves) or seiches (wave oscillations in an enclosed or semi-enclosed body of water) are not hazards for the site at this time.

5.9 Flooding and Dam Failure Inundation

Based on the Flood Hazard Zone Layer from the National Flood Hazard Database prepared by the Federal Emergency Management Agency (FEMA) (https://hazards-fema.maps.arcgis.com/home/index.html), the northern portion of the campus is located within an area of "0.2 percent annual chance of flood hazard". However, the southern portion of the campus, including the proposed classroom building area is located in an "area of minimal flood hazard" (FEMA, 2025). A presentation of the FEMA flood map surrounding the site is shown in the FEMA Flood Hazard Map, Figure 9.

Based on the California Division of Safety of Dams (DSOD) *California Dam Breach Inundation Map Web Publisher* (DWR, https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2, accessed October 2025), the site does not appear to be located within the inundation zone any reservoirs. Therefore, dam failure inundation is not considered to be a hazard for the site.

5.10 Expansive Soil

Laboratory testing performed by Raney indicates very low to low expansion potential in the near-surface clay soils at the site. Therefore, expansive soil is not considered to be a hazard for the site.

5.11 Soil Corrosion Potential

Soil corrosion potential testing is being performed by Raney. Refer to Raney's report for test results and related discussion.

5.12 Volcanic Activity

The nearest active volcanic area to the site is the Long Valley Caldera, located approximately 125 miles east of the site (USGS, 2025). According to the *California Volcano Locations, Threat Rank and Hazard Zones* map (Peters et al., 2019), the nearest risk to the site is 60 miles east of the site and mapped as two inches or greater of ash accumulation in the event of eruption from the Long Valley Caldera.

Due to the distance between the site and the nearest volcanic field and its mapped hazard zone, the potential for direct impacts to the site due to regional volcanic activity is low.

5.13 Naturally Occurring Asbestos

The site is not located within an area mapped as an ultramafic rock unit, former asbestos mine, historic asbestos prospect, or other reported occurrence of asbestos in California. Naturally occurring asbestos (NOA) minerals (chrysotile, tremolite, actinolite, crocidolite, anthophyllite, and amosite) are more likely to be encountered in areas with ultramafic rocks or sheared metavolcanic rocks due to metamorphic processes. The site is not within an area of known mapped NOA occurrence (Van Gosen and Clinkenbeard, 2011). Based on the site geology, which consists of alluvial deposits, the likelihood of NOA being present at the site is considered to be low.

5.14 Oil Fields & Methane Zones

Based on a review of the California Geologic Energy Management Division (CalGEM) online mapping system, the site is not located within 10 miles of any mapped gas fields. Additionally, no oil or gas wells are mapped in the immediate vicinity of the site (CalGEM, 2025), the closest being a plugged dry gas well located approximately 2.5 miles northwest of the site. Due to the voluntary nature of record reporting by the oil and gas well drilling companies, wells may be improperly located or not shown on the location map. Other wells could be encountered during construction. Any wells encountered would need to be properly abandoned in accordance with the current requirements of CalGEM.

5.15 Radon

The United States Environmental Protection Agency's (USEPA) Map of Radon Zones (USEPA, 2021) depicts the radon potential in each U.S. County. Areas in Zone 1 have the highest radon potential, and those in Zone 3 have the lowest. Stanislaus County is depicted on the map in Zone 3 (i.e., low potential). CGS' Special Report 247 *California Indoor Radon Potential* (CGS, 2022) similarly indicates low radon potential for the site vicinity. The CGS report utilizes data obtained from 2006 to 2018, including 39 measurements taken in Stanislaus County. Measurements in nearby Patterson and Turlock ranged from 1.6 to 3.4 pCi/L. The project site is not within a California Department of Conservation study area for indoor radon potential (2025). Therefore, there is a low potential for radon at the site.

6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, the geologic consultant should be notified so that supplemental findings can be given. The evaluation or identification of the potential presence of hazardous materials or environmental contamination was not part of our scope of services.

This report is issued with the understanding that it is the responsibility of the owner or their representative to ensure that the information contained herein are brought to the attention of the design team for the project and incorporated into the plans and specifications.

Changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. Additionally, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated partially or wholly by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geologic principles and practices used in the site area at this time. No warranty is provided, express or implied.

7.0 REFERENCES

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16. Federal Emergency Management Agency (FEMA), *National Flood Insurance Program, Flood Insurance Rate Map No. 06099C0945E*, map effective date September 26, 2008.

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VICINITY MAP

S3161-05-01	October 2025	Figure 1



Legend

B2 — Approximate Boring Location (Raney)

A A' — Approximate Cross-Section Location (See Figure 5)

Approximate Site Boundary

N

0 30

Scale in Feet

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SITE PLAN

S3161-05-01	October 2025	Figure 2

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Legend

B2 ⊗ Approximate Boring Location (Raney)

A A' Approximate Cross-Section Location (See Figure 5)

Approximate Site Boundary

Proposed Development Plan by TPH Architects (7/25/2025)

N

0 30

Scale in Feet

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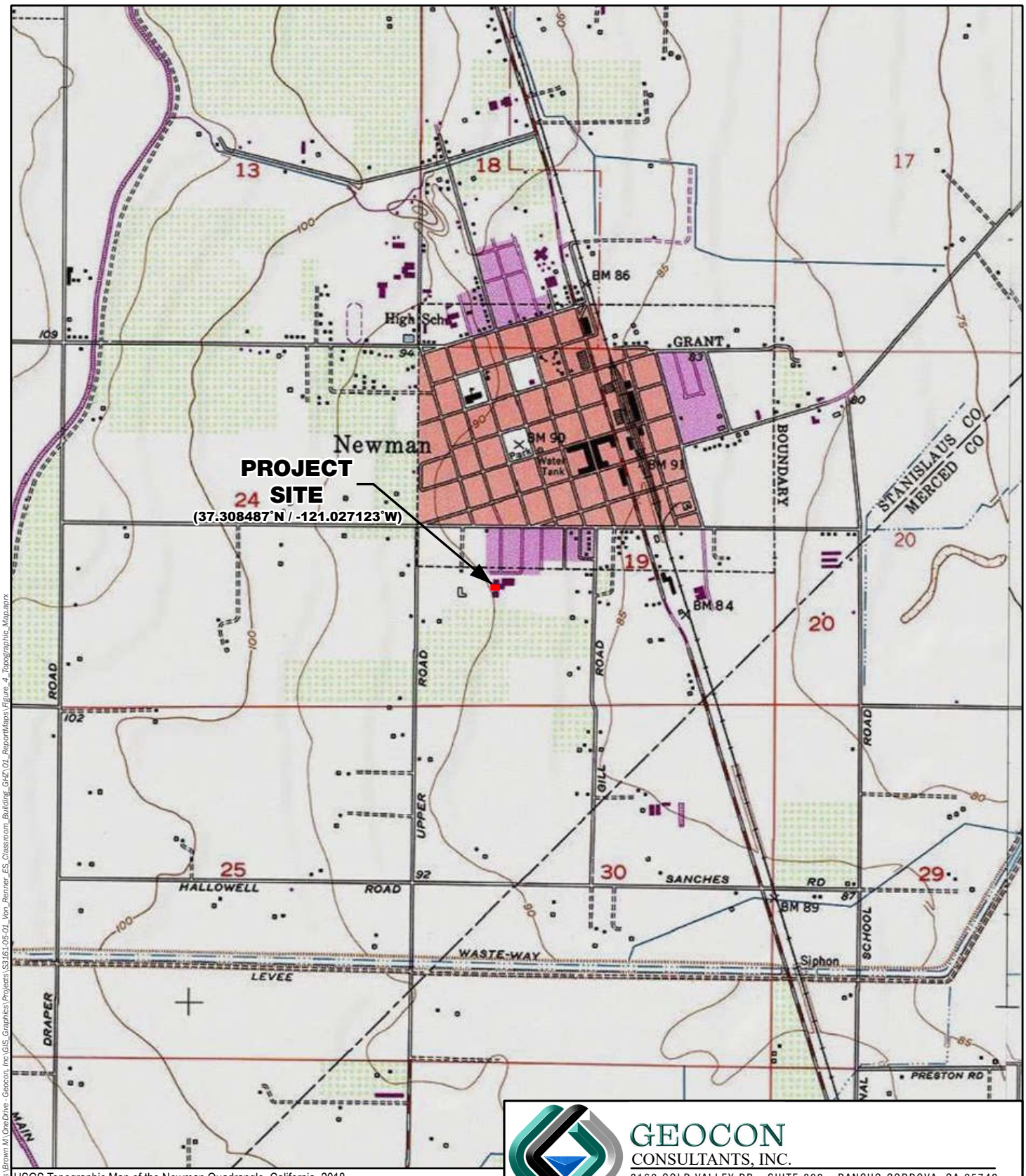
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PROPOSED DEVELOPMENT PLAN

S3161-05-01	October 2025	Figure 3

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USGS Topographic Map of the Newman Quadrangle, California, 2018

N

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Scale in Feet

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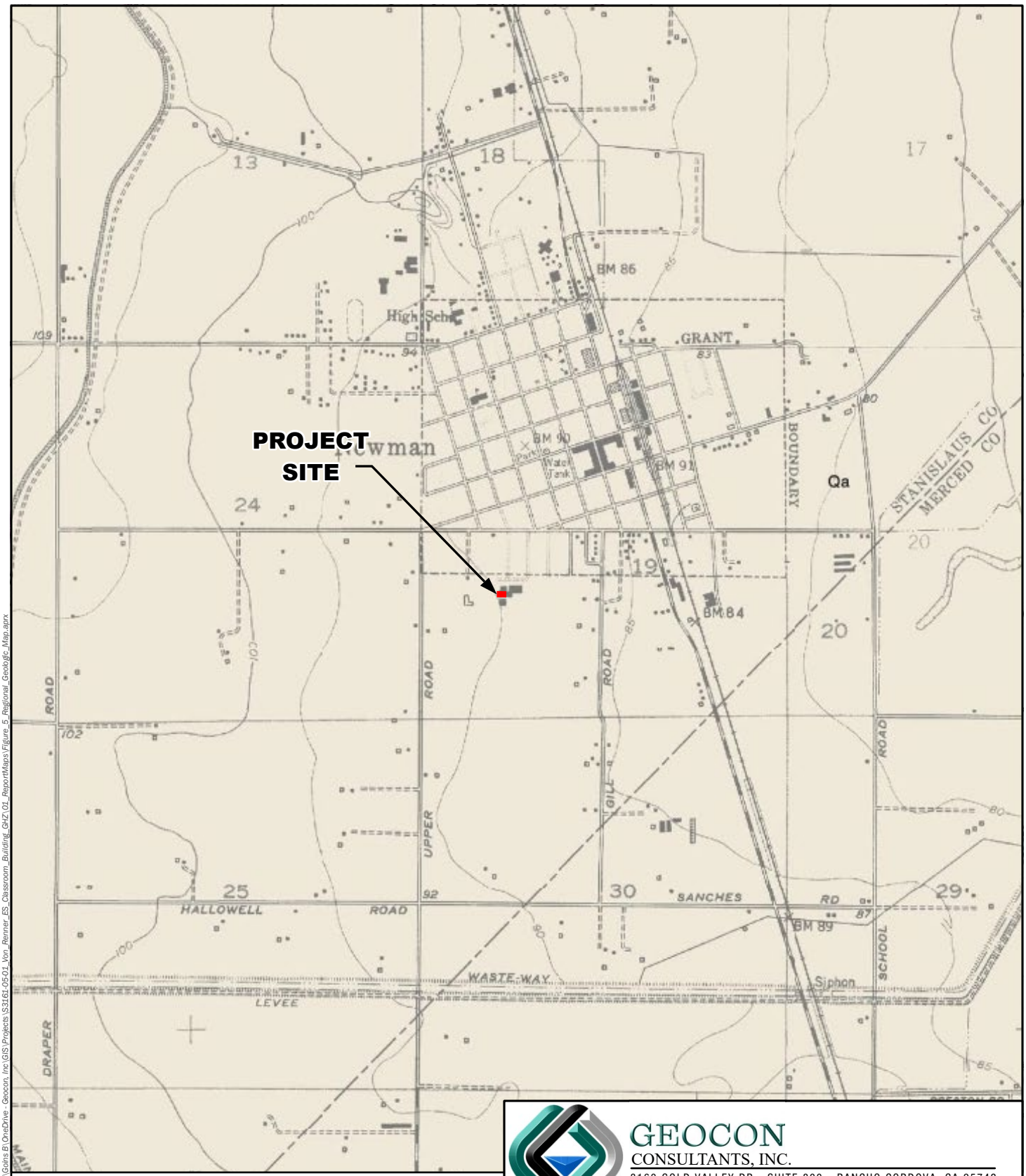
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TOPOGRAPHIC MAP

S3161-05-01	October 2025	Figure 4

GEOCON 9/24/2025 USER Brown M PATH C:\Users\Brown M\OneDrive - Geocon, Inc\GIS_Graphics\Projects\S3161-05-01_Von_Renner_ES_Classroom_Building_GHZ\01_ReportMaps\Figure_4_Topographic_Map.aprx



Geologic Map of the Orestimba Peak and Newman Quadrangles, Merced and Stanislaus Counties, California; T.W. Dibblee and J.A. Minch, 2007

Unit Explanation

Surficial Sediments

Qa	Alluvial gravel, sand, and clay of valley areas

N

0 2,000

Scale in Feet

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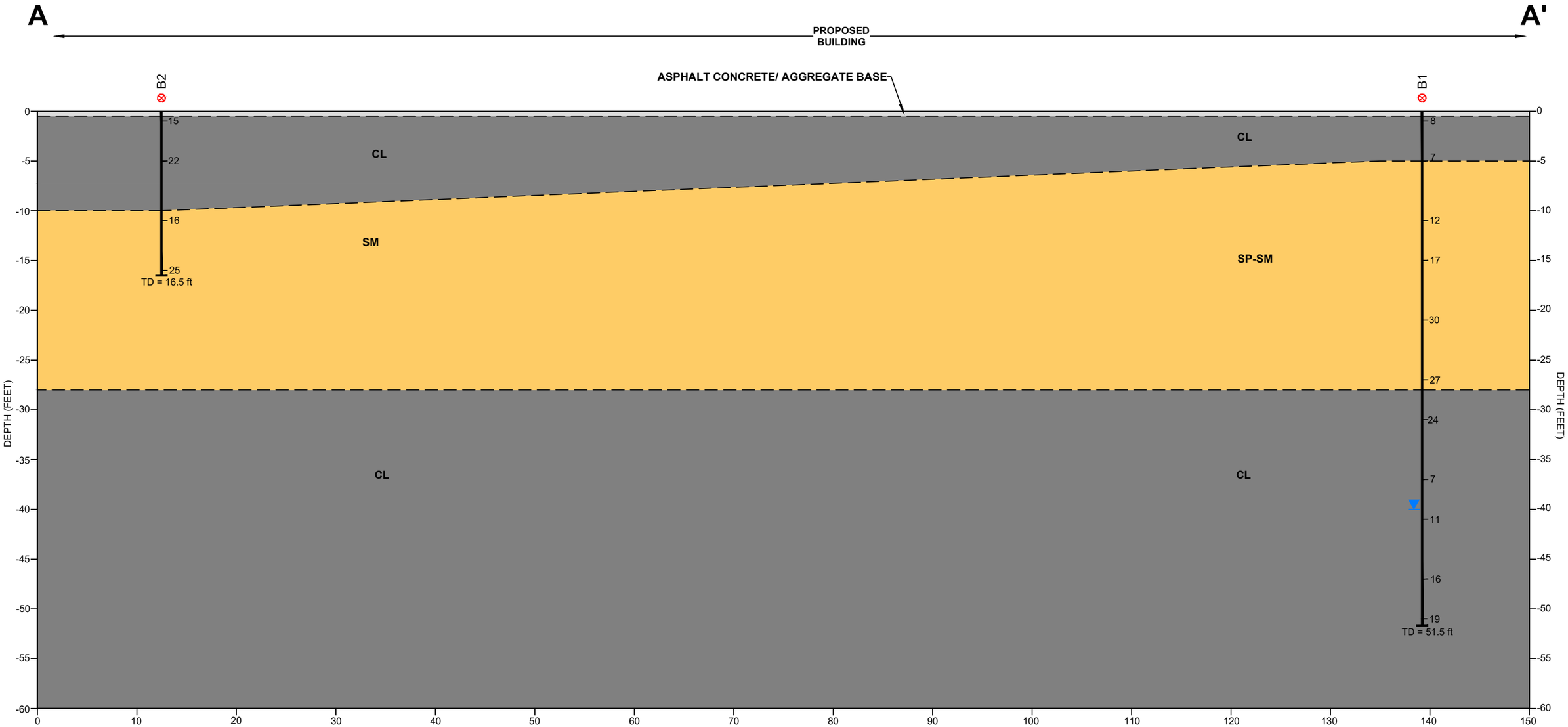
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REGIONAL GEOLOGIC MAP

S3161-05-01	October 2025	Figure 5

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Legend

B2 Exploration Location

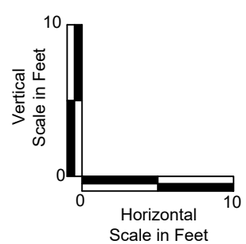
22 Blow Count (California Modified Sampler)

Water Level

Soil Contacts

Soil Classifications:
SP = Poorly graded sands, gravelly sands, little or no fines
SM = Silty sands, sand-silt mixtures
CL = Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

Abbreviations:
ft = Feet



Note:
1. This figure depicts generalized subsurface conditions inferred from subsurface explorations and is intended for use as general geologic characterization and an aid for design. Actual subsurface conditions, including groundwater depths/elevations, may vary. Please refer to the RGI boring logs for detailed subsurface conditions encountered at each boring location.

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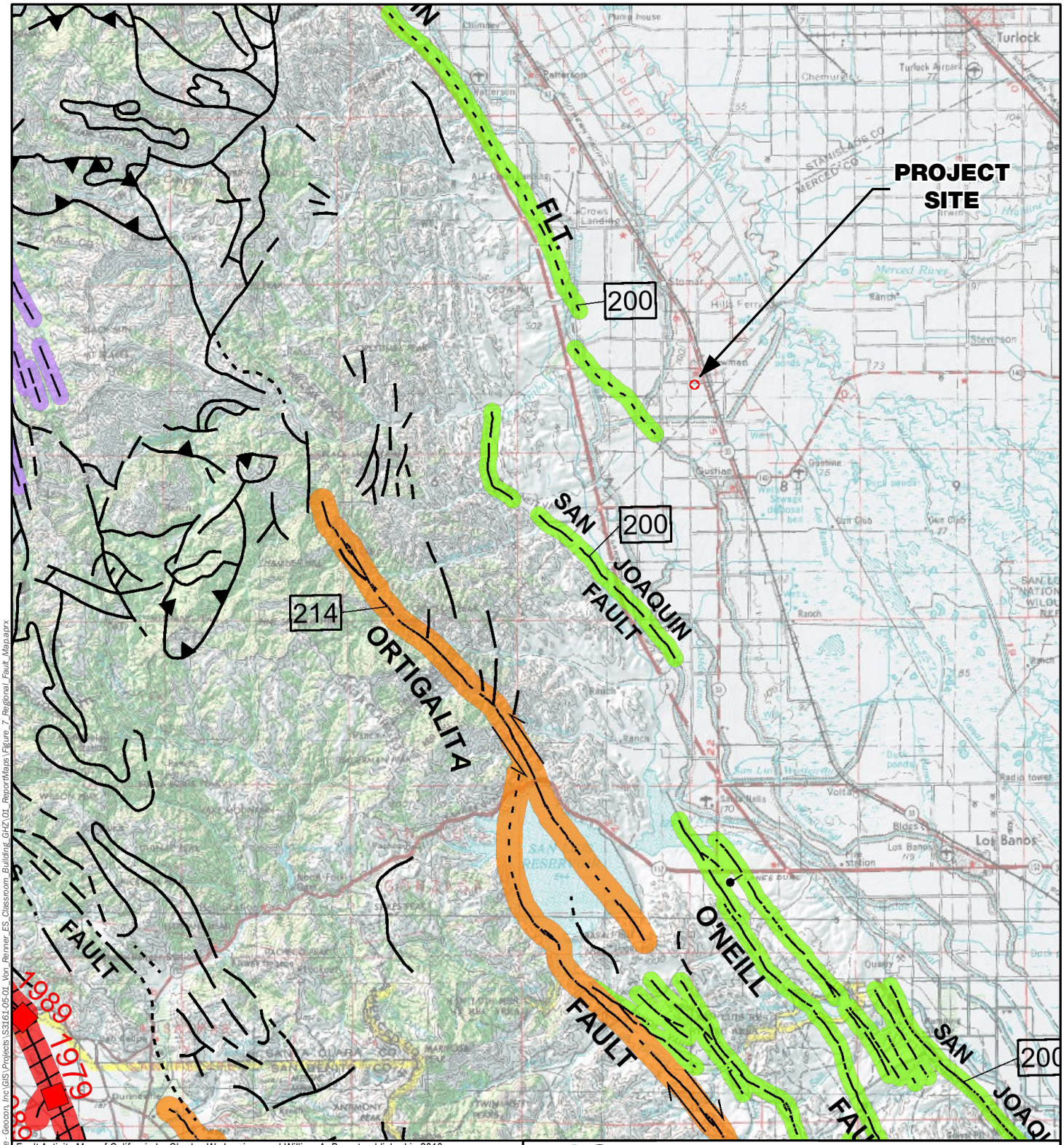
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CROSS SECTION A-A'

S3161-05-01	October 2025	Figure 6

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Fault Activity Map of California by Charles W. Jennings and William A. Bryant published in 2010. (California Department of Conservation, GIS)

Legend

- Structural discontinuity
- Fault, Certain
- Fault, Approximate
- Fault, Concealed
- Thrust Fault, Certain
- Thrust Fault, Approximate
- Fault with Late Quaternary Activity (within past 700,000 years)
- Quaternary Fault (activity with in past 1.6 million years)
- Historic Fault (within past 200 years)
- Holocene Fault (activity with in past 11,700 years)

N

0 5

Scale in Miles

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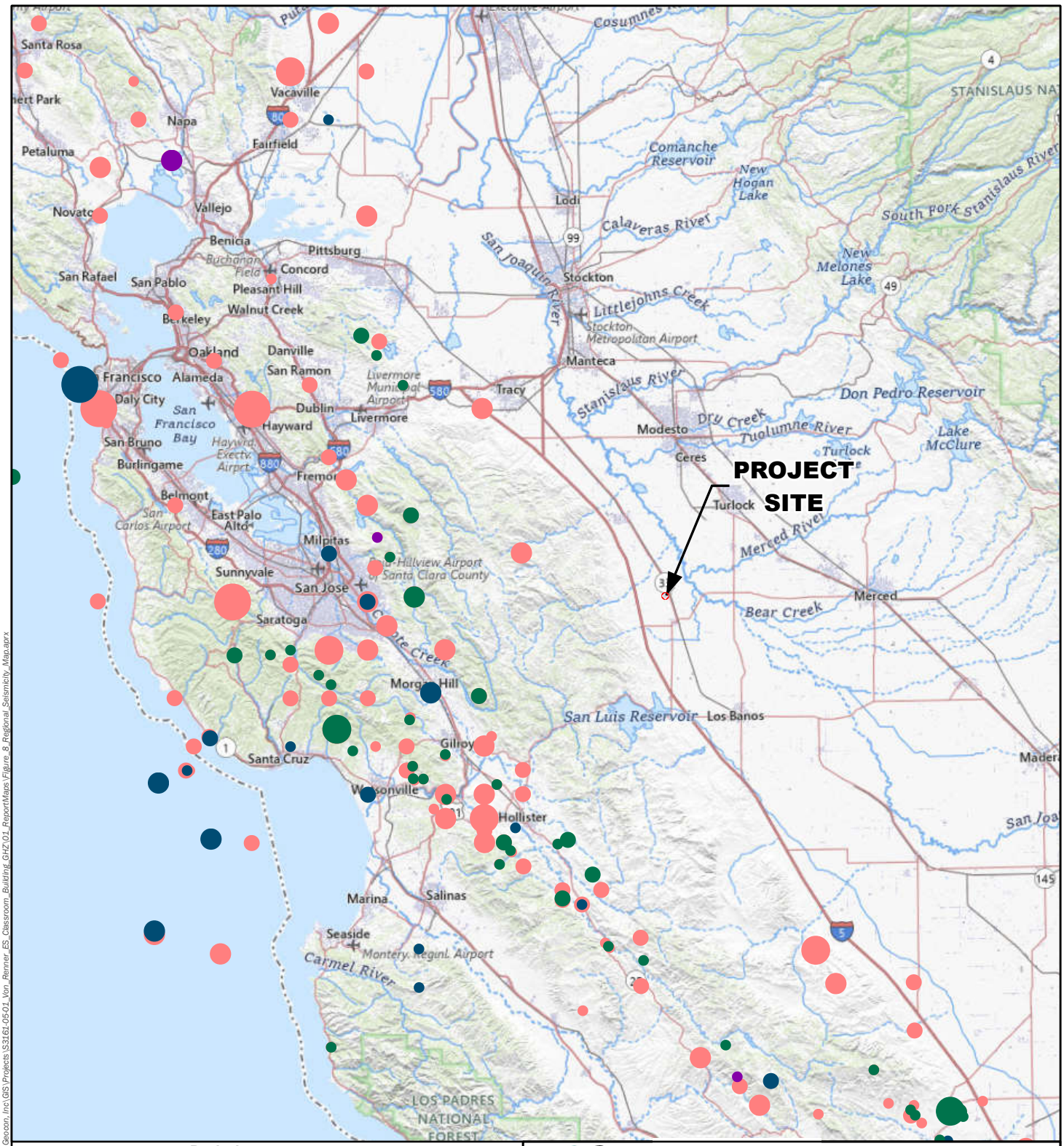
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REGIONAL FAULT MAP

S3161-05-01	October 2025	Figure 7

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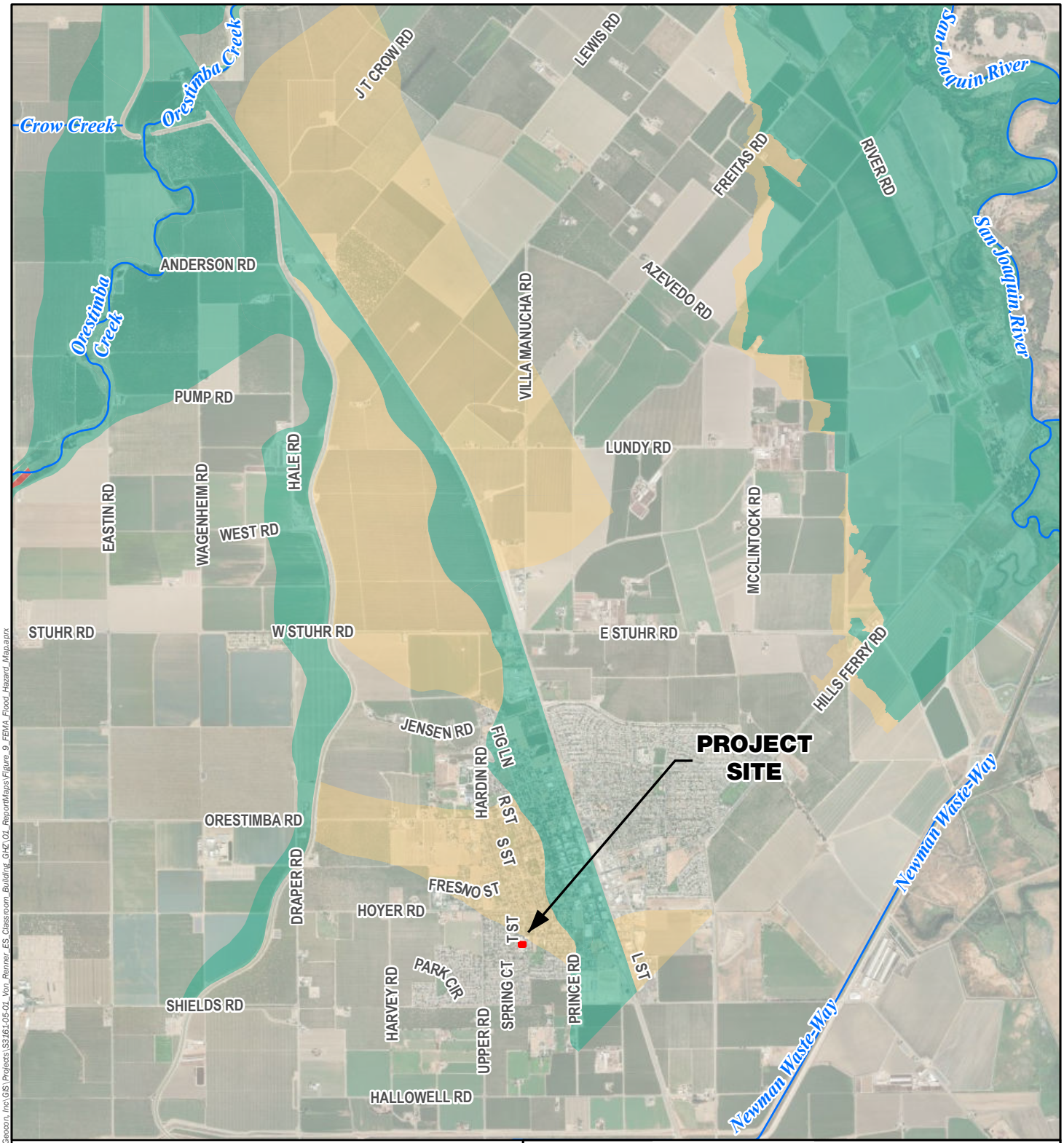
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REGIONAL SEISMICITY MAP

S3161-05-01	October 2025	Figure 8

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Legend

- Rivers, Steams, Creeks
- FEMA Flood Hazard Zone
- Regulatory Floodway
- Special Flood Hazard Area
- 0.2% Annual Chance Flood Hazard

N

0 4,000

Scale in Feet

Flood Hazard Zone layer from FEMA National Flood Hazard Database; https://hazards-fema.maps.arcgis.com/ 5/2/2025

GEOCON 9/24/2025 USER Goins B PATH C:\Users\Goins B\OneDrive - Geocon, Inc\GIS Projects\S3161-05-01_Von_Renner_ES_Classroom_Building_GHZ\01_ReportMaps\Figure_9_FEMA_Flood_Hazard_Map.aprx

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Von Renner Elementary School Classroom Building

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FEMA FLOOD HAZARD MAP

S3161-05-01	October 2025	Figure 9



Photo No. 1 - Current site conditions in the existing and proposed classroom building area, facing east.



Photo No. 2 – Current site conditions at existing school courtyard, facing northeast.

PHOTOS NO. 1 & 2

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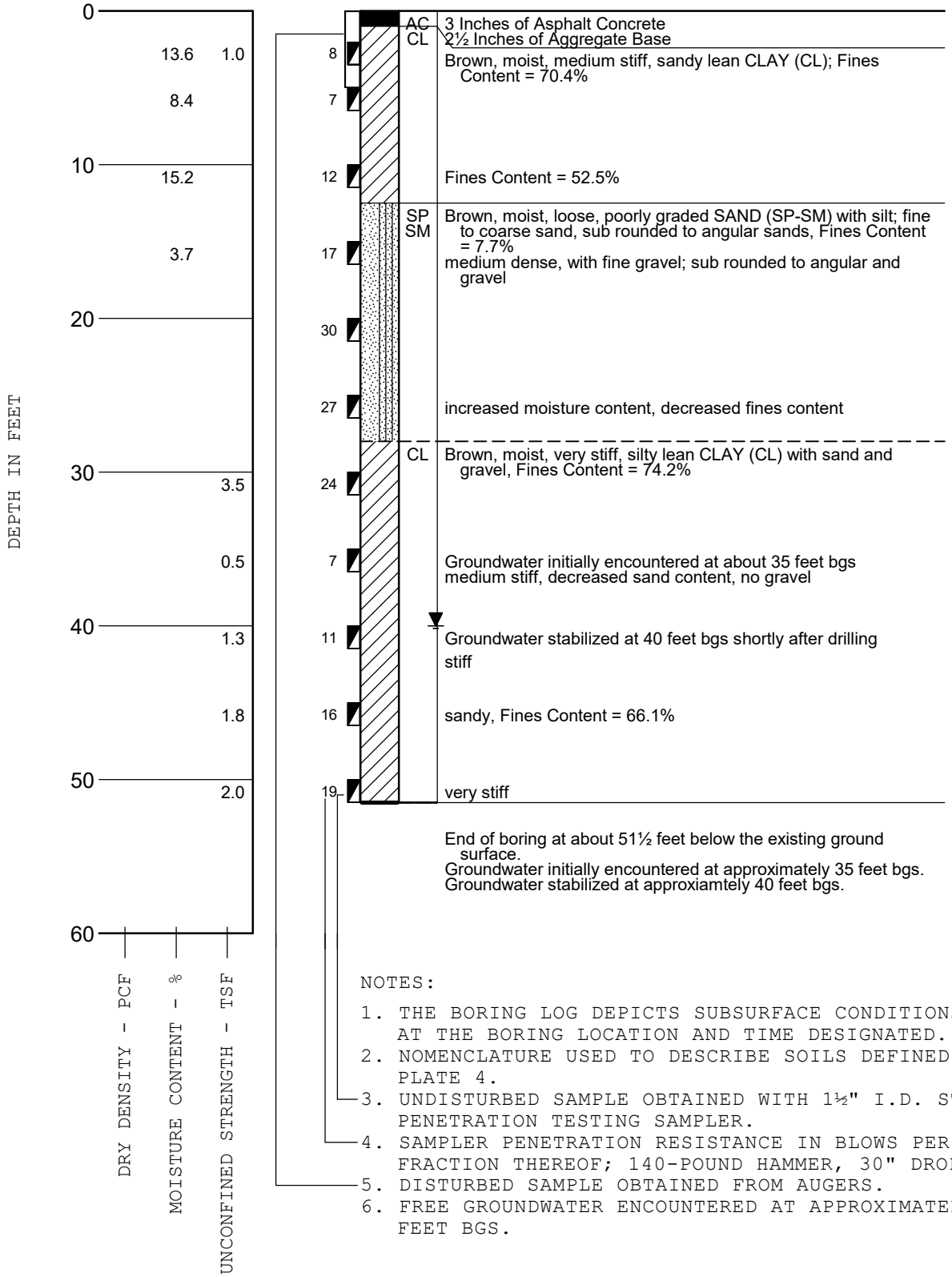
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GEOCON Project No. S3161-05-01 | October 2025

PROJECT NUMBER: 6389-001.00 PROJECT NAME: Von Renner ES Classroom Building
DRAWN BY: HZ DATE: 9/20/2025

BORING 1

DRILLED: 9/20/25



NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 4.
3. UNDISTURBED SAMPLE OBTAINED WITH 1½" I.D. STANDARD PENETRATION TESTING SAMPLER.
4. SAMPLER PENETRATION RESISTANCE IN BLOWS PER FOOT OR FRACTION THEREOF; 140-POUND HAMMER, 30" DROP.
5. DISTURBED SAMPLE OBTAINED FROM AUGERS.
6. FREE GROUNDWATER ENCOUNTERED AT APPROXIMATELY 35 FEET BGS.

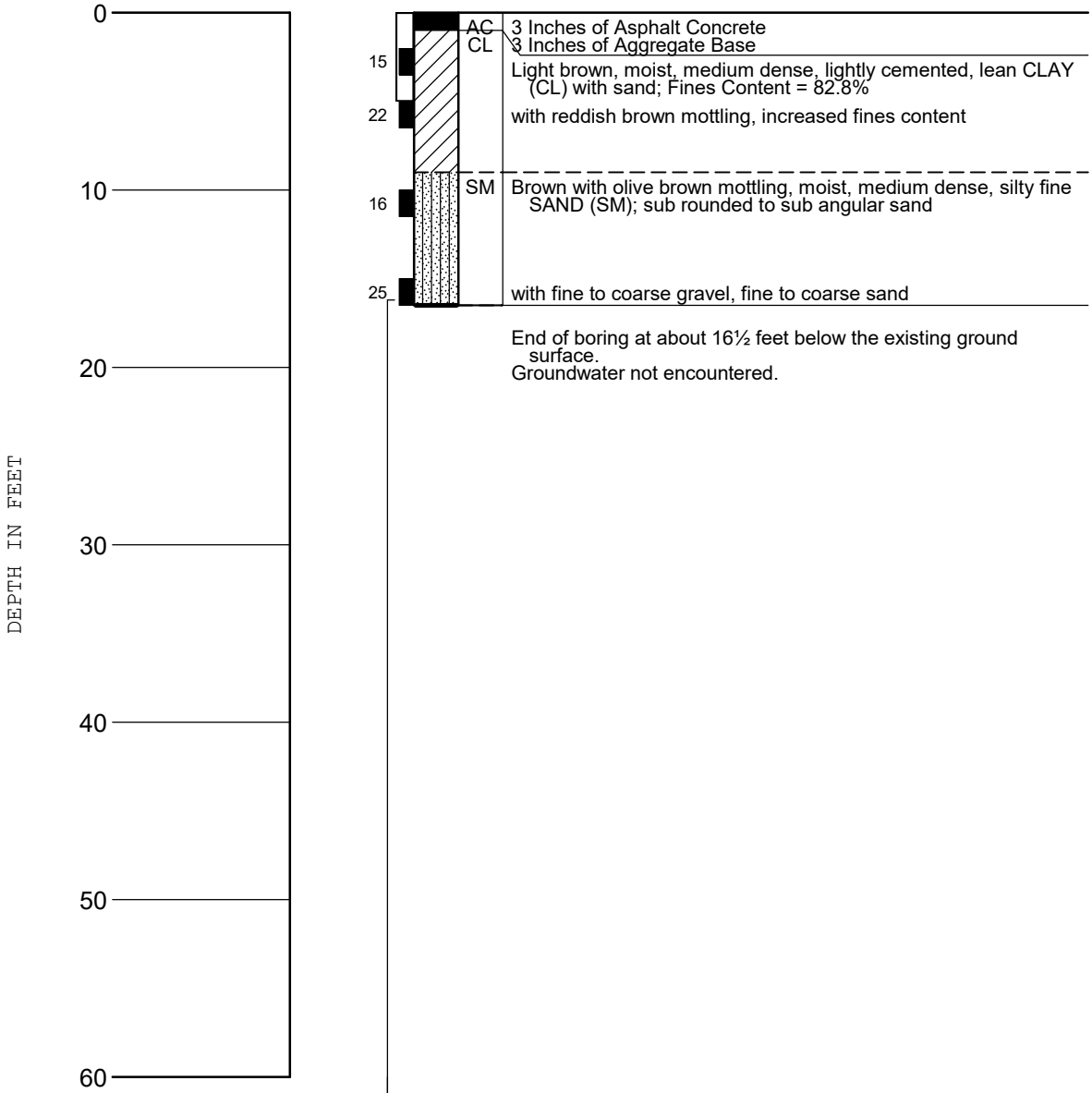
LOG OF BORING

RANEY GEOTECHNICAL INC

PROJECT NUMBER: 6389-001.00 PROJECT NAME: Von Renner ES Classroom Building
DRAWN BY: HZ DATE: 9/20/2025

BORING 2

DRILLED: 9/20/25



NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 4.
3. UNDISTURBED SAMPLE OBTAINED WITH 2" I.D. MOD. CALIFORNIA SAMPLER.
4. SEE ADDITIONAL NOTES ON PLATE 2.
5. FREE GROUNDWATER NOT ENCOUNTERED.

LOG OF BORING

GEOLOGISMIKI Geotechnical Software

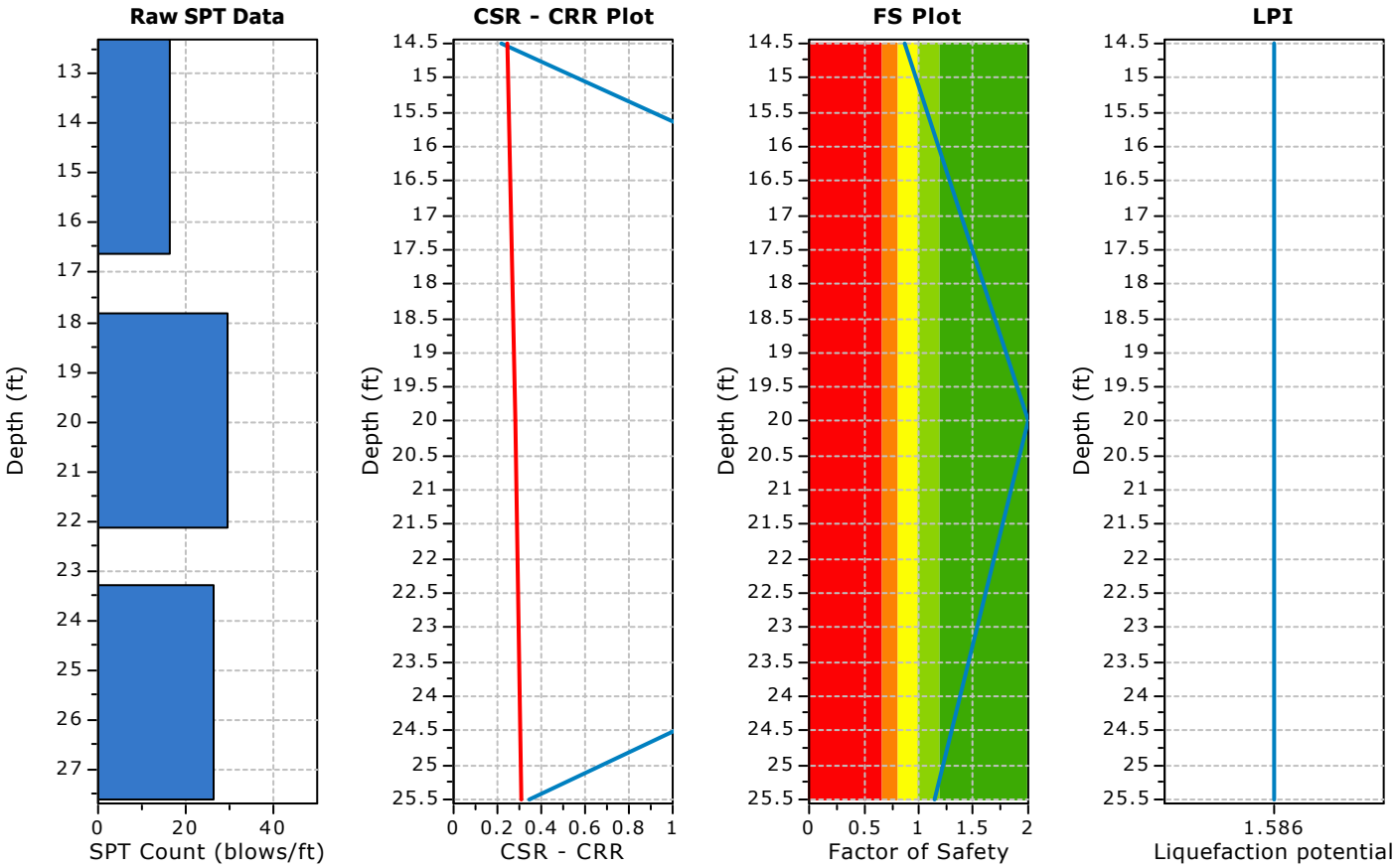
SPT BASED LIQUEFACTION ANALYSIS REPORT

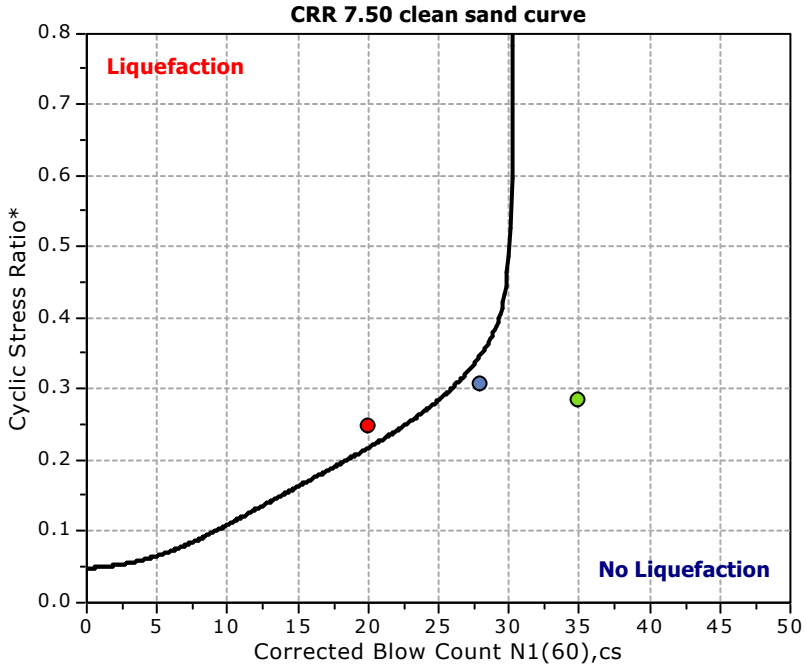
Project title : 6389-001 - Von Renner ES Classroom Building **SPT Name: SPT #1**

Location : Newman

:: Input parameters and analysis properties ::

Analysis method:	NCEER 1998	G.W.T. (in-situ):	35.00 ft
Fines correction method:	NCEER 1998	G.W.T. (earthq.):	11.00 ft
Sampling method:	Sampler wo liners	Earthquake magnitude M_w:	6.30
Borehole diameter:	65mm to 115mm	Peak ground acceleration:	0.53 g
Rod length:	3.30 ft	Eq. external load:	0.00 tsf
Hammer energy ratio:	1.00		





F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

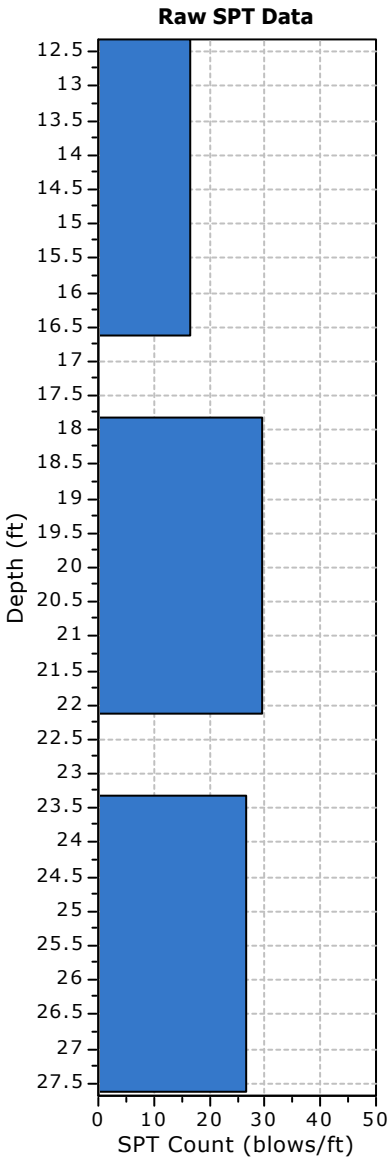
LPI color scheme

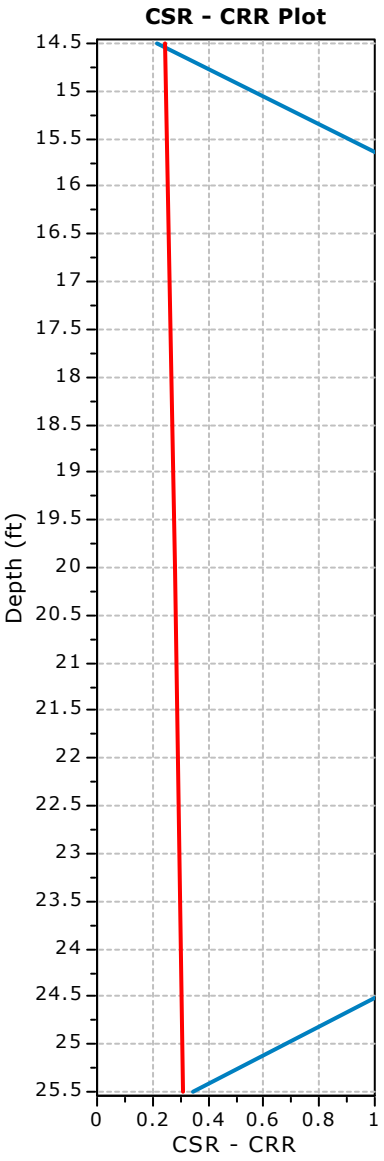
- Very high risk
- High risk
- Low risk

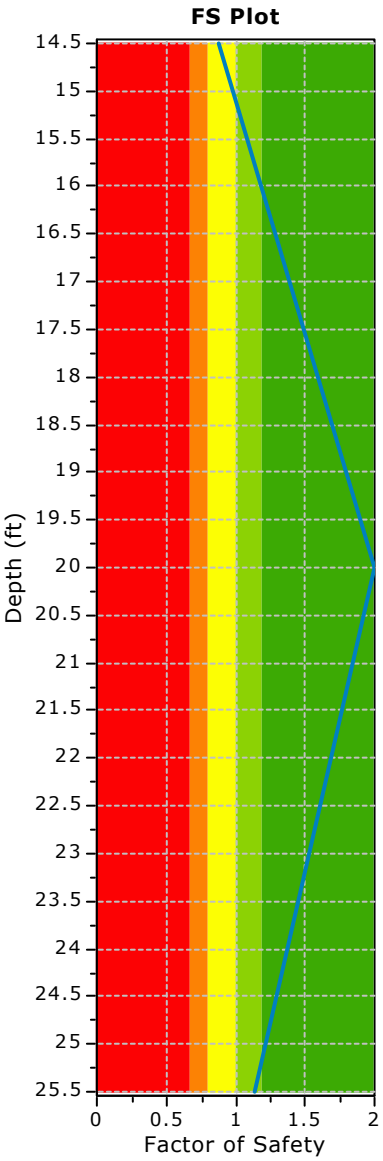
SEPTEMBER 2026

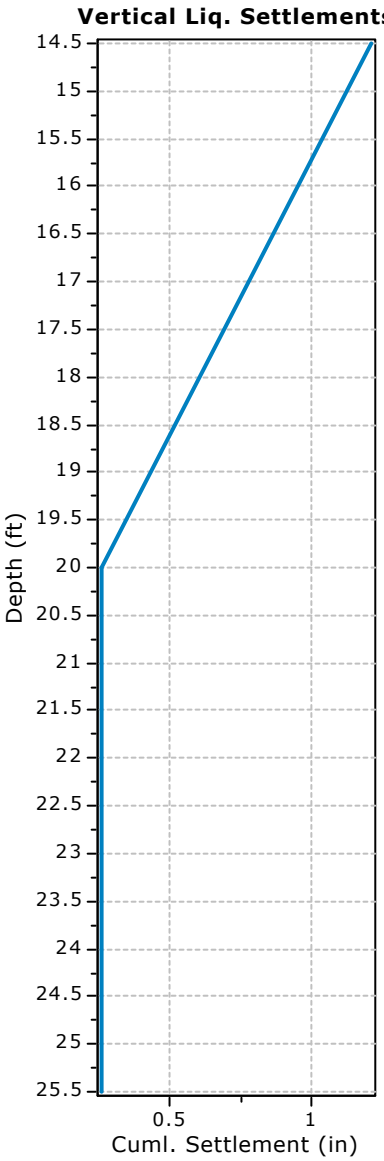
Von Renner Elementary - 2514 02.2600 - 57

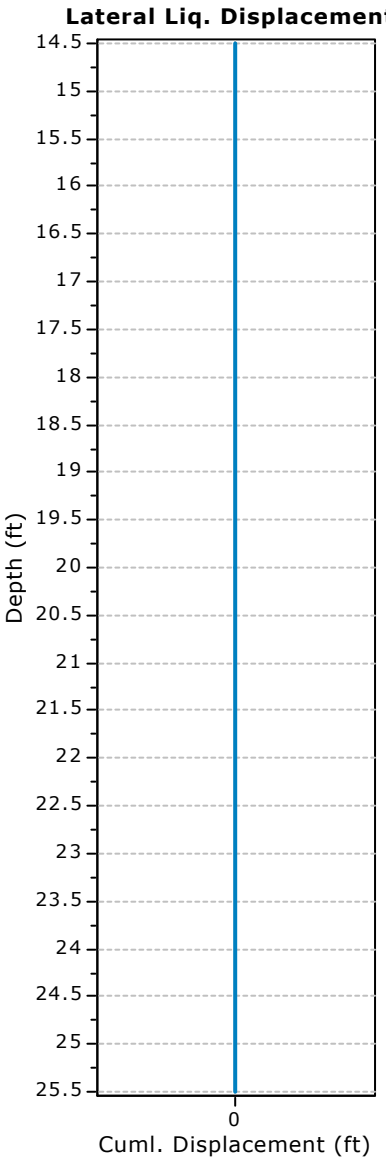
:: Overall Liquefaction Assessment Analysis Plots ::











:: Field input data ::

Test Depth (ft)	SPT Field Value (blows)	Fines Content (%)	Unit Weight (pcf)	Infl. Thickness (ft)	Can Liquefy
14.50	17	7.70	110.00	5.00	Yes
20.00	30	7.70	110.00	6.00	Yes
25.50	27	7.70	110.00	5.00	Yes

Abbreviations

Depth: Depth at which test was performed (ft)
SPT Field Value: Number of blows per foot
Fines Content: Fines content at test depth (%)
Unit Weight: Unit weight at test depth (pcf)
Infl. Thickness: Thickness of the soil layer to be considered in settlements analysis (ft)
Can Liquefy: User defined switch for excluding/including test depth from the analysis procedure

:: Cyclic Resistance Ratio (CRR) calculation data ::

Depth (ft)	SPT Field Value	Unit Weight (pcf)	σ_v (tsf)	u_o (tsf)	σ'_{vo} (tsf)	C_N	C_E	C_B	C_R	C_S	$(N_1)_{60}$	Fines Content (%)	α	β	$(N_1)_{60cs}$	$CRR_{7.5}$
14.50	17	110.00	0.80	0.00	0.80	1.13	1.00	1.00	0.85	1.20	20	7.70	0.24	1.01	20	0.218
20.00	30	110.00	1.10	0.00	1.10	0.98	1.00	1.00	0.95	1.20	34	7.70	0.24	1.01	35	4.000
25.50	27	110.00	1.40	0.00	1.40	0.87	1.00	1.00	0.95	1.20	27	7.70	0.24	1.01	28	0.348

Abbreviations

σ_v: Total stress during SPT test (tsf)
u_o: Water pore pressure during SPT test (tsf)
σ'_{vo}: Effective overburden pressure during SPT test (tsf)
C_N: Overburden corretion factor
C_E: Energy correction factor
C_B: Borehole diameter correction factor
C_R: Rod length correction factor
C_S: Liner correction factor
$N_{1(60)}$: Corrected N_{SPT} to a 60% energy ratio
α, β: Clean sand equivalent clean sand formula coefficients
$N_{1(60)cs}$: Corected $N_{1(60)}$ value for fines content
$CRR_{7.5}$: Cyclic resistance ratio for M=7.5

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*	FS	
14.50	110.00	0.80	0.11	0.69	0.97	1.00	0.387	1.56	0.248	1.00	0.248	0.879	●
20.00	110.00	1.10	0.28	0.82	0.96	1.00	0.443	1.56	0.283	1.00	0.283	2.000	●
25.50	110.00	1.40	0.45	0.95	0.94	1.00	0.478	1.56	0.306	1.00	0.306	1.137	●

Abbreviations

$\sigma_{v,eq}$: Total overburden pressure at test point, during earthquake (tsf)
$u_{o,eq}$: Water pressure at test point, during earthquake (tsf)
$\sigma'_{vo,eq}$: Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
α: Improvement factor due to stone columns
CSR : Cyclic Stress Ratio (adjusted for improvement)
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$: CSR adjusted for M=7.5
K_{sigma}: Effective overburden stress factor
CSR^*: CSR fully adjusted (user FS applied)***
FS: Calculated factor of safety against soil liquefaction

*** User FS: 1.00

:: Liquefaction potential according to Iwasaki ::

Depth (ft)	FS	F	wz	Thickness (ft)	I_L
14.50	0.879	0.12	7.79	5.50	1.59
20.00	2.000	0.00	6.95	5.50	0.00
25.50	1.137	0.00	6.11	5.50	0.00

Overall potential I_L : 1.59

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

:: Vertical settlements estimation for saturated sands ::

Depth (ft)	D_{50} (in)	q_c/N	e_v weight factor	e_v (%)	Δh (ft)	s (in)
14.50	0.00	5.00	1.00	1.57	5.00	0.941
20.00	0.00	5.00	1.00	0.00	6.00	0.000
25.50	0.00	5.00	1.00	0.44	5.00	0.266

Cumulative settlements: 1.207

Abbreviations

D_{50}: Median grain size (in)
q_c/N: Ratio of cone resistance to SPT
e_v: Post liquefaction volumetric strain (%)
Δh: Thickness of soil layer to be considered (ft)
s: Estimated settlement (in)

:: Lateral displacements estimation for saturated sands ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)
14.50	20	62.61	6.34	5.00	0.000	0.00
20.00	34	81.63	0.00	6.00	0.000	0.00
25.50	27	72.75	2.21	5.00	0.000	0.00

Cumulative lateral displacements: 0.00

Abbreviations

D_r: Relative density (%)
γ_{max}: Maximum amplitude of cyclic shear strain (%)
d_z: Soil layer thickness (ft)
LDI: Lateral displacement index (ft)
LD: Actual estimated displacement (ft)

References

- Ronald D. Andrus, Hossein Hayati, Nisha P. Mohanan, 2009. Correcting Liquefaction Resistance for Aged Sands Using Measured to Estimated Velocity Ratio, Journal of Geotechnical and Geoenvironmental Engineering, Vol. 135, No. 6, June 1

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- Dipl.-Ing. Heinz J. Priebe, Vibro Replacement to Prevent Earthquake Induced Liquefaction, Proceedings of the Geotechnique-Colloquium at Darmstadt, Germany, on March 19th, 1998 (also published in Ground Engineering, September 1998), Technical paper 12-57E

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- Zhang, G., Robertson. P.K., Brachman, R., 2002, Estimating Liquefaction Induced Ground Settlements from the CPT, Canadian Geotechnical Journal, 39: pp 1168-1180

- Zhang, G., Robertson. P.K., Brachman, R., 2004, Estimating Liquefaction Induced Lateral Displacements using the SPT and CPT, ASCE, Journal of Geotechnical & Geoenvironmental Engineering, Vol. 130, No. 8, 861-871

- Pradel, D., 1998, Procedure to Evaluate Earthquake-Induced Settlements in Dry Sandy Soils, ASCE, Journal of Geotechnical & Geoenvironmental Engineering, Vol. 124, No. 4, 364-368

- R. Kayen, R. E. S. Moss, E. M. Thompson, R. B. Seed, K. O. Cetin, A. Der Kiureghian, Y. Tanaka, K. Tokimatsu, 2013. Shear-Wave Velocity–Based Probabilistic and Deterministic Assessment of Seismic Soil Liquefaction Potential, Journal of Geotechnical and Geoenvironmental Engineering, Vol. 139, No. 3, March 1

APPENDIX B

Liquefaction Analysis Results

GEOLOGISMIKI Geotechnical Software

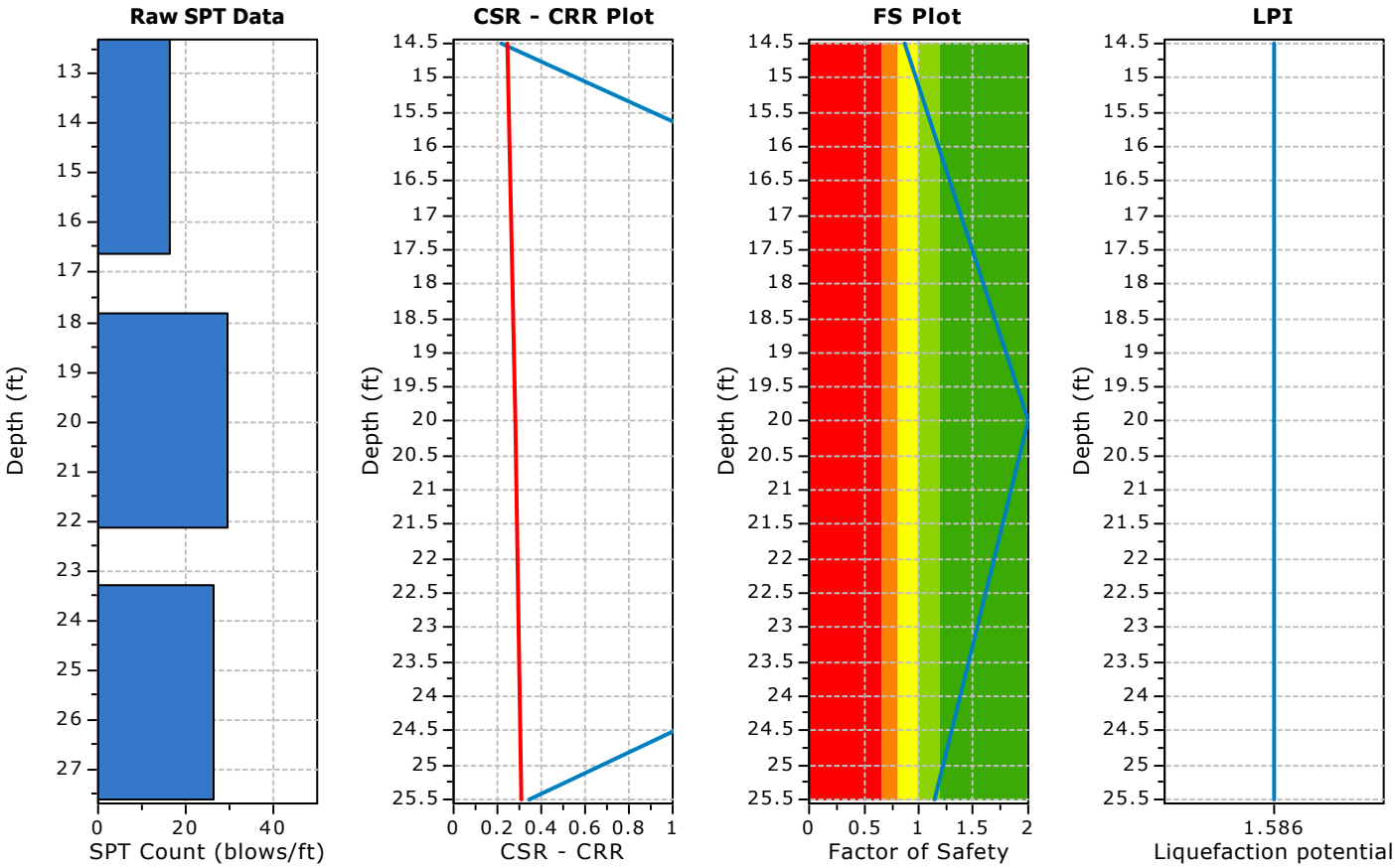
SPT BASED LIQUEFACTION ANALYSIS REPORT

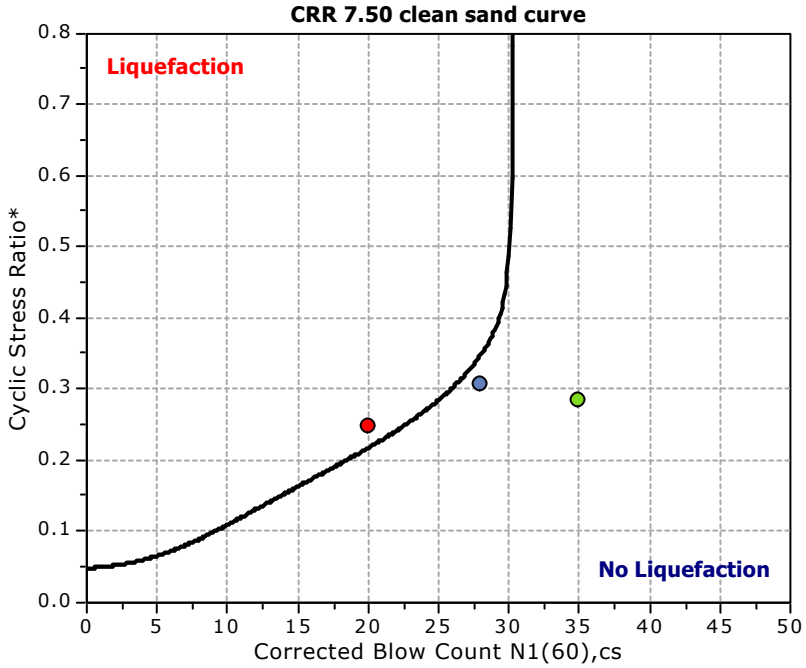
Project title : 6389-001 - Von Renner ES Classroom Building **SPT Name: SPT #1**

Location : Newman

:: Input parameters and analysis properties ::

Analysis method:	NCEER 1998	G.W.T. (in-situ):	35.00 ft
Fines correction method:	NCEER 1998	G.W.T. (earthq.):	11.00 ft
Sampling method:	Sampler wo liners	Earthquake magnitude M_w:	6.30
Borehole diameter:	65mm to 115mm	Peak ground acceleration:	0.53 g
Rod length:	3.30 ft	Eq. external load:	0.00 tsf
Hammer energy ratio:	1.00		





F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

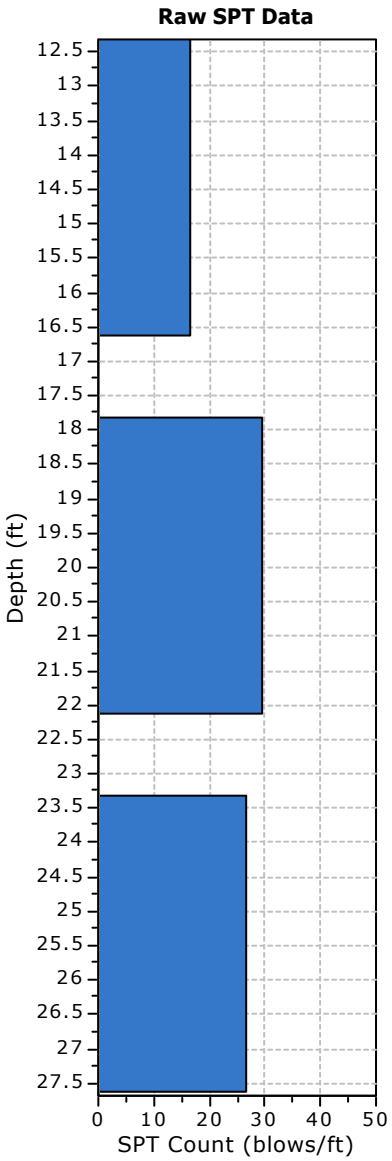
LPI color scheme

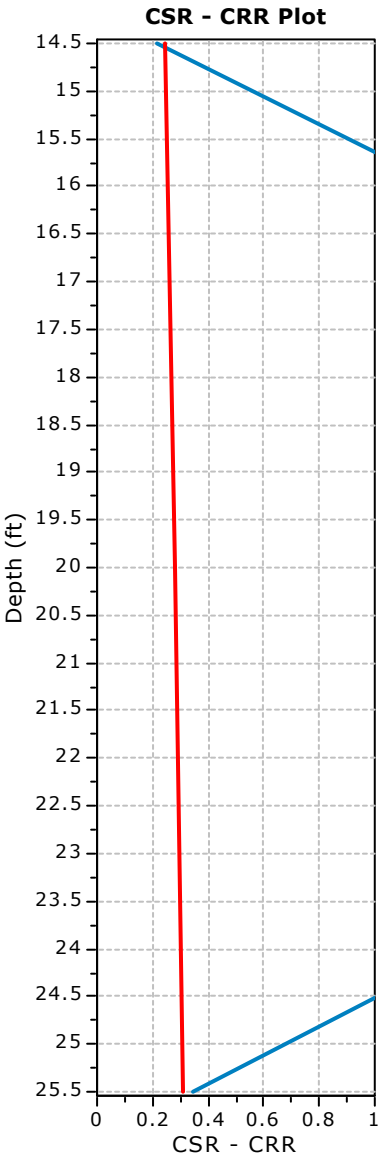
- Very high risk
- High risk
- Low risk

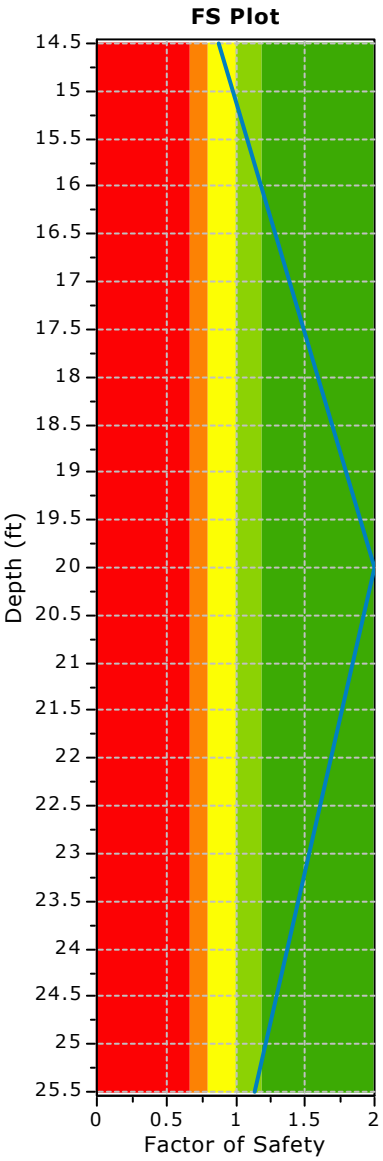
SEPTEMBER 2026

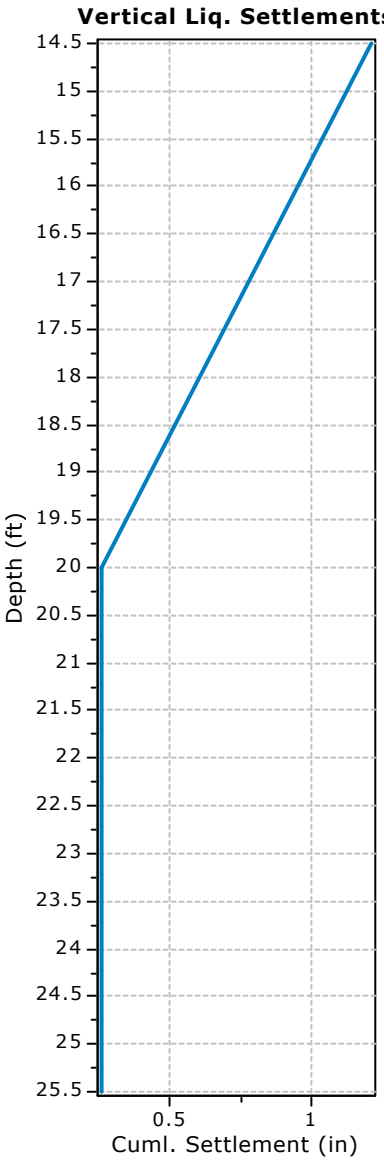
Von Renner Elementary - 2514 02.2600 - 63

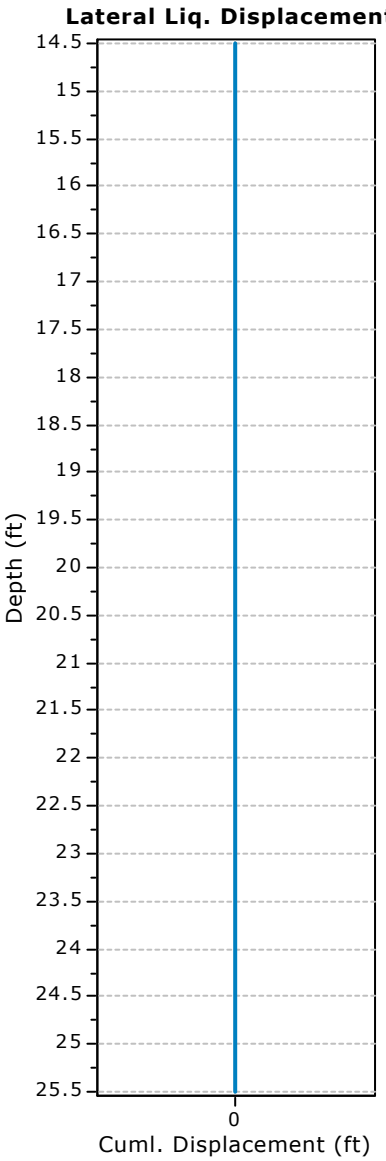
:: Overall Liquefaction Assessment Analysis Plots ::











:: Field input data ::

Test Depth (ft)	SPT Field Value (blows)	Fines Content (%)	Unit Weight (pcf)	Infl. Thickness (ft)	Can Liquefy
14.50	17	7.70	110.00	5.00	Yes
20.00	30	7.70	110.00	6.00	Yes
25.50	27	7.70	110.00	5.00	Yes

Abbreviations

Depth: Depth at which test was performed (ft)
SPT Field Value: Number of blows per foot
Fines Content: Fines content at test depth (%)
Unit Weight: Unit weight at test depth (pcf)
Infl. Thickness: Thickness of the soil layer to be considered in settlements analysis (ft)
Can Liquefy: User defined switch for excluding/including test depth from the analysis procedure

:: Cyclic Resistance Ratio (CRR) calculation data ::

Depth (ft)	SPT Field Value	Unit Weight (pcf)	σ_v (tsf)	u_o (tsf)	σ'_{vo} (tsf)	C_N	C_E	C_B	C_R	C_S	$(N_1)_{60}$	Fines Content (%)	α	β	$(N_1)_{60cs}$	$CRR_{7.5}$
14.50	17	110.00	0.80	0.00	0.80	1.13	1.00	1.00	0.85	1.20	20	7.70	0.24	1.01	20	0.218
20.00	30	110.00	1.10	0.00	1.10	0.98	1.00	1.00	0.95	1.20	34	7.70	0.24	1.01	35	4.000
25.50	27	110.00	1.40	0.00	1.40	0.87	1.00	1.00	0.95	1.20	27	7.70	0.24	1.01	28	0.348

Abbreviations

σ_v: Total stress during SPT test (tsf)
u_o: Water pore pressure during SPT test (tsf)
σ'_{vo}: Effective overburden pressure during SPT test (tsf)
C_N: Overburden corretion factor
C_E: Energy correction factor
C_B: Borehole diameter correction factor
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$CRR_{7.5}$: Cyclic resistance ratio for M=7.5

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF	$CSR_{eq,M=7.5}$	K_{sigma}	CSR^*	FS	
14.50	110.00	0.80	0.11	0.69	0.97	1.00	0.387	1.56	0.248	1.00	0.248	0.879	●
20.00	110.00	1.10	0.28	0.82	0.96	1.00	0.443	1.56	0.283	1.00	0.283	2.000	●
25.50	110.00	1.40	0.45	0.95	0.94	1.00	0.478	1.56	0.306	1.00	0.306	1.137	●

Abbreviations

$\sigma_{v,eq}$: Total overburden pressure at test point, during earthquake (tsf)
$u_{o,eq}$: Water pressure at test point, during earthquake (tsf)
$\sigma'_{vo,eq}$: Effective overburden pressure, during earthquake (tsf)
r_d : Nonlinear shear mass factor
α: Improvement factor due to stone columns
CSR : Cyclic Stress Ratio (adjusted for improvement)
MSF : Magnitude Scaling Factor
$CSR_{eq,M=7.5}$: CSR adjusted for M=7.5
K_{sigma}: Effective overburden stress factor
CSR^*: CSR fully adjusted (user FS applied)***
FS: Calculated factor of safety against soil liquefaction

*** User FS: 1.00

:: Liquefaction potential according to Iwasaki ::

Depth (ft)	FS	F	wz	Thickness (ft)	I_L
14.50	0.879	0.12	7.79	5.50	1.59
20.00	2.000	0.00	6.95	5.50	0.00
25.50	1.137	0.00	6.11	5.50	0.00

Overall potential I_L : 1.59

I_L = 0.00 - No liquefaction
I_L between 0.00 and 5 - Liquefaction not probable
I_L between 5 and 15 - Liquefaction probable
I_L > 15 - Liquefaction certain

:: Vertical settlements estimation for saturated sands ::

Depth (ft)	D_{50} (in)	q_c/N	e_v weight factor	e_v (%)	Δh (ft)	s (in)
14.50	0.00	5.00	1.00	1.57	5.00	0.941
20.00	0.00	5.00	1.00	0.00	6.00	0.000
25.50	0.00	5.00	1.00	0.44	5.00	0.266

Cumulative settlements: 1.207

Abbreviations

D_{50}: Median grain size (in)
q_c/N: Ratio of cone resistance to SPT
e_v: Post liquefaction volumetric strain (%)
Δh: Thickness of soil layer to be considered (ft)
s: Estimated settlement (in)

:: Lateral displacements estimation for saturated sands ::

Depth (ft)	$(N_1)_{60}$	D_r (%)	γ_{max} (%)	d_z (ft)	LDI	LD (ft)
14.50	20	62.61	6.34	5.00	0.000	0.00
20.00	34	81.63	0.00	6.00	0.000	0.00
25.50	27	72.75	2.21	5.00	0.000	0.00

Cumulative lateral displacements: 0.00

Abbreviations

D_r: Relative density (%)
γ_{max}: Maximum amplitude of cyclic shear strain (%)
d_z: Soil layer thickness (ft)
LDI: Lateral displacement index (ft)
LD: Actual estimated displacement (ft)

References

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U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new USGS Earthquake Hazard Toolbox for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

Input

Edition

Dynamic: Conterminous U.S. 2014 (update) (un…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

37.3085

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

-121.0272

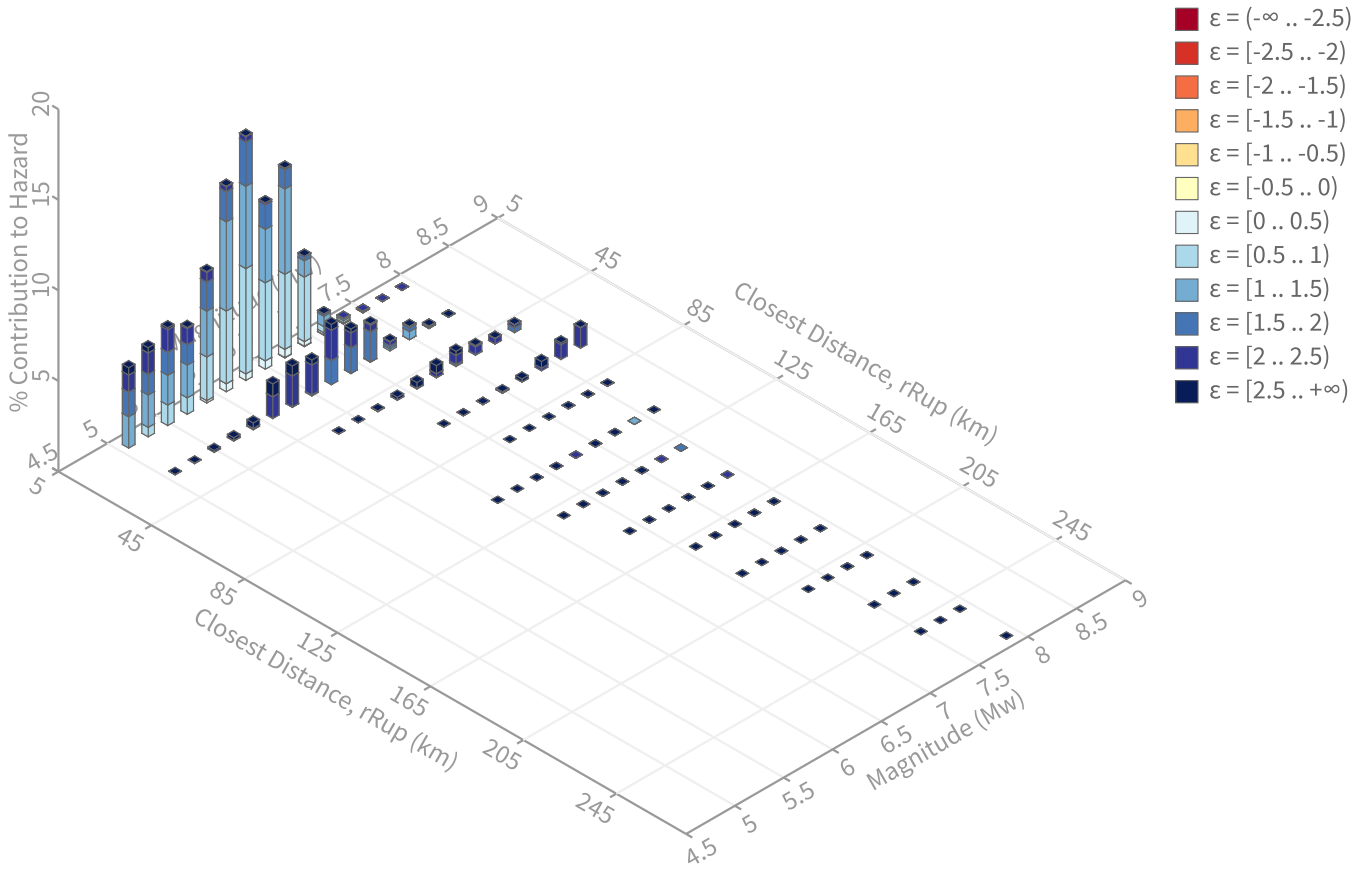
Site Class

259 m/s (Site class D)

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.57886368 g

Recovered targets

Return period: 2826.068 yrs
Exceedance rate: 0.00035384853 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.11 %

Mean (over all sources)

m: 6.32
r: 14.76 km
ε_0: 1.43 σ

Mode (largest m-r bin)

m: 6.28
r: 9.53 km
ε_0: 1.09 σ
Contribution: 13.47 %

Mode (largest m-r-ε_0 bin)

m: 6.29
r: 8.34 km
ε_0: 0.79 σ
Contribution: 5.82 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM32	System							30.71
Great Valley 07 (Orestimba) [17]		8.62	6.31	0.93	121.070°W	37.285°N	235.22	14.20
Great Valley 08 (Quinto) [0]		10.50	6.67	1.34	121.108°W	37.239°N	222.87	3.08
Ortigalita (North) [4]		21.48	6.80	2.04	121.189°W	37.165°N	221.97	2.89
Great Valley 09 (Laguna Seca) [0]		24.45	6.53	2.12	120.992°W	37.100°N	172.31	1.86
San Andreas (Santa Cruz Mts) [6]		68.87	8.14	2.36	121.595°W	36.886°N	227.12	1.19
Calaveras (Central) [1]		49.77	7.58	2.38	121.533°W	37.131°N	246.35	1.16
UC33brAvg_FM31	System							30.66
Great Valley 07 (Orestimba) [17]		8.62	6.32	0.92	121.070°W	37.285°N	235.22	14.31
Great Valley 08 (Quinto) [0]		10.50	6.67	1.34	121.108°W	37.239°N	222.87	3.22
Ortigalita (North) [4]		21.48	6.77	2.06	121.189°W	37.165°N	221.97	2.84
Great Valley 09 (Laguna Seca) [0]		24.45	6.54	2.12	120.992°W	37.100°N	172.31	2.02
San Andreas (Santa Cruz Mts) [6]		68.94	8.15	2.35	121.595°W	36.885°N	227.11	1.17
Calaveras (Central) [1]		49.77	7.58	2.38	121.533°W	37.131°N	246.35	1.15
UC33brAvg_FM31 (opt)	Grid							19.33
PointSourceFinite: -121.027, 37.331		5.55	5.72	0.94	121.027°W	37.331°N	0.00	3.38
PointSourceFinite: -121.027, 37.331		5.55	5.72	0.94	121.027°W	37.331°N	0.00	3.38
PointSourceFinite: -121.027, 37.367		8.12	5.63	1.40	121.027°W	37.367°N	0.00	1.74
PointSourceFinite: -121.027, 37.367		8.12	5.63	1.40	121.027°W	37.367°N	0.00	1.74
PointSourceFinite: -121.027, 37.421		11.68	6.07	1.61	121.027°W	37.421°N	0.00	1.20
PointSourceFinite: -121.027, 37.421		11.68	6.07	1.61	121.027°W	37.421°N	0.00	1.20
UC33brAvg_FM32 (opt)	Grid							19.31
PointSourceFinite: -121.027, 37.331		5.55	5.72	0.94	121.027°W	37.331°N	0.00	3.38
PointSourceFinite: -121.027, 37.331		5.55	5.72	0.94	121.027°W	37.331°N	0.00	3.38
PointSourceFinite: -121.027, 37.367		8.12	5.63	1.40	121.027°W	37.367°N	0.00	1.74
PointSourceFinite: -121.027, 37.367		8.12	5.63	1.40	121.027°W	37.367°N	0.00	1.74
PointSourceFinite: -121.027, 37.421		11.68	6.07	1.61	121.027°W	37.421°N	0.00	1.20
PointSourceFinite: -121.027, 37.421		11.68	6.07	1.61	121.027°W	37.421°N	0.00	1.20

DEMOLITION
SECTION 024100

PART 1 - GENERAL

1.1 SUMMARY

A. In accordance with pertinent provisions of this Section, carefully demolish and remove from the site those items scheduled to be so demolished and removed. The Conditions of the Contract apply to this section as fully as if repeated herein.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 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 the work of this Section.

1.3 DUST CONTROL

A. Take appropriate action to check the spread of dust and to avoid the creation of a nuisance in the surrounding area. Do not use water if it results in hazardous or objectionable conditions, such as ice, flooding or pollution. Comply with all dust regulations and permits imposed by local air pollution agencies.

PART 2 - PRODUCTS

(No products are required in this Section)

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. 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.

3.2 DEMOLITION

A. Contractor is responsible to review the Contract Documents, and visit site to determine the location and extent of demolition to be performed.

B. In company with the Architect, visit the site and verify the extent and location of demolition required.
   1. Carefully identify limits of demolition.

   2. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.

C. Prepare and follow an organized plan for demolition and removal of items.
   1. Protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.

   2. Completely remove items scheduled to be so demolished and removed, leaving surfaces clean, solid, and ready to receive new materials specified elsewhere.

   3. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.

D. Demolished material shall be considered to be property of the Contractor and shall be completely removed from the job site, unless noted otherwise on the drawings.

E. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

F. Contractor shall shutoff and disconnect all existing utilities to site (i.e.: power, communications, fire alarm, water, sewer, natural gas and other related utilities) prior to commencement of demolition. Coordinate scheduling with the District.

G. Install temporary fencing, caution signs and barricades around project area for duration of project to keep area clear of vehicles and spectators.

H. The Contractor shall be responsible for strict compliance with all requirements of the California Occupational Safety and Health Act (OSHA) which are applicable to the work to be accomplished pursuant to this contract. OSHA shall be construed to include, but not be limited to all applicable safety orders issued by the Division of Industrial Safety, State of California. In the event the Contractor or any of the Contractor's employees shall observe any violation of OSHA in or on the premises on which the Contractor is to preform work pursuant to this contract, the Contractor shall immediately give written notice to the County of such violation.

I. Contractor shall obtain any and all permits required for such work in accordance with applicable local, state and federal laws and regulations, including San Joaquin Valley Air Pollution Control District.

3.3 REPLACEMENTS

A. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the approval of the Architect and at no additional cost to the Owner.

END OF SECTION

CONCRETE FORMWORK
SECTION 031000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Forms for cast-in-place concrete.
   2. Shoring, bracing, accessories and form coating.

B. Work installed but furnished in other Sections:
   1. Inserts, bolts, anchors and other items furnished by other trades for installation in formed concrete.

C. Related work:
   1. Division 3 for concrete finishing.

1.2 SYSTEM DESCRIPTION

A. Design requirements: Engineer, fabricate, assemble and install concrete formwork to meet or exceed the criteria indicated and specified, to conform to the profiles indicated and to other requirements of the Contract Documents, to satisfy the requirements of the authorities having jurisdiction, and to provide a watertight, structurally sound self-draining assembly.
   1. References:
      a. American Concrete Institute
         1) ACI 347R-2014 (R 2021)

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber forms: Douglas Fir or Hemlock.

B. Plywood forms: Swanson Group “B-Matte Concrete Form” or equal overlaid plywood complying with US Products Standard PS-1, exterior grade and edge sealed, APA grade-stamped, or ABS, PVC, steel or FRP forms.

2.2 ACCESSORIES

A. Chamfer strips: Basis of design is for extruded PVC with 3/4-inch diagonal face, unless otherwise indicated, by one of the following:
   1. Meadowbruke Co.

2. SIKA Corp.
3. Or equal.

B. Form ties and spreaders:
1. Provide cone or snap ties designed to be completely removed form wall, or to break off and provide minimum 1-1/2-inch coverage over ends of the portion of snap tie remaining in the concrete, and which will not leave a hole larger than 1-inch in diameter in the concrete surface.
2. Do not use wire ties, wood spreaders, or embedded types in which embedded portion is less than 1-1/2-inch from exterior face of concrete.

C. Form coating: Basis of design is for “Crete-Lease 880" by Cresset Chemical Co., or equal.

D. Prefabricated construction joint keyways: Basis of design is for “Key-Loc” joint system with all accessories by Form-A-Key Concrete Specialties Products. Other acceptable materials/manufacturers include the following:
1. Laticrete SJ1 Screed Joint.
2. Or equal.

E. Sealants: As specified in Section 079200.

2.1 FORMWORK REQUIREMENTS

A. General:
1. Form contact surfaces shall be clean, free from dents, holes and other imperfections.
2. Establish and maintain benchmarks, lines and controls necessary to achieve specified tolerances.
3. Take an accurate survey of the form location just prior to concrete pour.

B. Earth bank:
1. Except for exterior face of wall footings and grade beams that must be formed, earth banks may be used to form footings and grade beams if the soil is firm, neatly trimmed, and will retain concrete in the required size and shape.
2. Increase the concrete overage as required by the authorities having jurisdiction when concrete is cast against earth.

C. Wood forms: Construct with plywood panels as large as practicable.

D. Re-use of forms:
1. Form materials may be re-used if they produce finished surfaces equal to finished surfaces where new form materials are used.

2. Before reuse, thoroughly clean, recondition in every respect, suitable for their re-use purpose.

E. Tolerances: To obtain cast-in-place concrete not exceeding the tolerance specified in Section 033000, except support form facing material to limit deflection to L/360 between supports for concrete exposed to view and L/270 for all other concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct detrimental conditions before proceeding with installation.

3.2 FORMWORK INSTALLATION

A. Construction:
1. Comply with the applicable provisions of ACI 347 R-2014 (R 2021), Guide to Formwork for Concrete, and APA Design/Construction Guide “Concrete Forming” .
2. Rigidly support and construct forms to the lines, surfaces and profiles necessary to produce concrete to the design indicated.
3. Form stakes shall not buried in concrete or installed in trenches or footings.
4. Make forms tight, without cracks or holes, to prevent leakage of mortar or loss of fine particles from concrete.

B. Wales and studs: Provide wales and stud of adequate size and spacing to prevent form failure and to obtain concrete within the tolerance specified.

C. Ties and spreaders: Place ties as indicated on approved shop drawings, spaced and aligned as indicated, in plumb columns and level rows. Do not permit wood, other than built-in treated bucks or nailing blocks, to permanently remain in forms.

D. Form contact surfaces: As specified above, except that the plywood form facing material specified must be used for concrete permanently exposed to view. Forms for all other concrete may be constructed of plywood, fiberglass, plastic, or steel.
1. To eliminate joint offsets, block plywood edges that do not occur at bearing points.
2. Do not expose plywood edges to concrete.

E. Special features:
   1. Corners: Miter or cope corners accurately and attach securely to the form facing material with adhesive or nails driven flush with the item being fastened. Avoid hammer marks.
      a. Provide sharp, clean corners, without visible edges or offsets at intersecting planes. Back joints with extra studs or girts to maintain square intersections.
   2. Concrete details: Form offsets, keys, reglets, seats, pockets, anchorages, moldings, chamfers, blocking, screeds, drips, bulkheads and other required features as indicated or as necessary to receive or engage the work of other trades.
   3. Openings, chases and recesses: Form as indicated or necessary to receive, pass and clear other work.
      a. Verify sizes and locations with other trades before forming. Closely coordinate the location of boxes, cans and sleeves furnished by other trades.
      b. Seal edges of cutouts and holes in plywood.

F. Form release agent: Thoroughly clean forms and coat with release agent prior to intitial use (except when mill-oiled) and before each reuse.
   1. Apply form coating before reinforcement is placed.
   2. Apply form coating in accordance with its manufacturer's instructions and coverage rates. Do not over-apply.
   3. Provide a coating of uniform thickness.

3.3 FORMWORK REMOVAL

A. Remove forms after concrete has developed sufficient strength to safely sustain its own weight and superimposed loads, as determined by testing field-cured concrete cylinders, but not sooner than specified in ACI 347, Table 5.7.2.3.

B. Take care when removing forms that concrete surfaces are not marred or gouged, that corners are true, sharp and unbroken. Do not pry against concrete when removing forms.

C. Cut nails flush on concealed surfaces. Cutback tie wires and nails to exposed concrete surfaces at least 1-1/2-inch.

D. Where used, remove rod and cone ties and separators or similar devices and pull .

END OF SECTION

CONCRETE REINFORCING
SECTION 032000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Reinforcing steel for cast-in-place concrete.
   2. Supplementary parts and components, such as clips, fasteners, chairs, tie wires, and other miscellaneous accessories required for a complete installation.
      a. References:
         1) American Concrete Institute
            a) ACI MNL-66
            b) ACI 117
         2) ASTM
            a) ASTM A82
            b) ASTM A615
            c) ASTM A706
            d) ASTM A1064
         3) CRSI
            a) CRSI Manual of Standard Practice

1.2 SUBMITTALS

A. Shop drawings:
   1. Submit shop drawings showing fabrication, bending, and placement of concrete reinforcing.
   2. Submit bar drawings and schedules with the corresponding placing diagrams.
      a. Comply with ACI SP-66.
      b. Indicate bar schedules, stirrup spacing, diagrams of bent bards, and arrangement of concrete reinforcing.
      c. Include special reinforcing required for openings through concrete structures.
   3. Drawings shall be complete for any specific area of Project when submitted.

B. Certificates: Submit copies of mill reports prior to starting this work.
   1. Mill reports shall contain the steel source, description, heat number, yield point, ultimate tensile strength, elongation percentage, bend test and chemical analysis.
      a. If the reports show material is satisfactory no tests will be required.
      b. For foreign steel, perform testing as specified below by a testing laboratory acceptable to the authorities having jurisdiction.
      c. Certification from any other sources is not acceptable.
   2. Ensure material delivered for use is that represented by mill reports.
   3. Ensure material delivered for use complies with Specifications requirements.

C. Test reports: Submit test data for reinforcing steel sampled and tested prior to starting this work.
   1. Where materials proposed for use cannot be identified, contract shall pay for an approved testing laboratory to make one series of tests (tensile and bend) from each 2.5 tons, or fraction thereof, of each size and kind of reinforcing steel.

   2. Include minimum 2 samples of sufficient length to allow tests to be made on the as-rolled bar.

1.3 HANDLING

A. Delivery:
   1. Deliver reinforcing to the site bundled, tagged and marked; handle to prevent damage to material.
   2. Use metal tags indicating size, length and other markings shown on placement drawings. Maintain tags after bundles are broken.

PART 2 - PRODUCT

2.1 MATERIALS

A. Reinforcing steel: ASTM A615 or A 706, Grade 60, Deformed Bars.

B. Rebar: ASTM A615 Grade 60 requires 80,000 psi minimum tensile strength with 1.10 minimum ratio of actual tensile strength to actual yield strength based on mill testing.

C. Welded wire mesh: ASTM A1064. Provide in flat sheets, not rolls.

D. Tie wire: ASTM A 82, 16-gage (minimum) galvanized steel wire, 6"x6", #10x#10, unless noted otherwise.

E. Supports for reinforcing: Provide bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire mesh in place. Use wire-bar-type supports complying with Concrete Reinforcing Steel Institute (CRSI) specifications.
   1. Slabs-on-grade: Provide supports with sand plates or horizontal runners where base material will not support chair legs, or precast concrete block chairs with embedded wire ties.
   2. Exposed concrete surfaces: Where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

3. Over vapor retarder: Provide precast chairs to prevent puncturing of membrane.
    a) Contractor shall restore vapor barrier damage prior to concrete pour.

2.2 FABRICATION

A. General: Except as modified by the Contract Documents, comply with Chapter 7of CRSI Manual of Standard Practice for fabrication of reinforcing steel.

B. Bending and forming:
1. Fabricate steel bars, wire and welded wire mesh to sizes, lengths and gages indicated.
2. Accurately form to shapes by methods that will not damage the materials.
    a) Heating of reinforcing for bending is not permitted.

C. Tolerances: Comply with ACI 117.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

A. Clean reinforcing of loose mill scale, excessive rust, oil, and other coating that might destroy or reduce its bond before placing it.

3.3 PLACING

A. Place reinforcing under the continuous inspection by the Project Inspector.

B. Placing: Comply with the listed reference standards as applicable. Do not install bars with unscheduled kinks or bends.

C. Spacing of reinforcing: Space reinforcing to maintain proper distance and clearance between parallel bars and between bars and forms.

D. Splices:
1. At lapped splices, bars shall be in contact, unless noted otherwise on the Drawings, and shall be firmly wired together before placing concrete.
2. Extend stubs and dowels required to receive and engage subsequent work a sufficient length to develop the strength of the bar, or as indicated on drawings.

3. Place dowel and stub bars in the forms and secure against displacement during placing of concrete.

E. Welded wire mesh reinforcing:
   1. Straighten and cut to required size where required and lay flat in place.
      a. Lap welded wire mesh one full mesh plus 2 inches.
      b. Securely wire together and to other reinforcing at approximately 24 inches o.c..
   2. In concrete slabs-on-grade, extend welded wire mesh to within one inch of expansion, construction and contraction joints. As concrete is placed, chair welded wire mesh to ensure embedment at position indicated.

F. Clearance: Maintain clear distances between reinforced steel and face of concrete indicated on the Drawings.

END OF SECTION

CAST-IN-PLACE CONCRETE
SECTION 033000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Cast-in-place concrete (CIPC).

B. Related work:
   1. Division 03 1000, for concrete forms, and concrete reinforcing.
   2. Division 03 3500, for concrete finishing.
   3. Division 07 2613, for vapor retarder under slabs-on-grade.
   4. Division 09 9723, for interior concrete floor sealer.

1.2 REFERENCES

A. American Concrete Institute
   1. ACI 117
   2. ACI 214
   3. ACI 301
   4. ACI 302
   5. ACI 305
   6. ACI 306
   7. ACI 308
   8. ACI 318
   9. ACI PRC 304R

B. ASTM International
   1. ASTM C33
   2. ASTM C94
   3. ASTM C150
   4. ASTM C618
   5. ASTM C192
   6. ASTM C39
   7. ASTM C31
   8. ASTM C172
   9. ASTM C42

1.3 SUBMITTALS

A. Data:
   1. Product data: Submit manufacturer's product data, specifications, typical installation details and other data as necessary to demonstrate compliance with the specified requirements for all manufactured products.
   2. Design data:
      a. Submit pit source and characteristics of each type OF aggregate to Architect prior to designing mixes.
      b. Submit mix designs, and any subsequent changes in mix designs.

B. Certificates: Submit cement certificates, admixture certificates (including chloride ion content) and batch plant ticket and non-shrink grout test data.

C. Proposed Control/Construction/ Expansion Joint Layout.

1.4 QUALITY ASSURANCE

A. Uniformity: Obtain each type of class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

B. Installer's qualifications: Firm and individuals with a minimum of 3 consecutive years of experience in the installation of cast in place concrete on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in application with a record of successful in-service performance.

C. Manufacturer's qualifications:
   1. Firm experienced in manufacturing ready-mixed concrete products and complying with requirements of ASTM C94 for production facilities and equipment.
   2. Firm certified according to the NRMCA Certification of Ready Mixed Concrete Production Facilities.

D. Pre-installation meeting:
   1. At least one week prior to ordering specified materials or the start of concrete work, arrange a pre-installation meeting between the Contractor, Architect, Project Superintendent, concrete supplier, and concrete finisher to review finishing techniques of concrete, use of additives, application of curing compounds and coordination with other trades.
   2. Include inspection of the vapor retarder for proper joint seals, and no unsealed penetrations.

3. Record minutes of the meeting, decisions made, and corrective measures to be taken before installation/application starts. Send copy of the minutes to the Architect no later than 3 days following the meetings.

E. Coefficient of friction: Exposed concrete flatwork shall have a coefficient of friction of 0.6 minimum for level areas and 0.8 minimum on ramps.

1.5 PROJECT CONDITIONS

A. Do not place concrete when the temperatures of the materials in contact with the concrete, the concrete temperature, and the ambient temperature exceed the ranges recommended in ACI 305 and 306, or if it is likely to exceed these temperature before the concrete has taken its initial set, unless special precautions recommended by ACI 305 and 306 are provided.

1.6 SCHEDULING

A. Allow sufficient time in the construction schedule for appropriate slab drying, in accordance with the finish manufacturer's recommendations, for slabs to receive a moisture-sensitive deferred finish.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland cement: ASTM C 150, Type II or IV. Do not change brand or type of cement without Architect's written approval.

B. Aggregates:
1. Hard rock aggregates: ASTM C 33, graded so that coarse aggregate nominal size is not larger than 1/5 of the narrowest dimension between form faces, nor 3/4 of the minimum clear spacing between individual reinforcing bars or bundles or bars, whichever is less, but never greater than 3/4-inch in any dimension for slabs 4 inches thick or less; 1 inches maximum at all other locations.

C. Admixtures:
1. May be used only with the Architect approval.
2. Submit manufacturer's data for products proposed for use in the Architect in compliance with the requirements of Division One.

D. Pozzolans: If used, shall comply with ASTM C618, Class F and conform to CBC 1903A.6.

E. Water: Fresh, clean, and free of oil and other materials injurious to concrete.

F. Dry-pack and grout: One of the following:
   1. Sika Grout - 713 by Sika Corp.
   2. Five Star Grout by Five Star Products, Inc.

2.2 EPOXY ADHESIVES

A. Structural adhesive: Basis of design "Sikadur 32 Hi-Mod" by Sika Corp. Other acceptable materials/manufacturers include the following:
   1. "Set-3G" by Simpson Strong-Tie (at buildings see structural drawings.).
   2. "Hit-RE 500" by Hilti (at buildings see structural drawings)
   3. "Euco 452 MV Epoxy System by Euclid Chemical co.
   5. "Rezi-Weld 1000" by WR Meadows.

2.3 MIXES

A. Mix design:
   1. Design structural concrete mixes required for the Project to provide:
      a. Concrete compressive strength:
         1) Footings/foundations: 4,000 PSI at 28 days, 6 sack min, 0.50 max water/cement ratio.
         2) Slab-on-grade & curbs: 3,000 PSI at 28 days, 5 sack min, 0.45 max water/cement ratio.
      b. Adequate workability and proper consistency to permit concrete to be worked readily into the forms and around reinforcement without segregation and excessive bleeding.
      c. Other requirements noted on the Drawings and specified herein.
   2. Determine proper proportions for design mixes in compliance with ACI 211 or ACI 318.
   3. Proportion and design mixes to result in concrete slump(s) at point of placement not exceeding the maximum recommended by ACI 301 and as accepted in the mix design.
   4. Use air-entraining admixture in all exterior concrete, unless otherwise shown or specified. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within 4 percent to 6 percent.
   5. Compressive Break Testing shall be conducted in compliance with ASTM C 39.

B. Submit reports showing results of sieve analysis, mix design and results of compression tests.
   1. Make test specimens from not less than 3 batches of each design mix.
   2. The trial batch strength for each mix shall exceed indicated fc by 25 percent or a lesser amount based on standard deviations of strength test records according to ACI 318.

3. Do not start concrete production until mixes have been reviewed and are acceptable to the Architect.

C. For each batch, weigh fine and coarse aggregate separately, measure cement and water separately and introduce separately into the mix so that proportions can be accurately controlled and easily checked.

D. Do not change proportions established by the accepted mix design without the Architect's written approval.
   1. Cement: If concrete develops less than required minimum strength, adjust mix proportions and increase the amount of cement, as necessary.
   2. Water: Do not exceed predetermined amount of water because of slowness of discharge from mixer or any other reasons, but reduce water to minimum necessary to produce concrete that will work readily into corners and angles of forms and around reinforcements, without segregation of materials and without free water collecting on the surface.
   3. Aggregate: Reasonable variations in grading will be allowed by the Architect because of characteristics of available materials and the need for workability and strength.

E. Concrete mixing:
   1. Mixing and delivery shall comply with ASTM C 94, these Specifications, and Building Code requirements.
   2. Owner's Testing Agency will perform check sieve analysis of the aggregates being used, check compliance with mix design and the cement being used against mix design; check that water has been removed from the drum before adding mix ingredients for the following load and shall witness the loading of mixing trucks. The Fire District's Testing Agency will send a written report of each inspection to Architect indicating compliance with these Specifications.
   3. In addition to the requirements of ASTM C 94 section 16.1, provide the following information on delivery tickets signed by an authorized representative of the batching plant with each mixer truck of concrete delivered to the site.
      a. Type and brand of cement.
      b. Cement content per cubic yard of concrete.
      c. Maximum size of aggregate.
      d. Total water content expressed as water/cement ratio.
      e. Time batched.
   4. Deliver batch tickets to Inspector at the site when concrete is delivered.
   5. Maintain equipment in proper operating condition, with drums cleaned before each new batch. Schedule rates of delivery in order to prevent delay of placing the concrete after mixing, or holding dry-mixed materials too long in the mixer before the addition of water and admixtures.
   6. Remove all materials, including water remaining in the ready-mix truck drum, completely before ingredients for the following loads are introduced in the drum.

7. Do not use concrete that has not been placed 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is introduced into the mix.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. As applicable for each placing operation, verify accuracy of lines, levels, elevations and dimensions for excavations, subgrade, vapor retarder and formwork.

C. Verify reinforcing and accessories for proper position, sizes, clearances, fastenings, laps and splices.

D. Verify that no vapor retarder damage has occurred since the pre-installation conference Inspection.
   1. Repair damage to achieve complete and continuous vapor barrier membrane.

E. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

A. Place items to be embedded in concrete, including but not limited to, conduits, sleeves, nailers, anchor and rough hardware, built into concrete as indicated or required.
   1. Do not embed piping and conduits, other than steel electrical conduits, in structural concrete. Locate conduits so as to reduce strength of the structure the least amount, as approved by the Architect, and as indicated on the Drawings.
   2. Embed bolts, inserts and other items in the concrete. Secure accurately so that they are not displaced during concrete placing, compacting and finishing operations. Wire tie, nail or bolt embeds securely to forms.
   3. Set embedded bolts for materials and equipment attached to concrete to template, layouts and shop drawings. Verify size, length and location of electrical conduits with respect to equipment supports.
   4. Fill voids in sleeves, insert and anchor slots temporarily with readily removable material to prevent entry of concrete in the voids.
   5. Install expansion joint fillers where indicated, and as required to isolate concrete slabs-on-grade from other building elements such as walls and equipment pads. Cover filler with plastic joint cap and leave in place until ready to receive sealant.

B. Moisten, do not saturate, earth, subgrade and bearing surfaces. Do not place concrete on muddy subgrade.

C. Wet wood forms thoroughly when they are not treated with form release agent. Wet other materials sufficiently to reduce suction and maintain concrete workability.

D. Mask areas to receive sealants, caulking compounds or waterproofing/coatings before application of curing or sealing agents.

E. Do not proceed with placement of concrete until conditions are satisfactory.

3.3 CONVEYING

A. Rapid handling: Transport concrete from the mixer to location of placing as rapidly as practical to avoid separation or loss of ingredients**.**

B. Transporting methods: Use pipes, cranes, carts, buggies or other approved means to deliver concrete to final locations. Do not use delivery systems (pipe, chutes, etc.) formed of aluminum for transporting concrete.

C. Free fall:
   1. As directed by job conditions at each location, but not more than 4ft. where concrete will be exposed in the Work and 6ft. at all other locations.
   2. Avoid large concentration of concrete in one location that would produce unacceptable deflection in supporting form work.

D. Concrete flow:
   1. Keep surface of concrete level during placing with a minimum of concrete allowed to flow from one position to another.
   2. Carry concrete up uniformly for the length of walls being placed to reduce lateral flow of concrete to 5ft. maximum.

E. Runways: Construct substantial runways and scaffolding to avoid movement and vibration in the forms and reinforcing steel as a result of transporting and placing concrete.

3.4 PLACING

A. General: Comply with ACI PRC 304R. Do not place concrete in or under water.

B. Consolidation: Thoroughly consolidate concrete and work it around reinforcement and embedded items and into corners and angles of forms, by spading, spreading, and tamping to exclude rock pockets, air bubbles and “honeycombs” and to obtain required density and strength.

C. Internal vibration:
   1. Use mechanical vibrators to consolidate each layer with the previously placed, to completely embed reinforcement and fixtures, and to bring fine materials to the faces and top surfaces to produce the proper finish.
   2. Assign at least one workman at each location where concrete is being placed to vibrate and consolidate the concrete in forms. Do not "over-vibrate" to prevent separation of ingredients.
   3. Keep extra operable standby vibrator at the site.
   4. Do not use vibrator to move concrete.

D. Flow of concrete:
   1. Keep surface of concrete level during placing, with a minimum of concrete allowed to flow from one position to another.
   2. Place concrete in a continuous operation until each section or panel has been completed.

E. Record: Keep records showing location, date and time of placement and quantity of concrete place on the Project.

F. Floor slabs: Shape slabs to the levels, slopes and elevations indicated and accurately pitch or grade to drainage fittings and fixtures installed in them. Where indicated, depress slabs to receive other finishes.

G. Construction joints:
   1. Location: Locate joints to least impair the strength and appearance of the structure. **Obtain the Architect's approval of construction joint locations before casting concrete.** In general construction joints shall be located as follows, unless otherwise indicated on the Drawings.
      a. In slabs-on-grade locate joints, offset not less than 5 ft.,with a minimum short dimension (width) of 60'-0". Allow proper time lapse in placing floor sections adjoining prior placings.
      b. Continue reinforcement across joints, unless otherwise indicated.
   2. Provide keyways at least 1-1/2-inch deep in construction joints in slabs, and between walls and footings; use prefabricated bulkheads specified for slabs in Section 031000.
   3. Keep exposed face of construction joints continuously moist from time of initial set until subsequent placing of concrete against them, but not to exceed the curing period. When not damp, wet (do not saturate) the contact surface of joints for a minimum of 24 hours before placing adjoining concrete.
      a. Before placing adjoining concrete surface to remove laitance, loosened particles of aggregate or damaged concrete, and expose sound, coarse aggregates solidly embedded in the matrix.

b. To achieve the above, and contact surface may be washed with clean water under pressure wet blast, may be sandblasted, or in areas which will not concealed from view when the building is completed an approved structural adhesive may be used on clean, structurally sound concrete. Remove wash water entirely from surface.

c. If a contact surface becomes coated with foreign materials of any nature after being cleaned, clean again to suitable conditions.

H. Site tolerance: Finish surfaces to a tolerance of 1/8 inch in 10 feet when measured with a 10-foot straightedge placed anywhere on the surface, except as specified in Section 033500 for polished concrete floors. Variation from level likewise shall not exceed 1/8"-inch overall.

3.5 FINISHING

A. As specified in Section 033500 - Concrete Finishing.

3.6 MISCELLANEOUS CONCRETE WORK

A. Provide all other concrete work indicated or required to complete the Work, even though not specifically specified, including the following.

B. Equipment bases and foundations:
1. Provide machine, and equipment bases and foundations where indicated on Drawings.
2. Set anchor bolts for machines and equipment with a template at correct elevations, complying with diagrams or templates by the manufacturer furnishing the machines and equipment.

C. Construct pits, trenches, curbs, integrally cast equipment pads, and other miscellaneous concrete work to the profile and dimensions indicated.

D. Grouting and dry-packing: Comply with the grout manufacturer printed instructions and the following.
1. Mix material with sufficient water so it flows under its own weight for grout, and to just moisten and bind the material together for dry-pack.
2. Place dry-pack by forcing and rodding to fill all voids and provide complete bearing under plates. Place fluid grout from one side only and puddle to completely fill voids; do not remove dams or forms until grout attains initial set. Finish exposed surfaces smooth and damp cure at least 3 days.

3.7 FIELD QUALITY CONTROL

A. Site tests: The following will be performed by the School District's Testing Agency.
   1. Sample will be taken during progress of the work to determine slump, compression strength, aggregate sieve analysis, and grout-mix tests, with assistance furnished by the Contractor.
   2. Minimum of 3 cylinders will be made for each day's pour or for each 150 cu. yards or once for each 5,000 sq. ft. (per ACI 318 26.12.2.1) of surface area, whichever is less, for each type of concrete being cast. At the request of the Contract and approval of the Owner, extra cylinders shall be taken to determine earlier strength gain, if needed, such as at 3 days or 14 days.
   3. One cylinder will be tested at 7 days, and one cylinder at 28 days. The remaining cylinder will be kept in reserve in case tests are unsatisfactory.
   4. Sample will be made in compliance with ASTM C 172.
   5. Specimens will be made and laboratory cured in compliance with ASTM C 31.
   6. The 28-days value will be the criteria for acceptance of concrete regarding strength only.
      a. 7-day tests may be regarded as indicative of compliance or non-compliance with the 28-days strength requirements, and the Contractor should be guided accordingly in matter of adjusting proportions, if necessary, and notify the Architect.
      b. 7-days test shall also be a guide to the Contractor regarding time for form removal.
   7. Slump tests will be made for each set of tests cylinders in compliance with ASTM C 143.

B. Test evaluation:
   1. Concrete cylinder test will be evaluated in compliance with ACI 318.
   2. If 28-day test results indicate that concrete strength is not as specified, core concrete as directed by the Architect in compliance with ASTM C 42.
      a. Plug core hole solid as specified in Article 3.6D above.
      b. The cost of cores, tests and patching shall be borne by the Contractor.
   3. In the event that additional core tests do not show strength required, or as determined by load tests made in compliance with ACI 318, the defective concrete shall be removed and replaced, or shall be reinforced as directed by the Architect, at the Contractor's expense.
   4. If core tests results fall below design strength specified, adjust the concrete mix or water content for future batches, at no additional cost to the District.

C. Defective concrete:
   1. Concrete which does not meet the requirements of the Contract Documents will be deemed defective.
   2. Remove defective concrete as directed by Architect and replace with concrete meeting the requirements of the Contract Documents, at no additional cost to the District.

3.9 PROTECTING/CLEANING

A. Take suitable precautions in compliance with applicable ACI requirements to secure satisfactory concrete in either hot or cold weather.

B. Restrict construction vehicular traffic on slabs-on-grade to prevent damage and straining.

C. Protect concrete to prevent damage and staining.

D. Protect work of other trades from damage by work of this Section with heavy Kraft paper securely taped in place.
   1. Maintain protection in effective condition for as long as need for protection exists.
   2. Control use of water within the building so that no damage to previously installed work or existing structure and finishes will occur.

E. Upon completion, wash and clean exposed concrete and leave free of oil, paint, plaster and foreign substances, ready to receive applied finishes or to be left exposed.

END OF SECTION

CONCRETE FINISHING
SECTION 03 3500

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Finishing concrete surfaces.
   2. This Section supplements Section 03 3000.

B. Related work:
   1. Division 07 9200, for sealants.
   2. Division 09 9723, for interior concrete floor sealer.

1.2 SUBMITTALS

A. Data: Manufacturer's data, including installation instructions where applicable, for the following items before proceeding with this work.
   1. Curing and curing/hardening compounds.
   2. Curing paper.
   3. Bonding agents.
   4. Patching and surfacing compounds.
   5. Expansion joint filler.

1.3 QUALITY ASSURANCE

A. Mockups: Provide 4-foot by 4-foot mockups of the each concrete finish specified for the Architect's approval prior to commencing concrete work. Repeat mockups if first ones prove unsatisfactory. Locate mockups where directed at the site.
   1. Broom, float and trowel finishes.
   2. Exposed aggregate finish.

1.4 HANDLING/PROJECT CONDITIONS

A. Protection: Protect adjacent surfaces from staining and damage by covering them with impermeable coverings securely taped in place.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. As specified in Section 03 3000.

B. Water: Fresh, clean, and free of oil and other materials injurious to concrete.

2.2 CURING COMPOUNDS

A. General: Curing, hardening and sealing agents to be applied sequentially shall be products of single manufacturer. Where products of different manufacturers are used including proprietary topping and surfacing materials, confirm their compatibility with respective manufacturers.

B. Mask areas to receive sealants, caulking compounds or coatings before application of curing or sealing agents.
   1. Compound shall produce a uniform, continuous, adherent film that does not check, crack, or peel and is free from pinholes or other imperfections. Cure permanently exposed surfaces with a clear-type membrane-forming curing compound containing a fugitive dye.
   2. Curing compound used on exposed concrete surfaces shall be non-discoloring, fast drying and shall be conclusively demonstrated not to darken or yellow with age.
   3. Curing compound for use on concrete floors to receive adhered covering shall be specially formulated for such use and shall be certified by the manufacturer not to inhibit the bonding qualities of fiooring adhesives. Refer to the Finish Schedule on the Drawings for specific finish materials and areas of application.

C. Compatibility: Use compound guaranteed not to affect the appearance of the concrete surfaces, and the bond, adhesion, or effectiveness of finishes and surface treatment specified herein to be applied to concrete.

D. Type I, moist cure only: Rollout waterproof covering complying with ASTM C 171
   1. Ultracure NCF, Sika Corp.
   2. or equal.

E. Type II cure only: ASTM C 309 Type 1, Class A and B, liquid membrane-forming, non-penetrating, fugitive dyed compound for interior or exterior use.
   1. Safe-Cure & Seal 309, ChemMaster Inc.
   2. CC-309-1WS, W.R. Meadows Inc.
   3. Kurez DR-100, Euclid Chemical Co.
   4. Cure & Seal 309 J18, Dayton Superior.
   5. Or equal.

F. Type III, cure and seal: Apply one coat for curing and second coat for sealing.
   1. Polycure, SpecChem Inc.lear, Upco Co., Division of USM.
   2. Eucocure VOX, Euclid Chemical Co.
   3. Singlestep WB by PROSOCO, Inc.
   4. Or equal.

G. Type IV, Moist Cure, Hardener & Sealer:
   1. Ashford Formula, Curecrete Distribution, Inc.
   2.
   3. Hornolith hardener, Tams Industries Inc.
   4.
   5. Sure Hard Densifier J17, Dayton Chemical.
   6. Euco Diamond Hard, Euclid Chemical Co.
   7. Surfhard, The Euclid Chemical Co.
   8. Or equal.

H. Sealer for "exposed aggregate" concrete: Sonoglaze by Sonneborn, or equal.
   1. Expo-Glass, W.R. Meadows Inc.
   2. Or Equal.

2.3 MISCELLANEOUS MATERIALS

A. Bonding agent (non-structural): ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

B. Surface retarder: Top Cast by Chryso, Lithotex by Sika Corp., Rulasol 5 by Sika Corp., or Top-Stop CDE by W.R. Meadows, Inc..

C. Expansion/contraction joint materials:
   1. Joint filler: Homex 300 Expansion Joint by Homasote Co. or equal non-bituminous product compatible with sealant specified in Section 079200. Use in combination with Greenstreak plastic joint cap made by Greenstreak or equal.
   2. Joint sealant and back-up rod: As specified in Section 079200.

PART 3- EXECUTION

3.1 EXAMINATION

A. Joints in flatwork:
   1. Set premolded expansion joint strip below finished surface with a slightly tapered, dressed, wood strip, temporarily secured to top of expansion strip to provide space for sealant, or use an extruded plastic strip, approved by the Architect.
   2. Install expansion joints in straight or curved lines as indicated.
   3. After concrete finishing operations are completed, and concrete is cured, fill void formed by the strip with sealant as specified in Section 079200. Provide joints where indicated and in all cases where concrete flatwork abuts vertical elements such as walls, columns and curbs.

3.2 GENERAL REQUIREMENTS

A. Finish concrete surfaces to produce a uniform appearance throughout area involved and throughout adjacent areas with the same treatment.
   1. Finish and measure surface so gap at any point between concrete surface and an unleveled freestanding 10-foot long straightedge, resting on 2 high spots and placed anywhere on the surface, does not exceed the following:
      a. 1/4 inch (ACI 11.7 Class B) for exterior locations.
      b. 1/8 inch (ACI 117 Class A) for interior locations.

B. Where concrete finishing occurs adjacent to finished metal and similar surfaces, particularly where serrated or indented surfaces occur, remove all traces of cement film before allowing concrete to harden.

C. Use no troweling machines within 12-inch of electrical junction and outlet boxes set to finish flush with concrete floors.
   1. Float and trowel such areas by hand with wood floats and steel trowels, using caution so that concrete is finished flush with box cover and matches adjacent surfaces.

D. Concrete finish will be considered defective and shall be repaired, when the repairs are acceptable to the Architect, or removed and replaced with proper work conforming to Contract Documents, at no additional cost to District, when:
   1. It does not match approved mockups.
   2. It is not true to lines and planes.
   3. It is not properly troweled and surfaced as required, and varies in excess of 1/8-inch along a 10-foot straightedge (except for surfaces to receive a topping slab).
   4. Is scuffed or has a rough surface, except where required.
   5. Does not connect properly to adjoining work.
   6. Does not slope to drains.
   7. Is not properly cured.

3.3 MARKINGS

A. At expansion joints and elsewhere as indicated, provide markings with a rounded edging or marking tool, to a 1/4-inch radius. In textured work, edge and mark with a combination edging and smoothing tool approximately 1-1/2-inch wide.

B. Where indicated, provide cut markings sawn into surface of cured concrete with a diamond tipped or other abrasive saw within 12 hours after placing slabs. Coordinate this work with the work of other Sections to avoid damage to adjacent vertical or horizontal surfaces.

C. Make marking lines straight, or curved where required by the Drawings, equally spaced and parallel to adjacent lines and walls, edges and other construction, and of uniform depth and cross section, with intersections accurately formed.

3.4 BUILT IN ITEMS

A. Set items furnished under this or other Sections and finish to floor fixtures and other floor features as indicated. Adjust finish to properly connect and fit to other work. Slope floor to drain where indicated.

B. Floor drains and other items furnished and installed under other Sections: Finish concrete surface flush with rims unless detailed otherwise.

C. Exercise particular care with respect to drains to ascertain that they are installed at proper elevations to permit drainage. Do not proceed until corrective work has been performed and accepted.

3.5 FINISHING FORMED SURFACES

A. General:
   1. Remove fins, laitance and loose materials from concrete surfaces when forms are removed.
   2. Repair honeycombs, rock pockets, sand runs, spalls and other damaged surfaces by removing the damaged or unsatisfactory area to sound concrete, with slightly undercut edges, and filling-in with the same mix as the adjacent concrete minus the coarse aggregate.
   3. Fill-in tie holes with the same mix as the adjacent concrete minus the coarse aggregate.
   4. Tamp and float, or trowel patches flush with adjacent surface and to match adjacent concrete texture.

B. Smooth form finish:
   1. Provide as-cast smooth form finish for formed concrete surfaces that will remain exposed-to-view, or that will be covered with a material applied directly to the concrete, or a material bonded to the concrete such as waterproofing, painting, and similar system.
   2. Provide smooth form finish by selecting form material to impart a smooth, hard, uniform texture and arranging forms in an orderly and symmetrical pattern, with a minimum of seams.
   3. Repair and patch defective areas with fins or other projections completely removed and smooth.

C. Related unformed surfaces:
   1. At tops of wall, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with textured matching the adjacent formed surfaces.

   2. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surface, unless otherwise shown.

D. Curing:
   1. Wet the tops and exposed portions of formed concrete and keep moist until forms are removed.

   2. If forms are removed before 14 days after concrete is cast, coat concrete with curing compound Type II applied as specified for curing compound Type III for flatwork below.

3.6 COMPACTING AND FLOATING FLATWORK

A. Bring slabs with monolithic finish to proper level using screeds and strike off with a straightedge. Remove excess water and laitance.
   1. Compact and consolidate to embed coarse aggregates.
   2. Float and test surfaces with a 10-foot straightedge and eliminate high and low spots to comply with tolerances specified.
   3. From this point, use methods and tools necessary to produce surface finish specified.

B. Use continuous screeds of such type and construction and so spaced and located as to produce surface tolerances specified.

3.7 METHODS OF FINISHING AND CURING FLATWORK

A. Water Curing Type I: For surfaces to receive concrete topping, bonded cementitious setting beds, thin-set ceramic and paver tiles, and elastomeric floor coating.
   1. After troweling and as soon as it can be done without marring finish, lay curing paper, lap seams 3 inches and seal with pressure-sensitive tape.
   2. Keep concrete continuously moist for 14 days minimum. Leave paper in place as temporary protection as long as possible.

B. Curing/hardening compound Type IV: For interior slabs not scheduled to receive a deferred finish.
   1. After troweling or finishing and as soon as it can be done without marring the finish, spray curing and hardening compound uniformly in compliance with its manufacturer instructions submitted to the Architect, as specified in Article 1.2 of this Section.

2. When the manufacturer recommends a coverage range, use the heavier application unless otherwise permitted by the Architect.
3. Examine at regular intervals that the compound film is intact. If damaged, moisten the concrete and apply additional compound.

C. Curing compound Types II and III: For all other concrete flatwork.
1. Promptly after troweling or finishing, apply curing compound uniformly by spray as described above for sealer.
2. Examine at regular intervals that the compound film is intact. If damaged, moisten the concrete and apply additional compound.

D. Protection: Unless otherwise recommended by the curing compound manufacturer, restrict traffic on treated slabs for a minimum of 8 hours under normal conditions.

3.8 MOISTURE CONTROL

A. In addition to finishing requirements specified, use a water fog spray to reduce plastic shrinkage cracks during flatwork finishing operations when conditions of low humidity and high temperature exist, or use evaporation retarder specified.
1. Immediately after wet concrete has been leveled, or sloped as required, and the shiny film of moisture disappears, start fog spraying and continue until final troweling, by applying a light film of moisture with an atomizing type sprayer.
2. Use frequent light applications of moisture rather than excessive amounts at any one time. Adjust the amount and frequency of fog spray as required by variable conditions of weather, wind, temperature and humidity.

3.9 FLATWORK FINISHES

A. Integral Float Finish:
1. Use for curbs, gutters, surfaces to receive roofing and waterproofing membrane, and ceramic and paver tile whether on conventional setting bed over a cleavage membrane or dry-set over concrete slab.
2. After screeding and compacting, finish with a wood float using a rotary or darbied circular motion to produce a uniform texture and finish throughout.

B. Integral smooth steel trowel finish:
1. Use for surfaces to receive carpet, resilient flooring, and surfaces that have no other specific finish specified.
2. Trowel surface until the slabs are finished to a smooth, hard, burnished surface.
3. Consolidate the concrete surface by final hand troweling operation, free of trowel marks, uniform in texture and appearance, and with surface plane tolerance specified. Grind smooth surface defects that would telegraph through applied fioor covering system.

4. Where surfaces will receive elastomeric coating and thin set tiles, in lieu of the final troweling, brush surface lightly with a broom or floor brush as recommended by the coating manufacturer. Coordinate finishing operations with the trades applying the elastomeric coating and performing the tile work.

C. Raked or scratched finish:
   1. Use for surfaces to receive a bonded topping slab or cementitious setting bed.
   2. After screeding and compacting, roughen finish with a garden rake or other appropriate tool to provide a mechanical bond for topping slabs.

D. Broom finish: Use where indicated on the Drawings.
   1. After screeding, compacting and floating, sweep the finish with a coarse broom, against a straightedge at right angle to the slope or direction of travel, to produce a uniform non- skid surface with the depressions parallel and at a uniform depth.
      a. Medium Broom Finish: At slopes less than 6%.
      b. Heavy Broom Finish: At slopes less than 6%.
   2. Time this operation to texture slabs at the same age to obtain a uniform finish throughout.

3.10 ADJUST/CLEAN

A. Protect exposed concrete work as necessary to prevent damage resulting from impact or from subsequent work or rubbish.

B. Protect adjacent work from damages by this work with heavy Kraft paper or polyethylene film.

C. Maintain protection in effective condition for as long as need for protection exists.

D. Control use of water within the building so that no damage to previously installed work or existing structures and finish occurs.

END OF SECTION

POLISHED CONCRETE
SECTION 033543

PART 1 GENERAL

1.1 SUMMARY

A. Section includes: Specification for the grinding, epoxy soaking/filling and polishing of concrete slabs on grade, having a bare, slip resistant finish, at new restrooms and art room.

1.2 REFERENCES

A. National Floor Safety Institute (NFSI)
   1. NFSI B101.1 - Test method for measuring the wet SCOF of hard-surface walkways

1.3 INFORMATION SUBMITTALS

A. Installers Qualifications
   1. Installing contractor must be able to provide documentation verifying a minimum of 5 years of documented experience and 3 projects of similar requirements including epoxy resin soaking, precision flattening and overall quality of polishing. Previous jobs will be inspected for quality of workmanship.

1.4 QUALITY ASSURANCE

A. Pre-installation Meetings: Conduct a pre-installation meeting to verify project requirements and manufacturer's installation instructions. 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. Installation of polished floor finishes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Ensure each manufacturer has a minimum 5 years experience in manufacturing components similar to or exceeding requirements of project.

2.2 POLISHED CONCRETE FINISHING PRODUCTS

A. Epoxy soaking resin
   1. Acceptable material: Kemko 246 MVR epoxy primer or equal.
   2. ChemCo Systems, Inc., 2800 Bay Road, Redwood City, CA 94063; Telephone 650-261-3790; FAX 650-261-3799; website: www.chemcosystems.com
   3. Any alternate epoxy resin submitted must be two-component, have a low viscosity and a minimum 24 hour pot life. It also must not be a water-based formulation.

B. Final stain resistant sealer, Premium Impregnating Sealer by Stain-Proof LTD., (no substitution allowed)
   1. Stain-Proof, 150 Dascomb Road Andover, MA 01810; Telephone 978-482-2048.

C. Joint Sealant
   1. Acceptable material: SikaFLEX-2c SL by Sika Corp.
   2. Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071; Telephone 201-933-8800.
   3. Two component, self-leveling urethane sealant to be applied with hand-operated caulking guns after being mixed to manufacturer's specifications and in color of owner's choice.
   4. No poly-urea or epoxy or single component urethane joint sealants are allowed.

PART 3 EXECUTION

3.1 MANUFACTURERS INSTRUCTIONS

A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, and product carton installation instructions.

3.2 GENERAL REQUIREMENTS FOR INSTALLATION OF THE POLISHED FLOOR SYSTEM

A. All initial flattening and grinding though 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 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" wide plastic film or other suitable protective material to the walls and then 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.

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 flat and level condition up to the face of the wall.

E. Any dry grinding starting with the 400 grit level shall be done in conjunction with a dust collector of suitable size and power to adequately eliminate airborne dust and to keep the floor adequately clean.

3.3 INSTALLATION FOR CONCRETE SLABS ON GRADE

A. Floor Surface Polishing and Treatment

1. Prior to starting any grinding, all open and unprotected construction or control joints shall be filled with a polymer modified cementitious grout or epoxy mortar so as to protect the joint edges against cracking or spalling off during the grinding phase.
2. Provide polished concrete floor treatment in entirety of slab indicated by drawings. Grind to flatten surface of irregularities such as curled joint edges and high ridges. The flattening process shall be continued until a flatness of 1/8" in 10 ft. is achieved. Grind using 30/40 grit diamond tooling on a planetary or other dual action type floor grinder, having three or more cutting heads and an overall cutting diameter of 24" minimum. Grind to remove all the cement rich "cream" thus exposing 1/8 inch to 1/4 inch diameter aggregate at a minimum. Where relatively high areas are ground off in the flattening process, aggregate of larger size will be exposed. Great care shall be exercised in grinding excessively low areas to not cause swirl marks or gouges.
3. Clean and fill all undesirable chips and cracks with a clear epoxy/sand mortar to the architect's and owner's satisfaction. All cracks are to be filled to the top and welded tight.
4. After the 60/80 grit grinding step is completed, the floor shall be cleaned of all grinding slurry and powder deposits. Once the floor exhibits total surface dryness, it is to have a prime coat applied of a two component, clear, low viscosity, minimum 24 hour pot life epoxy resin tightly toweled over the entire surface. Excess resin on the surface shall be removed with a steel trowel or with a squeegee. Water based epoxy shall not be used. The epoxy may be thinned slightly with a compatible solvent to facilitate penetration into the concrete surface.
5. After the initial epoxy prime coat has cured sufficiently, a second epoxy coat shall be applied and trowelled out so as to totally fill all remaining holes, cracks, porous stones or other porous areas. Depending on the temperature, the epoxy may need to cure for 2 to 3 days before it is hard enough to grind.

6. Re-saw all construction joints and control joints to a width of 3/16" to 1/4" by approximately 3/4" to 1" deep. Clean the joints by pressure washing and then install foam "backer rod" approximately 3/8" deep. Finally, mix and install the urethane joint sealant using hand-operated caulking guns. Tool the top of the sealant so that a slight downward "meniscus" is formed below the adjacent surfaces.
7. Next, all the excess epoxy resin on the surface shall be completely ground off with 120 grit diamond tooling, wet. The floor will be inspected after this step and a "knife scrape test" performed to ensure that no excess resin remains on the tops of polished stones. Care shall be exercised during the grinding process to not excessively grind the surface, thus removing too much of the resin saturated cement paste located between the stones and to not open up new porosity just below the surface.
8. Continue polishing with 200 grit wet, then with 400 grit and finally with 800 grit, resulting in a high gloss finish.
9. After the 800 polish is completed, apply one thin coat of Stain Proof's, "Premium Impregnating Sealer" permanent sealer as per manufacturer's recommendations. While the surface is still slightly wet, buff in the remainder with a high-speed buffer with a non-abrasive pad.

3.4 FIELD QUALITY CONTROL

A. Inspect completed polished concrete floor system with Owner, Contractor, Architect, and Installer.

B. Review procedures with Architect to correct unacceptable areas of completed polished concrete floor system.

C. Testing: Test the following from completed polished concrete floor system:
   1. Static Coefficient of Friction, ASTM C 1028.
      a. Dry Surface
      b. Wet Surface
   2. Specular Gloss/Reflectance, ASTM D 523.
   3. Floor Surface Profiles, ASTM E 1155.

3.5 PROTECTION

A. Protect completed polished concrete floor system from damage until Substantial Completion.
   1. All trades will be informed that the slab must be protected at all times.
   2. Repair damaged areas of completed polished concrete floor system to the satisfaction of the Architect.

END OF SECTION

CONCRETE MASONRY UNIT
SECTION 04 2200

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Concrete Masonry Unit (CMU) Specifications.
   2. Grout for use with CMU construction.
   3. Mortar for use with CMU construction.

B. Related work:
   1. Section 03 2000, Concrete Reinforcing.
   2. Section 03 3000, Cast-In-Place Concrete.
   3. Division 5, Anchor Bolts.
   4. Division 9, Painting.

C. Definitions:
   1. Concrete Masonry Unit Construction may heretofore be referred to as:
      a. CMU
      b. Block
      c. Masonry
   2. These terms may collectively be used to either individual units or to general work including units, mortar, grout, and/or reinforcement.

1.2 REFERENCES

A. ASTM International:
   1. ASTM C90, Dry-Cast Load-bearing Concrete Masonry Units.
   2. ASTM C144, Aggregate for Masonry Mortar.
   3. ASTM C150, Portland Cement.
   4. ASTM C207, Hydrated Lime for Masonry Purposes.
   5. ASTM C270, Mortar for Unit Masonry.
   6. ASTM C404, Aggregates for Masonry Gout.
   7. ASTM C490, Use of Apparatus for the Determination of Length Change of Hardened Cement Past, Mortar, and Concrete.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 013 3000.

B. Product Data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

C. Certification: Prior to delivery of concrete masonry materials to the job site, deliver to the Architect a letter from the Manufacturer of the proposed masonry units certifying that all such units to be delivered to the job site are in strict conformance with the provisions of this section.

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 the work of this Section.

B. Codes and Standards: In addition to complying with the California Code of Regulations, Title 24, comply with the Standards of Masonry Installation described in "Reinforced Concrete Masonry Construction Inspector's Handbook", published by California Masonry Council (formerly Masonry Institute of America).

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units above ground on level platforms which allow air circulation under the stacked units. Cover and protect against wetting prior to use.

B. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

C. Replacements: 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.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Ball Wall CMU:
   1. Standard blocks shall be 8" x 8" x 16" (nominal) sizes to match existing, with 2" cap, f'm 2,000 psi minimum, and shall conform to the requirements of ASTM C90 medium weight or light weight units. Other size blocks and profiles shall be as shown on the drawings.

2. Concrete Block Color/Texture:
   a. Standard grey, smooth face.

B. Shrinkage of blocks shall not exceed the amount specified in ASTM C90.

C. Water Content:
1. At the time of delivery to the jobsite, concrete masonry units shall have a value, in weight of contained water, of not more than 35% of the fully saturated content for the unit tested.
2. Ship all units from the factory, and store at the jobsite, with all necessary protection to prevent increase of water content from rain and other sources.

2.2 MORTAR

A. All mortar for concrete block shall conform to ASTM C270 and shall have grey color matching block.

B. Mortar Type S:
1. Proportioned per ASTM C270 Proportion Table.

2.3 REINFORCING STEEL

A. Install steel reinforcement as indicated on the drawings, per requirements specified in Section 03 2000.

2.4 GROUT

A. Provide grout with proportion of ingredients in accordance with ASTM C476.

B. Grout shall have a compressive strength of 2000 psi at 28 days.

C. Grout shall have a slump of 8 to 11 inches.

2.5 AGGREGATES

A. Aggregate for masonry mortar: ASTM C144.

B. Aggregate for masonry grout: ASTM C404.

2.6 HYDRATED LIME

A. ASTM C207, Type S.

2.7 PORTLAND CEMENT

A. For Grout: ASTM C150, type I.

2.8 ADMIXTURE

A. No admixutures for grouting are allowed except “Sika Grout Aid” for concrete block masonry.

2.9 OTHER MATERIALS

A. All other materials not specifically described but required for a complete and proper installation of the work of this Section shall be as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION AND COORDINATION

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

B. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this Section.

C. Use a mechanical mixer of one sack minimum capacity. Mix mortar for at least 3 minutes after all materials have been added. Mix only as much mortar as can be used in one hour after water has been first mixed in the batch. Do not re-temper mortar.

3.2 INSTALLATION

A. Construct in accordance with the requirements of CCR Title 24, Section 2104A.5
   1. All CMU shall be grouted in low lifts.

B. General: Lay-up all walls in running bond, plumb, level and true to the lines and dimensions shown on the drawings. Do not use chipped or broken units. If any such units are discovered in the finished wall, the Architect may require their removal and replacement with new units at no additional cost to the Owner.

C. Dampening:
   1. Store all masonry units on the job so that they are kept off the ground and protected from the rain.

2. Wetting the units will not be permitted, except when hot and dry weather exists, causing the units to be warm to the touch, and then only the surface (not the interior) may be wetted with a light fog spray.

D. Mixing Mortar:
1. Use a mechanical mixer of one sack minimum capacity. Mix mortar for at least 3 minutes afer all materials have been added. Mix only as much mortar as can be used in one hour after water has been first mixed in the batch. Do not re-temper mortar.

E. Laying-Up:
1. Place all units in mortar with full-shoved bed and head joints.
2. Align all vertical cells to maintain a clear, unobstructed system of flues.
3. Hold racking to an absolute minimum.
4. Provide cleanouts as required for removing mortar droppings. Do not close the cleanouts until they have been inspected and approved by the Inspector.

F. Reinforcement: Install all reinforcement as indicated on the drawings. Fully embed reinforcement in grout, not in mortar or mortar joints. Provide all required metal accessories to ensure accurate alignment of steel during grout filling operations.

G. Joints: Flush, both sides.

3.5 GROUTING

A. General: Perform all work in strict accordance with the provisions as described in Section 2104A of the California Building Code, 2025 edition.

B. Timing: Do not grout until masonry mortar has cured at least 48 hours.

C. Consolidation: Consolidate all grout at time of pouring by puddling with a mechanical vibrator, filling all cells of the masonry, and then reconsolidating layer by puddling before plasticity is lost.

3.6 QUALITY CONTROL

A. Upon completion of masonry work, make a thorough inspection of all CMU work. Damaged units or joints not in conformance with the requirements of this section shall be repaired (or replaced, at the direction of the Architect) at no cost to the Owner.

3.7 CLEANING

A. Clean all surfaces of CMU construction as required for proper application of finish (as applicable). If CMU is unfinished clean in such a manner that surves are free of all debris, mortar droppings, or other adverse detritus.

B. Promptly clean areas around work of all debris associated with the performance of the work (ie.: mortar droppings, broken units, tools, or equipment). Area should be neat and orderly at the end of each work day.

END OF SECTION

STRUCTURAL STEEL
SECTION 051200

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Structural steel as indicated on the Drawings and defined and enumerated in Section 2, "Definition of Structural Steel, of AISC Code of Standard Practice for Steel Building and Bridges."

B. Work furnished but installed in other Section:
   1. Anchor bolts and loose bearing and setting plates for installation by other trades in their work.

C. Related work:
   1. Division 3 for grouting beneath base and bearing plates.
   2. Division 5 for Cold Formed Metal Framing.
   3. Division 9 for finish painting.

1.2 REFERENCE

A. AISC 360 - Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings, and Commentary and Supplements.

B. AISC Manual of Steel Construction, 15th Edition.

C. AISC 303 - Code of Standard Practice for Steel Building and Bridges.

D. AWS D1.1 - Structural Welding Code-Steel.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Complete shop and erection diagrams.
   2. Make erection diagrams as complete as possible before first submittal.
   3. Should more than one submittal be required, later submittals shall clearly identify material added or revised subsequent to period submittal.

4. Indicate all shop and erection details, including cuts, penetrations for pipes and ducts where applicable, copes, connections, holes, threaded fasteners, and welds.
5. Identify welds, both shop and field, by AWS A2.4, Symbols for Welding and Nondestructive Testing.

B. Submit the following for information:
1. Proof of compliance for materials: Manufacturer's mill certificates and mill test reports for all structural steel to be used in the Work.
2. Welders certificates:
a. Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
b. If re-certification of welder is required, retesting will be Contractor's responsibility.
3. Welding sequence: Proposed field welding sequence and Weld Procedure Specification (WPS).

1.4 QUALITY ASSURANCE

A. Fabricator's qualifications: Firm specializing in performing work similar to that of this Section, with minimum 5 years of documented experience, certified by ICC or under the continuous inspection of a deputy inspector certified by the same body.

B. Erector's qualifications: Firm specializing in performing work similar to that of this Section with a minimum of 5 years of documented experience.

1.5 HANDLING

A. Storage:
1. Store steel members at the site above ground on platform, skids or other supports to allow for easy access for inspection and identification.
2. Protect steel from mechanical damage and corrosion.
3. Comply with the combined recommendations of the AWS and the electrode manufacturer for weld material storage and care. Do not use electrodes that have been wetted.
4. Store other materials in a weather tight and dry place, until ready for incorporation into this work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Channels, bars and other miscellaneous steel: ASTM A 36 (Fy-36ksi).

B. Hollow Structural Sections: ASTM A 500, Grade C (Fy=50ksi for rectangular sections, Fy=46ksi for round sections), domestic suppliers only, foreign sources are prohibited.

C. Steel pipe: ASTM A 53, Grade B.

D. Fastening materials: As noted on the Drawings or complying with the following.
   1. Unfinished threaded fasteners, together with their nuts and washers: ASTM A 307, Grade A, regular low carbon steel, hexagonal heads and nuts.
   2. High Strength Bolts: ASTM F3125 GR. A325N (to be used for all steel-to-steel connections).
   3. Arc-Welding electrodes: As required by AWS for the conditions of intended use and metal being welded.
   4. Powder Actuated Fasteners - as manufactured by Simpson Strong-tie - must comply with ESR-2138, or as manufactured by Hilti-Complying with ESR-2269.

E. Anchor bolts: ASTM F1554, Grade 36. Unless noted otherwise on Drawings.

F. Wide Flange Beams: ASTM A 992 (Fy=50ksi).

G. Plates: ASTM A36, (Fy=36ksi).

H. Primer:
   1. Series V10 by Tnemec Co.
   3. Carbocoat 150 universal primer by Carboline.

2.2 FABRICATION

A. Conform to the applicable provision of the AISC 303 and 360.

B. Before being fabricated, or worked, wire-brush materials clean of loose mill scale and rust, and straighten by methods that will not injure the steel and so that they will comply with AISC tolerance.
   1. After punching or working a member remove twists or bends before the parts are assembled.
   2. Finished members shall be free from twists, bends, and open joints when erected.

C. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence, which will expedite erection and minimize field handling of materials.

D. Punching, drilling and reaming:
   1. Material may be punched 1/16 in. larger than the nominal diameter of the bolt, wherever the thickness of the metal is equal to or less than the diameter of the bolt plus 1/8 in.
   2. Where the metal is thicker than the diameter of the bolt plus 1/8 in., the holes shall be drilled and sub-punched and reamed.
   3. The die for sub-punched holes, and the drill for sub-drilled holes, shall be 1/16 in. smaller than the nominal diameter of the bolt to be accommodated.
   4. Finished holes shall be precisely located to insure passage of bolts through assembled materials without drifting.
   5. Enlargement of holes necessary to receive bolts shall be done by reaming.
   6. Poor matching of holes will be sufficient cause for rejection.

2.3 SHOP PAINTING

A. General:
   1. Thoroughly clean steel, and painted and unpainted iron materials provided under this Section of rust, scale and grease.
   2. Steel not to be painted:
      a. Surfaces to be welded or high-strength bolted with friction-type connections unless the primer meets AISC 360, Class B faying surface and is acceptable to authorities having jurisdiction for these connections.
      b. Surfaces embedded in concrete.
   3. Shop paint the following surfaces.
      a. Steel exposed to view.
      b. Steel exposed to the elements during construction.
      c. Embedded steel, which is partially exposed on exposed portions and initial 2 inches of embedded areas only.
      d. Apply 2 coats of primer to surfaces that will be inaccessible after assembly or erection.. Change color of second coat to distinguish it from first.

B. Cleaning method for steel to be painted: Comply with SSPC SP-3 Power Tool Cleaning.
   1. Immediately after cleaning, shop-apply paint at the rate, needed to obtain the dry film thickness recommended by the paint manufacturer.
   2. Field painting, except for touch-up, is not permitted.
   3. Paint with brushes entire surface to be covered smoothly, thoroughly with paint worked into all joints. Paint may be sprayed but must be back-brushed.
   4. Clean work arriving at site that has been carelessly painted and paint with an additional coat of paint before being erected, except that work that will be exposed to view in the finished construction shall be returned to shop for recleaning and repainting.
   5. Protect painted work until paint is thoroughly dry. Do not load material for shipment until shop coat is fully dry.

6. Unless primer used is approved for use with friction-type joints, do not prime surfaces within friction-type joints but coat with an approved rust-preventative that must be removed before components are permanently connected.
7. Do not coat surfaces to be welded within ½ in. of the toe of the weld, except that paint is allowed on surfaces on which metal decking or shear studs will be welded.

2.4 SOURCE QUALITY CONTROL

A. Tests of structural steel will be made and reports issued by the District's Testing Laboratory in compliance with the following:

B. Test of mill order steel: Where steel ordered from the mill, cut to length, is identified by heat or melt numbers and is accompanied by mill analysis test reports, such material may be used without further local tests, provided an acceptable affidavit is given to confirm that the material conform to Contract requirements.
1. In case of controversy, tension and bend tests of the materials, either locally or at the mill, as required for local stock, will be required.

C. Tests of local stock steel: In the event local stock structural steel can be identified by heat or melt number and is accompanied by mill analysis and test report, such stock may be used provided one tension and one bend test is made for each 100 tons or fractional part thereof of each shape, heat or melt of such stock as may be used in this work.
1. Where material cannot be identified, or its source is questionable, one tension and one bend test shall be made for each 20 tons or fractional part thereof of each shape, heat or melt, of such stock as may be used in this work for steel with a yield strength of 36,000 psi. For steel with yield strength of more than 36,000 psi, make one tension and one set of bend test for each piece.
2. Complete 4-sided surface inspection may be required for materials.

D. Take test specimens under the direction of the Testing Laboratory and machined to dimensions required by the applicable ASTM Specifications.

E. Prior to fabrication, the following areas in column flanges and girder flanges are subject to ultrasonic inspections:
1. Within 6 in. on either side of each groove-welded girder flange to column connection.
2. Within 3 in. on either side of the welded web or web plate to column connection.
3. Within 6 in. on either side of welded splice point in columns.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine governing dimensions and conditions at the site before starting erection.

B. Verify the location and elevation of anchor bolts and concrete surfaces supporting steel to verify that they meet the following tolerances:
   1. Elevation of concrete surfaces: Plus 3/8 in.
   2. Elevation top of anchor bolts: Plus 1 in., minus 3/8 in.
   3. Out-of -position of anchor bolts: Plus 1/8 in.

C. Correct conditions that would prevent proper and timely completion of this work before proceeding with erection.

3.2 ANCHOR BOLTS

A. Furnish anchor bolts and connection material to be embedded in concrete and masonry when and as required to maintain job progress.

B. Provide the necessary drawings and templates for the setting of such anchor bolts and connection material.

3.3 ERECTION

A. Erect structural steel in compliance with the Drawings, approved shop drawings, these Specifications, and the standards listed below, except provide washers on all bolted connections regardless of the tightening method used.
   1. AISC 360.
   2. AISC, Manual of Steel Construction.
   3. AISC 303.

B. Erection tolerances:
   1. Establish leveling and plumbing measurements on the mean operating temperature of the structure, making allowance for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
   2. Comply with AISC 306, and AISC 303, except that maximum deviation of exterior columns toward the building line shall not exceed ½ inch.
   3. All natural or induced cambers shall be up, to counter the weight of the member.

C. Erection: By professional riggers, carefully planned and laid out so that a minimum of cutting will be necessary.
   1. Erect work plumb, square and true to line, and level, in precise positions as indicated.
   2. Provide temporary bracing and guys where necessary to provide for loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation. Leave in place as long as necessary to safeguard all parts of the Work.

D. Set column base plates in exact position, both as to alignment, level, and elevation, and support on steel wedges, or equivalent, until the grout has thoroughly set.
   1. The center of each base shall be true to the column center within 1/16 in. and its elevation within 1/32 in. of theoretical lines.
   2. Plates shall be exactly level on both axes.

E. Temporary connections:
   1. As erection progresses, bolt-up the work as necessary to maintain the steel in proper position while field bolting and welding is being done, and as necessary to take care of dead loads, wind, and erection stresses.
   2. Do not proceed with field welding or high-strength bolting until structural steel has been properly aligned, plumbed and leveled.

F. Field assembly:
   1. Closely fit members and sections, and finish true to line and in precise position necessary to allow accurate erection and proper joining of parts in the field.
   2. Drifting to enlarge holes will not be allowed.
   3. Except for minor details and as noted for field welds, do not heat members without prior approval.
   4. Use caution when installing and fastening structural steel to remain exposed in the Work to avoid damage that would remain visible.

G. Contact Surfaces:
   1. Component part of built-up members shall be well-pinned and rigidly maintained in close contact using clamps or temporary bolting during welding.
   2. Compression joints depending upon contact bearing shall have bearing surfaces accurately milled perpendicular to this axis, or as detailed, and shall be free of mill scales, rust, paint, weld spatter and other foreign materials.

H. Gas Cutting:
   1. Use a cutting torch only where the metal being cut is not carrying stress during the operation, and provided stresses will not be transmitted through a flame-cut surface.
   2. Make gas cuts smooth and regular in contour.
   3. To determine the effective width of members so cut, deduct 1/8 in. from the width of the gas cut edges.

4. Make the radius or re-entrant gas cut fillets as large as practicable, but in no case more than 1 in.

I. Bolting:
   1. Impact wrench socket shall be bolt clearance type and shall have hardened inserts to scruff-up the outside nut face.
   2. Verify that the connections are properly shimmed and joint clamped as necessary to insure full contact of all faying surfaces. Take special care to insure that heavy members are in full contact at faying surfaces before torquing connections.

3.4 WELDING

A. Welding and welded joints: Detail and execute welds in compliance with AWS D1.1, as modified by AISC standards, and as detailed and noted on the Drawings.

B. Operators' qualifications: In addition to other qualification requirements specified, operators shall be thoroughly trained and experienced in arc welding of structures, capable of making uniformly reliable butt and fillet welds in flat, vertical and overhead positions, and of producing neat, consistent work in actual operation.

C. Special requirements for field full and partial penetration welds:
   1. Use copper back-up bar.
   2. Preheat area to be welded to a minimum of 275 deg. F and maintain the heat.
   3. Post cool down the welded area to ambient temperature. Cool down rate not to exceed 100 deg. F/hr. use propane torch or other means to achieve this rate.
   4. Remove the back-up bar, back scarf the area to sound material and reinforce the area with a minimum of 3/8 in. fillet weld.

D. Ultrasonic and visual inspection of welded connections: Refer to Article 3.7C below.

3.5 GROUTING OF PLATES

A. Grouting is specified in Section 033000.

B. Contractor shall be responsible for maintaining bearing plates in proper location and at proper level while they are being grouted.

3.6 TOUCHUP

A. Clean abraded areas of shop primer in compliance with SSPC SP11, to bright metal, and touchup with same primer used for shop priming. Extend steel preparation and primer application at least 2 in. on sound, undamaged primer.

B. For touching-up of galvanized steel, comply with AGA "Recommended Practice for Touchup of Damaged Galvanized Coatings," and ASTM A 780.

3.7 FIELD QUALITY CONTROL

A. The Testing Agency employed by the District will inspect all shop and field welding (except for welding done in a licensed shop), and high-strength bolting.
   1. Testing Agency will furnish qualified inspectors.
   2. Tests and inspection shall comply with Code requirements.
   3. Testing Agency will be required to certify in writing upon completion of this work that the welding and high-strength bolting have been performed in compliance with Drawings and Specification requirements and with all applicable requirements of regulatory agencies having jurisdiction.

B. The Testing Agency will test ten percent (10%) of high strength bolts with a manual torque wrench to verify power wrench accuracy if the turn of the nut or calibrated wrench methods of tightening are used. If the direct tension indicator method of tightening is used the Inspector shall observe the installation of bolts to determine that the approved procedure is properly used and shall determine that the correct indication of tension has been achieved in compliance with the washer manufacturer's instructions.

C. The Testing Agency will provide ultrasonic inspection of full or partial penetration welds in compliance with ASTM E 114.
   1. The search pattern shall include the entire weld volume.
   2. 100 percent inspection will be required for all shop and field full or partial penetration welds.
   3. Any discontinuity indication of total loss over a width of 1 in. or greater measured across the width of the column flange, or less than 1 in. in width and greater than 6 in. in length, is unacceptable.
   4. Area of internal discontinuities exceeding the maximum permissible limits may be repaired subject to the approval of the structural engineer and the building department. Sketching of the defect repair will be required for such approvals.

D. The Testing Agency will visually inspect all non-full or partial penetration welds and report on the result of the inspection.

END OF SECTION

STEEL DECKING
SECTION 05 31 00

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Roof Deck

B. Related Sections:
   1. Section 09 9000 - Painting

1.02 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product Data: Submit "Letter of Conformance" in accordance with Section 01 33 00 indicating specified items selected for use in project with the following supporting data.
   1. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.
   2. Welding Certificates: Copies of certificates for welding procedures and personnel.
   3. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
      a. Mechanical fasteners.
      b. Acoustical roof deck.
   4. Research/Evaluation Reports: Evidence of steel deck's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

C. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer with a minimum of five years of experience who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel," and AWS D1.3, "Structural Welding Code - Sheet Steel."

D. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E119 by a testing and inspection agency acceptable to authorities having jurisdiction.
   1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
   2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

F. FMG Listing: Provide steel roof deck evaluated by FMG and listed in FMG's "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

G. Comply with applicable provisions of the following specifications and documents:
   2. ASTM International Publications:
      b. A653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process"
      c. A780 "Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings"
      d. A1008 "Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability"
      e. E119 "Standard Test Methods for Fire Tests of Building Construction and Materials"

   3. American Welding Society (AWS) Publications:
      a. D1.1 "Structural Welding Code - Steel"
      b. D1.3 "Structural Welding Code - Sheet Steel"
   4. Steel Deck Institute (SDI) Publications:
      a. ANSI/SDI SD-2022 - “Standard For Steel Deck”

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Approved Manufacturer:
   1. Steel Deck:
      a. ASC Steel Deck (916-372-6851)

All other manufacturers shall provide submittal showing properties and connections specified on plans are matched or better.

B. Other deck manufacturers (must demonstrate equivalent properties per note above)
   1. Consolidated Systems, Inc. (CSi) Metal Dek Group (800-654-1912)
   2. Epic Metals Corporation (877-696-3742)
   3. Nucor, Vulcraft Group (843-662-0381)
   4. Roof Deck, Inc. (800-631-0057)
   5. United Steel Deck, Inc., a subsidiary of Bouras Industries Inc. (800-631-1215)
   6. Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp. (877-333-0900)
   7. Infinity Structures Inc. (678-513-4080)
   8. Verco Manufacturing Co. (602-272-1347).

2.02 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply the Steel Deck Institute's ANSI/SDI SD-2022 - "Standard for Steel Deck", and the following:
   1. Galvanized Prime-Painted Steel Sheet: ASTM A 653, Structural Steel (SS), Grade [40] minimum, Galvanized coating G-90 (0.9 oz per square foot).

B. Acoustical Roof Deck: Acoustical metal decking shall have the same properties as "steel roof deck" listed above with consistent diameter holes with fiberglass batts factory inserted into cells at duct prior to shipment to job site.

2.03 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws; as noted on drawings.

C. Side-Lap Fasteners: Sidelap to be as noted on drawings.

D. Rib Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck unless noted otherwise on the drawings; of profile indicated or required for application.

F. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI for overhang and/or slab depth.

H. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

I. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

J. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory punched hole of 3/8-inch minimum diameter.

K. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch-wide flanges and sloped recessed pans of 1-1/2- inch minimum depth. For drains, cut holes in the field.

L. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

M. Galvanizing Repair Paint: SSPC -Paint 20, with dry film containing a minimum of 94 percent zinc dust by weight.

N. Repair Paint: Lead- and chromate-free rust-inhibitive primer complying with performance requirements of SSPC - Paint 25.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.02 INSTALLATION - GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in ANSI/SDI SD-2022 “Standard for Steel Deck”, manufacturer's written instructions, approved shop drawings, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required, to meet deflection limitations.

C. Locate decking bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
   1. Align cellular deck panels for entire length of cell runs and align cells at ends of abutting panels.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions, with fastener size/spacing as indicated on drawings.

3.03 INSTALLATION - ROOF DECK

A. Fasten roof deck panels to steel supporting members by fasteners indicated on drawings; fasten roof deck panels to cold formed joists with screws as indicated on Drawings.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals shown on the structural drawings. Side lap fastening shall meet or exceed performance of ASC sidelap connection “Peltagrip.”

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches, with end joints lapped 2” minimum.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking and weld flanges to top of deck. Space welds not more than 12 inches apart with at least 1 weld at each corner.

E. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.04 FIELD QUALITY CONTROL

A. Contractor shall engage an independent testing and inspecting agency acceptable to Owner and Architect to perform field inspections and tests and to prepare test reports.

B. Field welds shall have periodic inspection per DSA 103-22.

C. Testing agency will report test results promptly and in writing to Contractor, Owner’s Representative and Architect.

D. Remove and replace work that does not comply with specified requirements.

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

3.05 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Division 09 Section.

C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION

METAL FABRICATIONS
SECTION 055000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Metal fabrication work not classified as "structural steel", and not specified in other Sections.

   2. Handrails, guardrails and railings.

   3. Equipment Screens.

   4. Ladders.

   5. Safety posts at roof hatch(es).

   6. Miscellaneous angles, plates, bars, rods and other shapes, 10-gage and heavier, not specified in other Sections but required to complete the Work.

B. Furnish the following for installation in other Sections:
   1. Other miscellaneous items not mentioned, but shown on the Drawings.

C. Related work:
   1. Division 9 for finish painting metal fabrications.

1.2 REFERENCES

A. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.

B. AISI North American S100 - Specification for the Design of Cold-Formed Steel Structural Members.

C. AWS D1.1 - Structural Welding Code- Steel.

D. AWS D1.3 - Structural Welding Code- Sheet Steel.

1.3 SYSTEM REQUIREMENTS

A. Performance requirements:
   1. Provide railings capable of withstanding the loads prescribed by Code without exceeding the allowable design working stress of the materials involved, including anchors and connections.

   2. Apply each load to produce the maximum stress in each component.

   3. Limit deflection of continuous or simply-supported members under load to L/240 or 1/4-inch, whichever is less.

   4. Limit deflection of cantilevered member to L/180 [or 26/360] or 3/8 inch, whichever is less.

B. Railings and handrails: Fabricate and install in compliance with CBC requirements.

1.4 SUBMITTALS

A. Data: Submit the following.
   1. Specifications and installation instructions for manufactured items.

   2. Submit manufacturer's literature, including engineering data, for drilled-in and chemical anchors, and shot pins.

B. Shop drawings; Large scale, dimensioned shop drawings of metal fabrications, indicating in detail methods of fabrication and assembly, weight, materials, holes, lugs, inserts, finishes and other pertinent data.

C. Samples: Submit the following samples at least 6 inches long.
   1. Welded connection between the following components showing proposed weld quality and finish.
      a. Pipe to pipe (railing).
      b. Tube to tube.

1.5 QUALITY ASSURANCE

A. Qualifications for welding work:
   1. Qualify welding procedures and welding operators in compliance with AWS "Qualification" requirements of AWS D1.1.

   2. Examine that welders to be employed in this work have satisfactorily passed AWS qualification tests.

3. If recertification of welders is required, retesting will be Contractor's responsibility.

B. Special inspections:
   1. Except where otherwise specified, special inspections by District's testing laboratory, prescribed by Code, will not be required where work is performed on the premises of a licensed fabricator, registered and approved by authorities having jurisdiction to perform such work without special inspection.

   2. Submit certificates of compliance to demonstrate compliance with the above requirement.

   3. Costs for fabricator tests, inspections and quality control shall be borne by the Contractor.

C. Railings and handrails: Fabricate and install in compliance with CBC requirements.

1.6 HANDLING

A. Delivery: Deliver bolts, nuts and washers in bags or boxes, properly tagged for identification.

B. Storage: Above ground, under cover. Store galvanized assemblies separated with strip spacers, in a dry, well-ventilated location to avoid wet storage stains.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal surfaces -general: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

B. Steel plates, shapes, and bars: ASTM A 36.

C. Steel tubing (refer to "Pipe/Tubing" below for handrails and railings):
   1. Cold-formed steel tubing: ASTM A 500, Grade A, B, or C, as required for design loading, unless otherwise indicated.
   2. Hot-formed steel tubing: ASTM A 501. For exterior installations and where otherwise specified, provide tubing with hot-dip galvanized coating.

D. Galvanized steel sheet:
   1. ASTM A 653, Grade 33, [Grade 50 for material 16GA (54 mils) and thicker], unless another grade required for design loading, G90 coating designation.

E. Aluminum Equipment Screen:
   1. 1" tall x 4" wide x 1/8" thick aluminum blades by Air Performance or approved equal. Aluminum alloy 5052-H32, Tensile yield strength: 28,000 PSI, Shear Strength 20,000 PSI.
      2. Finish: Custom powdered coat color by architect.
      3. Other Aluminum plates and shapes. Aluminum alloy 6061-T6, 6063-T5, or 6063-T6, min Tensile yield strength 21,000 PSI.
      4. Fasteners: Dewalt Alumi-flex per ESR 4374.

F. Steel pipe/tubing:
   1. Handrails and railing assemblies: One of the following.
      a. Welded and Drawn Over Mandrel (DOM), ASTM A 513, Type 5.
      b. Cold Drawn Seamless (CDS), ASTM A 519.
      c. Hot Finished Seamless (HFS), ASTM A 519, machined to match the finish of the DOM steel above.

G. Flanges and anchors: Cast or formed metal of the same type of material and finish as supported rails, unless otherwise indicated.

H. Concrete inserts:
   1. Threaded or wedge type galvanized ferrous castings, either malleable iron complying with ASTM A 47, or cast steel complying with ASTM A 27.

   2. Provide bolts, washers, and shims as required, hot-dip galvanized in compliance with ASTM A 153.

I. Welding rods and bare electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

J. Fasteners: Provide zinc-coated fasteners for exterior use or where built into exterior walls, elsewhere fasteners may be uncoated. Select fasteners for the type, grade, and class required.
   1. Bolts and nuts: Regular hexagon-head bolts, F3125 Gr A325 with hex nuts, ASTM A 563; and flat washers, unless otherwise indicated.

   2. Anchor bolts: ASTM F 1554, Grade 36. Unless noted otherwise on Drawings (Grade 55 for al holddowns and column base plates).

   3. Machine screws: ASME B18.6.3.

4. Lag bolts: ASME B18.2.1.

5. Wood screws: Flat head, carbon steel, ASME B18.6.1.

6. Plain washers: Round, carbon steel, ASME B18.21.1.

7. Lock washers: Helical, spring type, carbon steel, ASME B18.21.1.

8. Post-Installed Mechanical Anchors:
   a. Expansion anchors, Simpson Strong-Bolt 2, complying with ESR-3037 [concrete], or Hilti KG-TZ2, complying with ESR-4266 [concrete].

   b. Screw Type Anchors: Simpson Titen HD, complying with ESR-2713 [concrete]; or Hilti KH-EZ complying with ESR-3027 [concrete].

9. Chemical anchors:
   a. Simpson SET-3G Epoxy System, compling with ESR-4057 [concrete]; or Hilti HIT-HY200 v3, complying with ESR-4868 [concrete].

10. Shot pins: Simpson PDPA, complying wih ESR-2138, or Hilti X-U, complying with ESR-2269.

K. Grout:
   1. Pre-packaged, non-shrink, non-metallic grout, non-staining, nongaseous grout complying with ASTM C 1107.

   2. Provide grout specifically recommended by manufacturer for interior and exterior applications with minimum 28-day strength of 5,000 psi.

L. Cement (expansive): Factory-prepared with accelerators quick-setting hydraulic cement complying with ASTM C 595.

M. Shop primer for ferrous metal: Manufacturer or fabricator standard, fast-curing, lead-free, universal modified alkyd primer selected for compatibility with finish paint systems specified in Section 099000, and complying with performance requirements equal to or better than Tnemec Series V10.

N. Galvanizing repair (zinc-rich) paint: Tneme-Zinc 90-97 by Tnemec Co., Cathacoat 302H by Devoe Coatings a division of Paxton Co., ZRC by ZRC Worldwide, or Amercoat 68 HS by PPG Inc..

O. Bituminous paint: Cold-applied asphalt mastic complying with SSPC Paint 33, containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 MANUFACTURED ITEMS

A. Safety post: Where ladder terminates at roof hatch, provide Bilco "LadderUp" safety post or "Hatch Access Safety Rail" by Ladders LLC, complete with hardware and fasteners required for installation.

B. Aluminum ladders: See Drawings.

2.3 FABRICATION-GENERAL

A. Comply with the reference standards and the following.

B. Engineer, fabricate and install exterior components to allow for expansion and contraction for a temperature range of 150-degree F without causing buckling, excessive opening of joints, and over-stressing of welds and fasteners.

C. Drill holes for bolts and screws. For screws exposed to view in finished surfaces use flat head countersunk (FHCS) type with screw slots filled and finished fiush and smooth with adjacent surfaces.

D. Form exposed work true to line and level with accurate angles and surfaces, and straight, sharp edges, so assembling can be done without filler pieces.

E. Shear and punch metals cleanly and accurately. Remove burrs.

F. Remove sharp or rough areas on exposed surfaces. Projecting edges are not permitted. Ease exposed edges to a radius of approximately 1/32 inch.

G. Weld corners and seams continuously to comply with AWS recommendations and the following:
   1. Do not use stitch, spot or tack welds on exposed surfaces.

   2. Use materials, methods and welding sequence that minimize distortion and develop strength and corrosion resistance of base metals.

   3. Obtain fusion without undercut or overlap.

   4. Remove welding flux immediately.

5. At exposed connections, undercut edges of components to be welded, weld and finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

6. Where welds will be exposed to the elements, weld connections between various pieces continuously to prevent water intrusion in the weld area, or seal welded parts, after weld is ground, with silicone sealant specified in Section 079200.

H. Form bent metal corners to the smallest radius possible without causing grain separation or otherwise impairing the strength of the material.

I. Form exposed connections with flush, hairline joints, using concealed fasteners wherever possible. Cope intersections of rails and posts, weld joints, and grind smooth; butt weld end-to-end joints of railings or use welding connectors.

J. Bend pipe without collapsing or deforming its walls, to produce a smooth, uniform curved section and to maintain uniform sectional shape.

K. Fabricate joints that will be exposed to the weather to exclude water, or provide weep holes where water or condensation may accumulate.

L. Fabricate items to be galvanized in accordance with ASTM A 385. Limit use of vent and drain holes and locate where concealed from view in the finish work.

M. Cut, reinforce, drill, punch, thread and tap metal work as required to receive finish hardware and similar items of work.

N. Fabricate items in the largest Sections practical to minimize field jointing.

O. Provide supplementary parts necessary to complete each item of metal fabrication even though such parts may not be shown or specified. Provide all anchors, brackets, and sleeves for securing metal work to adjacent construction.

P. Remove blemishes by grinding before cleaning, treating, and applying specified finishes.

2.4 PIPE RAILING FABRICATION

A. General: Fabricate handrails and railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble handrails and railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

D. Connect members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose when acceptable to the Architect. Weld connections continuously to match approved samples.

E. Brackets, flanges, fittings, and anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other work, unless otherwise indicated.

1. Provide inserts and other anchorage devices for connecting handrails and railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.

2. For railing posts set in concrete, unless otherwise indicated, provide preset sleeves of steel not less than 6-inch long with inside dimensions not more than 1/2-inch greater than outside dimensions of post, and steel plate forming bottom closure.

F. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members that are exposed to exterior or to moisture from condensation or other sources.

G. Fabricate joints to be exposed to weather to be watertight.

H. Close exposed ends of handrail and railing members.

I. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch or less.

2.5 WELDING

A. Weld shop and field connections continuously in compliance with AWS D1.1, or AWS D1.3, unless bolted connections are specifically shown.

B. Grind smooth and flush welds that will remain exposed to match and blend with parent metal surfaces. Match approved weld samples.

2.6 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum offset between components at joints: 1/16 inch except that at welded joints no offset is allowed.

C. Maximum misalignment of adjacent members: 1/16 inch.

D. Maximum bow: 1/8 inch in 48 inches.

E. Maximum deviation from plane: 1/16 inch in 48 inches.

F. Tolerance not specified above shall conform to AISC 303 Standards.

G. Handrails shall conform to AISC 303 Section 10.

2.7 GALVANIZING

A. Hot-dip galvanize exterior metal items and items, as shown on the Drawings, after their fabrication in compliance with ASTM A 123 or A 153, as applicable except galvanized sheet steel.

B. Coating weight shall conform to Table 1 of ASTM A 123, or ASTM A 153, as applicable.

C. Excessive dross, rough surfaces, blisters, lumpiness, runs, edge tears, spikes, and chromate quenching are unacceptable.

D. Safeguard assemblies against steel embrittlement in compliance with ASTM A 143, and against distortion in compliance with ASTM A 384.

E. Plug vent holes with zinc or aluminum plug after galvanizing.

F. If necessary to prevent humid storage staining, quench freshly galvanized steel in a passivating solution.

2.8 SHOP PRIMING

A. Apply a heavy coat of bituminous paint to metal surfaces in contact with concrete or masonry. Do not apply on exposed surfaces.

B. Shop prime all other metal assemblies as follows:
   1. Prepare surfaces in accordance with SSPC SP-3 Power Tool Cleaning and the following.

   2. Remove loose mill scale, rust, cutting and punching burrs, oil, grease and other deleterious materials before priming.

   3. Immediately after surface preparation, apply primer in compliance with the paint manufacturer's printed instructions to provide a uniform dry film thickness of not less than 1-1/2 mils per coat. Use painting methods that will result in full coverage of joints, corners, edges and all exposed surfaces.

   4. Apply primer to completely cover all exposed surfaces as well as surfaces concealed after assembly. Stripe paint corners, crevices, bolts, welds, and sharp edges.

   5. Allow paint to dry thoroughly before handling.

   6. Apply one coat of primer to surfaces exposed in the finished work, and 2 coats to surfaces that will be inaccessible after their assembly or erection.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

C. Provide other trades with metal items to be embedded in their work. Where necessary, provide templates and instructions for this work.

3.2 INSTALLATION

A. Fastening:
   1. Provide anchorage devices and fasteners required for attaching metal fabrications to in- place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, LAG bolts, wood screws and other connectors required.

   2. Dry-pack metal fabrications supported on concrete and masonry as specified in Section 033000 to provide firm, level bearing surfaces.

B. Cutting, fitting and placing:
   1. Perform all cutting, drilling and fitting required for installation of metal fabrications.

   2. Set items accurately in their proper location, alignment and elevation, plumb, level, true and free of rack as measured from established lines and levels.

   3. Provide temporary bracing or anchors for items to be built into concrete, masonry or similar construction.

   4. Fit exposed connections accurately to form flush, hairline joints.

   5. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and flush with parent metal.

C. Field welding: Comply with AWS Code for procedures of manual shielded arc welding, appearance and quality of welds made, and methods used to correct faulty welds.

D. Prefabricated items: Install as specified, and in compliance with their manufacturer's printed instructions.

E. Finish hardware:
   1. Drill and tap gate frames on the job as required for installation of hardware.

   2. Install hardware accurately fitted to gates and frames.

   3. Adjust to operate smoothly and without sticking and binding.

   4. Gates shall close uniformly against frame. When open in any position, gates shall remain stationary, without drifting.

   5. Cane bolt shall be lockable in engaged and unengaged positions.

   6. Latch shall engage strike and keeper regardless of the degree of force with which gates are closed.

   7. Where so required for smooth and noiseless operation, lubricate hardware in compliance with its manufacturer instructions.

3.3 TOUCHUP

A. General: Immediately after erection, clean field welds, bolted connections and abraded areas, and proceed as follows.

B. Damaged primer: Clean the damaged area, sand smooth, re-clean and spot-prime with the same paint as that used for shop priming applied to a minimum thickness of 2 dry mils.

C. Damaged zinc coating: Repair damaged areas with zinc-based solder in accordance with ASTM A 780, regardless of the width of the abrasion (not limited to 3/16-inch). When specifically approved by the Architect, Contractor may use zinc-rich paint applied in multiple coats to dry film thickness of 8 mils.

END OF SECTION

ROUGH CARPENTRY
SECTION 061000

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:
   1. Plywood sheathing (OSB is not permitted).
   2. Wood grounds, nailers and blocking.
   3. Rough hardware and fasteners.
   4. Miscellaneous accessories required for a complete installation.

B. Work furnished but installed in other Sections:
   1. Division 3 for anchor bolts.

C. Related work:
   1. Division 26 for plywood backboards for electrical and telephone equipment.

1.2 DEFINITIONS

A. Board: Lumber that is less than 2 inches nominal in the lesser dimension and 2 inches nominal or more in the greater dimension.

B. Dimension lumber: Lumber that is 2 inches nominal or more but less than 5 inches nominal in the lesser dimension.

C. Exposed framing: Dimension lumber not concealed by other construction and indicated to receive a stained or natural finish.

1.3 SUBMITTALS

A. Data: Submit wood treatment manufacturer's product data, specifications and instructions for proper use for each type of treated material.

B. Certificates:
   1. For each type of pressure treatment specified, submit a letter from the treating plant indicating chemicals and process used and net amount of preservative retained; and degree of corrosiveness; and stating that all materials meet or exceed the specified requirements.

2. For water-borne preservatives, include statement that moisture content of treated materials was reduced to a maximum of 19 percent for lumber and 15 percent for plywood prior to shipment of wood products to the project site.

1.4 QUALITY ASSURANCE

A. All wood required to be preservative treated shall bear the quality mark of an inspection agency that maintains continuing supervision, testing and inspection over the quality of the preservative- treated wood. Inspection agencies for preservative-treated wood shall be listed by an accreditation body that complies with the requirements of the American Lumber Standards Treating Wood Program or equal. The quality mark shall be on a stamp or label affixed to the preservative-treated wood and shall include the following information:
   1. Identification of treating manufacturer.

   2. Type of preservative used.

   3. Minimum preservative retention.

   4. End use for which the product is treated.

   5. AWPA standard to which the product was treated.

   6. Identity of accredited inspection agency.

1.5 HANDLING

A. Storage: Keep materials dry.
   1. Do not store materials in wet or damp areas.

   2. Protect against exposure to weather and contact with damp or wet surfaces.

   3. Stack materials to provide for air circulation within and around stacks and under temporary coverings.

   4. Protect plywood from moisture by covering with waterproof coverings until the plywood has been covered with a finish material, or the building has been completely enclosed.

   5. Protect materials from damage during unloading and storage. Do not use damaged materials, or plywood panels with damaged corners, except after removing damaged portion.

B. Handling: In accordance with American Wood-Preservers' Association (AWPA) recommendations for storage and protection of pressure-treated wood.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Framing lumber: Unless otherwise indicated, provide S4S, grade-marked Douglas Fir/Larch, manufactured and graded according to West Coast Lumber Inspection Bureau (WCLIB) or Western Wood Products Association (WWPA) rules, of the sizes and grades indicated.
   1. Sizes: Sizes indicated are nominal. Actual sizes shall conform to American Lumber Standard Committee (ALSC) publication DOC PS 20.

   2. Grading: Provide each piece of lumber factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

   3. Season lumber to a moisture content of 19 percent or less and stamp "S-Dry".

B. Plywood: Unless otherwise indicated, provide grade-stamped Douglas Fir plywood, of the sizes and grades indicated, complying with American Plywood Association (APA) publication US Product Standard PS 1.

2.2 ACCESSORIES

A. Metal framing accessories: Provide standard galvanized or provide with approved corrosion protection paint steel joist hangers, framing anchors, fasteners and other such connection devices indicated that are acceptable to the authorities having jurisdiction. Use offset and skewed hangers, as required.

B. Builder's rough hardware: Use fasteners to attach pressure-treated wood that will not corrode due to treatment materials used in the manufacture, present at time of use or when in the presence of moisture. Use hot-dip galvanized fasteners complying with ASTM A 153, or stainless steel fasteners, where carpentry will remain exposed to the weather and where used in roofing assemblies.
   1. Nails and staples:
      a. Size and type complying with the authorities having jurisdiction, unless otherwise indicated.

      b. Nails to be used with framing accessories shall be those furnished by the manufacturer with the framing accessories.

2. Bolts, washers, lag bolts and wood screws:
   a. Galvanized or cadmium-plated steel of standard manufacture.
   b. Anchor bolts: ASTM F 1554.

C. Adhesive: Basis of design is for products by Franklin International, or equal.
   1. Construction adhesive: Titebond Premium Polyurethane Construction Adhesive.

D. Flashing membrane: As specified in Section 07 6000.

E. Sill sealer: Basis of design is for "Triple Guard Energy Sill Sealer" self-adhering closed cell polyethylene foam by the Protecto Wrap Co. or equal.

2.3 PRESERVATIVE TREATED WOOD

A. Basis of design is for "Preserve" or "Preserve Plus" ACQ wood preservative materials by Chemical Specialties, Inc., Charlotte, NC. Other materials, when approved by the Architect shall be CCA (chromium copper arsenate)-free.

B. Preservative treatment by pressure process for above ground use:
   1. ComplywithAWPAU1.

   2. Retention: In compliance with AWPA C2 for lumber and C9 for plywood except that lumber not in contact with the ground, and continuously protected from liquid water, may be treated with inorganic boron (SBX).

   3. Kiln dry after treatment to 19 percent maximum moisture content for lumber and 15 percent for plywood.

   4. Application: Treat wood in the following locations:
      a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in contact with roofing and metal fiashings, vapor barriers or waterproofing.

      b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with concrete. Each sill plate piece shall bear stamp of approved agency.

      c. Wood within 4 inches of grade.

      d. Decking, fence boards and other wood exposed to weather.

5. Treatment of wood nailers used in conjunction with built-up roofing shall be compatible with the roofing bitumen; oil-based preservatives are not acceptable.

2.4 FIRE-RETARDANT TREATED WOOD

A. Basis of design is for "D-Biaze" fire retardant by Chemical Specialties, Inc., Charlotte, NC, or equal.
   1. Use products for which fire-retardant manufacturer publishes physical properties of treated wood after exposure to elevated temperatures when tested, by a qualified independent testing agency, in compliance with ASTM D 5664 for lumber and ASTM D 5516 for plywood.

   2. Use products that do not promote corrosion of metal fasteners.

B. Fire-retardant treatment by pressure process: AWPA C20 for structural lumber and AWPA C27 for plywood .
   1. Use exterior type wood for exterior locations.

   2. Use Type A High Temperature (HT) wood for interior locations.

PRT 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

A. Carefully select all members.
   1. Select individual pieces so that knots and defects will not interfere with placement of bolts, with nailing or when making connections.

   2. Cutout and discard pieces with defects that make the piece unable to serve its intended function.

B. The Architect may reject lumber for excessive warp, twist, bow, crook, mildew, fungus or mold, as well as for improper cutting or fitting, whether or not it has been installed.

3.3 INSTALLATION

A. Nailing:
   1. Fasten framing anchors and steel bridging with galvanized special nails furnished with hardware in every nail hole, except where noted to be welded to structural steel supports in which case comply with AWS requirements.
   2. Where possible, nailed joints shall be assembled such that load is acting at right angle to the nail (shear).
      a. Where nailing at right angle is impossible, toe-nailing at an angle approximately 3D- degree to the wood grain is an acceptable method of fastening wood members together.

      b. Penetrated nail points are not allowed in exposed construction.

B. Screw fasteners: Install wood screws and lag bolts with complete penetration up to head. Bore lead holes approximately 3/4-diameter and same depth as shank; continue holes to a depth equal to length of the screw but with diameter approximately 3/4-thread root.
   1. Drill holes in pieces where splitting may occur.

   2. Remove split lumber and replace with new members.

C. Bolted connections:
   1. Make bolt holes in wood 1/16 in. larger in diameter than the bolt diameter. After tightening, nick bolt threads to prevent nut loosening.

   2. Provide bolts and lag screws with washers under heads and nuts that bear on wood.

   3. Where a finish material will be installed over the bolt, recess the bolt head or the nut so that they are recessed or flush with the face of the member being bolted.

   4. Tighten bolts and re-tighten shortly before being covered.

D. Treat field cuts and penetration in pressure-treated lumber in compliance with AWPA M4.

3.4 FRAMING MEMBERS

A. Erect framing neatly and substantially to best trade standards, including preparatory work for subsequent trades and conditions not actually detailed.

B. Do not cut or notch structural members, except as indicated or directed by the Architect.
   1. Splices are permitted in structural members.

   2. Reinforce interrupted members as detailed.

C. On framing and furring members to receive a finished wall or ceiling, align the finish framing so that finish surface will not vary not more than 1/8-inch from a theoretical plane or surfaces of the room or space, unless more stringent tolerance is specified. Make corners square.

D. Install joists, lintels, beams and rafters with crown up, unless otherwise noted with cut members making structural contact with bearings or each other for full bearing.

E. Anchor sills with fasteners of the size and spacing shown.
   1. Provide 2 fasteners per piece minimum.

   2. Install sill plates on continuous layer of sill sealer.

F. Extend wall and partition studs and mullions continuously from sill to plate, unless otherwise indicated. Provide double plates unless a lintel replaces the lower member. Stagger plate joints at least 4-feet.
   1. Where 2 or more studs are cut, provide header beams over the opening.

   2. In stud walls and partitions, extend at least one stud from sill to plate on each side of interior openings and 2 studs on each side of exterior openings. In addition, place one stud trimmer to support each end of lintels over openings.

   3. Frame walls and partitions at corners and intersections so that wall material cannot extend from one room to another.

G. Frame stud partitions, furring or walls containing electrical panels, plumbing, or other pipes to give required clearance for piping and fixtures.
   1. Place approved piping in center of plates using a neat hole. Notching is not permitted.

   2. Do not place pipes exceeding 1/3 the plate width in partitions used as bearing or shear walls.

   3. Pipes shall not pass through plates less than 5-1/2-inch wide.

H. Do not shim sills, joists, short studs, trimmers, headers, lintels and other framing members.

I. Make joints accurately and neatly for a square, tight fit. Remove and replace defective work.

3.5 PLYWOOD SHEATHING

A. Layout and nail plywood as indicated.

B. Install plywood with 1/16-inch space between panels for expansion and contraction. Do not force panels in place.
   1. Place end joints over supports with face grain running perpendicular to supports except as otherwise shown.

   2. Solid block unsupported panel edges where indicated.

C. Provide minimum 6-inch wide flashing membrane at the perimeter of exterior openings. Membrane must be solidly supported at all locations.
   1. Where no solid backing exists to support the flashing membrane, provide either plywood, or tight and solid blocking between studs.

   2. Lap in the direction of water flow.

D. Cover roof sheathing with roofing material as soon as possible after installation. Do not leave exposed to the elements longer than 2 days.

3.6 BLOCKING/FURRING/BRIDGING/NAILERS

A. Blocking:
   1. Solid block joists and rafters over all supports with blocking of the same size and material as the joist or rafter.

   2. Provide fire blocking and draft stops where required by the authorities having jurisdiction.

   3. Locate other blackings to facilitate installation of finishing materials, fixtures, trim and soffits.

B. Furring: Provide continuous spaced at 16-inches o.c. maximum.
   1. Install furring plumb and level. Shim where necessary to provide a true, even plane suitable to receive the finish required.

   2. Attach to concrete and masonry with shot pins in pre-drilled holes.

C. Bridging:
   1. Use nominal2-inch by 3-inch cross bridging, 2-inch solid bridging or 16-gage galvanized metal bridging.

   2. Nail bottom ends of bridging only after sheathing has been nailed.

D. Nailers: Provide nailers at connections of wood materials, and other finish materials, to concrete, CMU and metal framing.
   1. Template and drill nailers to match holes provided in steel framing.

2. Furnishing necessary bolts and washers.

3.7 CLEAN-UP

A. Dispose of pressure-treated wood in an authorized disposal area.

B. Do not bury wood of any type on the jobsite.

END OF SECTION

LAMINATED VENEER LUMBER
SECTION 061713

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Laminate Veneer Lumber (LVL)

B. Related work:
   1. Division 06 1000, for rough carpentry.

1.2 SYSTEM DESCRIPTION

A. Design requirements: Specified products shall be designed and manufactured to the standards set forth in ICC Evaluation Service Report No. ESR-2993.

1.3 SUBMITTALS

A. Data: Submit manufacturer's product data, specifications, typical installation details and other data for lumber, adhesives, fabrication process, preservative treatment and accessories as necessary to demonstrate compliance with the specified requirements.

B. Provide Drawings showing layout and Details necessary for determining fit and placement in the Building.

C. Provide Manufacturer’s calculations for member designs to fit the dimensions and loads indicated on the Plans.

1.4 QUALITY ASSURANCE

A. Uniformity: Obtain all structural composite lumber products used for the Project from the same manufacturer.

B. Manufacturer's qualifications:
   1. Firm with minimum of 5 years experience in the production of specified products.
   2. Obtain lumber only from a manufacturer who will send a qualified technical representative to the Project site before covering the work of this section to review installation.

C. Installer's qualifications: Firm and individuals with a minimum of 5 consecutive years experience in the installation of specified products on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.

D. Certifications: Factory-mark all lumber delivered to the Project site with stamp indicating product type and grade, ICC or CCMC evaluation report number, manufacturer's name, plant number and the independent inspection agency's logo.

1.5 HANDLING

A. Delivery: Deliver materials to project site in original protective wrappings, clearly labeled with manufacturer's identification labels intact and legible, indicating manufacturer's name, brand, type, source of product, date of manufacture, and grade.

B. Storage: Store engineered wood products as shipped, in original wrappers, flat and off the ground on support blocks as recommended by the manufacturer, protected from sun and water.
   1. Repair damaged or torn wrap with manufacturer's recommended repair tape.
   2. Store away from direct sunlight, combustible materials and sources of heat.
   3. Do not subject materials to abnormal heat, extreme dryness, humid conditions or sudden changes in temperature.

C. Handling:
   1. Handle products to avoid damage.
   2. To minimize checking, seal ends of lumber after trimming or cutting and before storing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of LVL design is for "LVL" Laminated Veneer Lumber by RedBuilt, or equal.

2.2 MATERIALS

A. Minimum Properties: Fb = 2,900 PSI; Fc = 750 PSI; Fv = 285 PSI; E = 2,000 PSI.

B. Lumber:
   1. Strands: Manufacturer's standard, from fast-growing trees such as aspen or poplar.
   2. Adhesive:. Manufacturer's standard exterior exposure "wet-use" type adhesive complying with ASTM D 2559.

C. Accessories:
   1. Builder's rough hardware: As specified in Section 06 1000.

   2. Metal framing accessories:
      a. Basis of design is for galvanized or cadmium-plated steel joist hangers, framing anchors, fasteners and other such connection devices shall be of standard manufacture, of the types indicated, by Simpson Strong-Tie Co.
      b. Nails used with the framing accessories shall be those furnished by the manufacturer with the framing accessories.
      c. End sealer: Manufacturer's standard transparent, colorless wood sealer, effective in retarding transmission of moisture at cross-grain cuts.

2.3 FABRICATION

A. Shop-fabricate lumber to the dimensions and profiles indicated, or required, in continuous lengths with strands oriented parallel to the member length, and in accordance with the reference standards.

B. Tolerances:
   1. Finish Length (as specified): ± 1/8"
   2. Depth: ± 1/16"
   3. Width: ± 1/16"

C. Identification: RedLam LVL shall be identified by a stamp indicating the product type and grade, ICC-ES Evaluation Report Number, manufacturer’s name, plant number, date of fabrication, and the independent inspection agency’s logo.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine adjacent construction and supports.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 INSTALLATION

A. General: Install in accordance with the Contract Drawings, the lumber manufacturer's recommendations, the requirements of the authorities having jurisdiction and the following.

   1. Erect plumb, true, securely anchored, accurately aligned, with all required fastenings, accessories, etc.

2. Align framing members to receive finished surfaces so the difference in plane between adjacent members is 1/8-inch or less at any point.
3. Accurately cut and solidly fit to provide strong, rigid joints with full bearing for members. Shimming is not be permitted.
4. Cut or notch sloping members as required in order to provide uniform bearing surfaces.

B. Connections: Comply with requirements and the following.
1. Lateral nail holding, bolts perpendicular to glue lines: Use holding requirements for Douglas Fir.
2. Nailing: Requirements are based on 1-3/4-inch by 3-1/2-inches members.
   a. Parallel to glue lines: 4-inch O.C. minimum for 10d common nails; 3-inch O.C. minimum for 8d nails.
   b. Perpendicular to glue lines: In accordance with requirements
3. Bolts: Use malleable iron washers under bolt heads and nuts, tighten securely, ensure bolt threads do not bear on wood.
4. Lag screws: Use malleable washers under heads. Screw, do not drive, lag screws.

C. Cutting: Cut members as shown on the Drawings for passage of pipes, conduits, etc.
1. Obtain Architect's permission prior to performing cutting not specifically shown.
2. Unless otherwise detailed, or required by the authorities having jurisdiction, reinforce locations where cutting is performed with 1/8-inch by 3-inch by 18-inch galvanized steel straps punched for 10d nails at 6-inch o.c.

D. Warranty: The product delivered shall be free from manufacturing errors or defects in workmanship and material. The project, when correctly installed and maintained, shall be warranted to perform as designed for the normal and expected life of the building.

3.3 FIELD QUALITY CONTROL

A. Temporary construction loads that cause member deflections or stresses beyond design limits are not permitted.

B. Manufacturer shall conduct periodic on-site inspections of installation operations to verify the lumber manufacturer's recommended procedures are being followed.

END OF SECTION

GLUE-LAMINATED BEAMS
SECTION 06 1813

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Glued-laminated (glulam) beams.
   2. Connectors, anchors and accessories.

B. Related Work:
   1. Division 05 5000, for metal fabrications.
   2. Division 06 1000, for rough carpentry.
   3. Division 09 9000, for finish painting.

1.2 SUBMITTALS

A. Data: Submit manufacturer's product data, specifications, typical installation details and other data for lumber, adhesives, fabrication process, preservative treatment and accessories as necessary to demonstrate compliance with the specified requirements.

B. Shop Drawings:
   1. Submit large scale, dimensioned drawings showing profiles, joints, finishes, wood species, and stress grade of lumber, type of adhesive and methods of fabrication.
   2. Show connections to adjacent construction. Furnish isometric drawings for conditions too difficult to illustrate in 2 dimensions.
   3. Coordinate the shop drawings with the work of other trades that are part of, or will be incorporated into, the work of this section. Indicate work to be performed by other trades, including adjacent and abutting materials to which this work is to be secured.

C. Certificates:
   1. Submit American Institute of Timber Construction (AITC) inspection certificate certifying that glulam members were produced in compliance with the provisions of AITC 200, Manufacturing Quality Control Systems Manual.
   2. Submit welder's certificates demonstrating welders to be employed in this work are current in their certification.

1.3 QUALITY ASSURANCE

A. Uniformity: Obtain glulam beams used for the Project from the same manufacturer.

B. Manufacturer's qualifications:
   1. Firm with minimum of 5 years of experience in the production of specified products.
   2. Obtain glulam beams only from a manufacturer who is AITC licensed, qualified to apply the AITC "Quality Inspected" mark, and operating in compliance with AITC 200.
   3. Fabrication of beams to occur within 400 miles of project site.

C. Installer's qualifications: Firm and individuals with a minimum of 5 consecutive years of experience in the installation of specified products on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.

D. Welder's qualifications: Qualify welding operators and welding procedures in compliance with AWS "Qualification" requirements of AWS D1.1 for steel.
   1. Verify welders to be employed in this work have satisfactorily passed AWS qualification tests and are current in their certification.
   2. If re-certification is required, retesting will be Contractor's responsibility.

E. Certifications: Factory-mark each glulam beam delivered to the Project site with the AITC "Quality Inspected" mark.

1.4 HANDLING

A. Delivery: Deliver materials to project site in original protective wrappings, clearly labeled with manufacturer's identification labels intact and legible, indicating manufacturer's name, brand, type, source of product, date of manufacture, UL classification, and grade.

B. Storage:
   1. Store materials outdoors, as shipped in original wrappers, off the ground on stickers or racks, protected with breathing type covers.
   2. Repair damaged or torn wrap with manufacturer's recommended repair tape.
   3. Store away from direct sunlight, combustible materials and sources of heat.
   4. Do not subject materials to abnormal heat, extreme dryness, humid conditions or sudden changes in temperature.

C. Handling:
   1. Handle products to avoid damage.
   2. To minimize checking, seal ends of beams after trimming or cutting.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Glulam wood members:
   1. Lumber: Comply with ANSI AITC A190.1 and applicable lumber association standards cited therein for lumber grades required to achieve glulam requirements for design values, appearance, fabrication limitations and species.
   2. Stress value: DF 24F V4 and DF 24F V8. Coordinate stress value with Drawings (DF 24F V8 shall be used for any/all multi-span beams and/or beams with cantilevers/overhangs).
   3. Lumber species: Douglas Fir. Lumber species applies to all the laminations in the glulam member; do not combine species.
   4. Appearances: AITC 110, Industrial Appearance Grade; Architectural Appearance where exposed to view.
   5. Adhesive: Manufacturer's standard exterior exposure "wet-use" type adhesive complying with one of the following:
      a. ASTM D 2559.
      b. GSA (Canadian Standards Association) 0112.9.
      c. JAS (Japanese Agricultural Standard) SE-9.
      d. DIN (Deutsches Institute fur Normung) 1052.
   6. End sealer: Manufacturer's standard transparent, colorless wood sealer, effective in retarding transmission of moisture at cross-grain cuts.
   7. Penetrating sealer: Manufacturer's standard translucent penetrating wood sealer, which will not interfere with application of wood stain and transparent finish, or paint finish specified in Section 09 9000.

B. Connectors, anchors, and accessories:
   1. Custom steel plates, Steel plates, shapes and bars: ASTM A 36.
   2. Bolts and nuts:
      a. Regular hexagon-head bolts, ASTM A 307, Grade A, Property Class 4.6; with hex nuts, ASTM A 563, and flat washers unless otherwise indicated.
      b. Provide bolts, washers, and shims as required, hot-dip galvanized in compliance with ASTM A 153.
   3. Welding electrodes: Select welding rods and bare electrodes in accordance with AWS specifications for the metal alloy to be welded.

2.2 FABRICATION

A. General: Comply with ANSI A190.1.
   1. Shop-fabricate for connections and connecting hardware to greatest extent feasible, including drilling of bolt holes.
   2. The required camber for fabrication of each member is shown on Drawings.

B. Preservative Treatment: As specified in Section 06 1000.
   1. End-cut sealing: Immediately after end-cutting each member to final length, and after wood treatment (if any), apply a saturation coat of end sealer to ends and other crosscut surfaces, keep surfaces "flood-coated" for not less than 10 minutes.

C. Seal coat: After fabrication and sanding of each unit, and end coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.

D. Welding: Welding of steel connection assemblies shall conform to the referenced AWS D1.1. Welders shall be qualified in compliance with Building Code requirements.

E. Factory-applied protection: Before shipping or exposing to outdoor conditions, individually wrap each member with manufacturer's standard, opaque, durable, water-resistant, plastic-coated paper covering, with water-resistant seams.
   1. Leave wrapping intact until beam installation.
   2. At manufacturer's option, small members of uniform size may be bundle-wrapped, in lieu of individual wrappings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine adjacent construction and supports.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

A. Plan and execute erection procedures so that close fit and neat appearance of joints and structure as a whole will not be impaired. When hoisting members into place, use padded or non-marring slings, and protect corners with wood blocking.

3.3 INSTALLATION

A. Install miscellaneous steel connectors, anchors, and accessories.

B. Erect glu-lam members plumb, with cambers up and fasten securely in place in the locations shown on the Drawings. Comply with AITC 105, Recommended Practice for the Erection of Structural Timber Framing, and these Specifications.
   1. Do not install damaged glulam members.
   2. Adequately brace members as they are placed to maintain safe position until full stability is provided.

C. Avoid cutting beams during erection, except for fastener drilling and other minor cutting. Coat cuts with end sealer as specified under “Fabrication” above.

D. After installation, allow flulam members to gradually season and adjust to temperature and moisture conditions of the structure.

3.4 PROTECTION

A. Protect glulam members in place during the construction period to prevent mars, marks, indentations, other damage and stains until acceptance by the Fire District. Remove protection when no longer needed.
   1. Do not remove wrapping on individually wrapped members until it will serve no useful purpose, including protection from weather, soiling and damage from work of other trades.
   2. Coordinate removal of wrapping with finishing work specified in Section 09 9000. Retain wrapping wherever it can serve as a painting shield.

B. Remove and replace materials that are damaged, loose, chipped, broken, have been stained, or that do not match adjacent materials or cannot be satisfactorily cleaned or repaired, as determined and directed by the Architect, at no cost to the Fire District.

END OF SECTION

FINISH CARPENTRY
SECTION 062000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes exposed:
   1. Wood window sills.
   2. Rough and finish hardware for this work.
   3. Nailers and blockings for the work of this Section.

B. Related work:
   1. Division 6 for rough carpentry.
   2. Division 7 for joint sealers.
   3. Division 9 for painting.
   4. Division 12 for casework.

1.2 REFERENCES

A. ALSC, American Lumber Standards Committee: Softwood Lumber Standards.

B. AWPA, American Wood Preservers' Association.

C. NFPA, National Forest Products Association.

D. WCLIB, West Coast Lumber Inspection Bureau, Standard Grading Rules for West Coast Lumber.

E. WWPA, Western Wood Products Association.

F. APA PS-1, Plywood Grading Rules.

G. WI, Woodwork Institute, Manual of Millwork.

1.3 SUBMITTALS

A. Shop drawings: Submit shop drawings for the window sills and miscellaneous wood trim; show at large scale materials, dimensions, profiles, and fabrication details.

1.4 QUALITY ASSURANCE

A. Installer's qualifications:
   1. Firm certified by WI under their "Certified Installer Program" or millwork manufacturer , or a firm specializing in finish carpentry with 3 years experience in installation of custom millwork similar to that required for this project.

B. Mockup:
   1. Before starting production work, assemble mockups for the Architect's review and approval.

   2. Approved mockup will be used as a standard for the Work.

1.5 HANDLING

A. Protection:
   A. Protect materials against exposure to weather and contact with damp or wet surfaces.
   B. Stack lumber as well as plywood and other panels.
   C. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1.6 PROJECT CONDITIONS

A. Do not deliver or install interior finish carpentry until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 LUMBER

A. Seasoning: Wood shall be properly kiln-dried according to accepted methods for the thickness and species required in compliance with the reference WI standard.

B. Species and grade:
   1. Concealed nailers and blockings: Douglas Fir conforming to WI section 3 Economy Grade.
   2. For an opaque finish: Birch or Poplar conforming to WI Section 3.

2.2 FINISH GRADE PLYWOOD

A. 5/8" thick birch plywood.
   1. Triple sanded.
   2. Grade B2.

2.3 ROUGH HARDWARE

A. Wood screws, nails and bolts: As selected by the Contractor.

B. Toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete work for anchorage.

2.4 FABRICATION

A. General:
   1. bricate finish carpentry to the dimensions, profiles and details shown.
   2. Whenever possible, conceal means of fastening various parts and members together in windows. Where exposed nailing is unavoidable, neatly set nails for putty stopping.

B. Wood trim:
   1. Fabricate to profiles and dimensions shown in compliance with WI section 9, Custom Grade requirements.
   2. Rout-out the back of trim members to be applied to fiat surfaces, except for members with ends exposed in the finished work.

2.5 FINISHING

A. In preparation for finish, clean woodwork and fill nail holes.

B. Finish woodwork smoothly dressed, belt-sanded at mill and hand sanded before its installation. Finish surfaces shall be free from open joints, hammer and machine marks, structural defects and surface blemishes.

C. Backprime woodwork on all surfaces which will be concealed with one coat of wood primer. Schedule delivery to allow time for application and drying of backprime coat before installation of woodwork for those items that have not been backprimed in the shop.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Verify that detrimental conditions are corrected before proceeding with installation.

C. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.

3.2 INSTALLATION

A. Install work of this Section, plumb, level, with tight, hairline, flush joints. Shim as required using concealed shims.

B. Cut to fit when not shop-fabricated or shop-cut to exact size. Where woodwork abuts other finished surfaces, scribe and cut for accurate fit. Before making cut-outs, drill pilot holes at corners.

3.3 REPAIRING/CLEANING

A. Replace finish carpentry damaged beyond satisfactory field repair, as determined by the Architect, with satisfactory work.

B. Clean exposed surfaces and leave ready to be painted or finished as specified.

END OF SECTION

INTERIOR ARCHITECTURAL WOODWORK
SECTION 06 4023

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installing of all modular cabinets with plastic laminate finish as shown and noted on the drawings and herein specified including cabinet hardware.

B. Related Work

1. Documents affecting work of this Section include, but are not necessarily limited to, General Condition, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALIFICATIONS OF FABRICATORS AND INSTALLERS

1. Use personnel who are thoroughly trained and experienced in the work involved and in the standards applied and in the recommended methods of fabrication and installation.

2. In acceptance or rejection of architectural woodwork, no allowance will be made for lack of skill on part of workmen.

1.3 SUBMITTALS

A. Within 35 days after award of contract, and before any architectural woodwork is delivered to the job site, submit complete shop drawings to the architect for approval in accordance with the provisions of Section 013300 of these specifications.

B. The Woodwork Institute “Certified Compliance Grade Stamp” may be requested. If requested, all fees to W.I. for initial inspection will be paid by the Owner. Any re-inspection and/or correction costs will be paid by the contractor.

C. Submit samples of the laminated plastic to the Architect for approval in accordance with the provisions of Section 013300 of these specifications and for the Architects selection of colors available in the specified material.

1.4 PRODUCT HANDLING

A. Protection: Protect the architectural woodwork before, during and after installation. Protect adjacent installed work of other trades.

B. Replacements: Replace or repair any damaged cabinets at no additional cost to the Owner.

PART 2 - PRODUCTS:

2.1 CABINETS

A. Grade: Fabricate all cabinets to "Woodwork Institute" standards for Custom Grade modular casework with plastic laminate finish on all exposed surfaces except as noted. Countertops to be square edge with backsplash.

B. Design: Flush Overlay design.

C. Core: MDF meeting the requirements of Woodwork Institute standards.

D. Plan coordination: Woodwork Institute design numbers are noted in the Millwork Schedule unless otherwise noted.

E. Hardware: Provide all cabinet hardware as indicated on the drawings and as required by the W.I. modular casework standard and meet ANSI/BHMA standards, grade 1, as required for a complete installation.

1. Provide Accuride (www.acuride.com , 562-903-0200) heavy duty full extension drawer guides on all drawer units.

2. Provide 4" S.S. "Wire" door and drawer pulls with a brushed finish.

3. Cabinet Locks: Schlage CL-Series (CL1000 for doors, CL2000 for drawers) master keyed to Room Doors per Section 087100.

F. Plastic Laminate: Provide plastic laminate on all exposed surfaces on enclosed cabinets and exposed ends of groups of modular cabinets. Comply with W.I. "Custom Grade" rules on finishes of open shelving and knee space areas. The plastic laminate shall be produced by one of the following manufacturers, or an equal, in the standard range of colors and of the approved manufacturer. Adhesive shall be per W.I. recommendation.

1. Mfg: Formica
   10155 Reading Rd, Cincinnati, OH 45241, 1-800-367-6422,
   www.formica.com
   Type: High Pressure Laminate
   Color: by Architect
   Finish: Matte

2. Mfg: Pionite/ Panolam
   2 Corporate Drive, Suite 946, Shelton, CT 06484, 1-877-726-6526,
   www.panolam.com
   Type: High Pressure Laminate
   Color: by Architect
   Finish: Matte

3. Mfg: Wilsonart
   2501 Wilsonart Dr., Temple, TX 76504, 1-800-433-3222,
   www.wilsonart.com
   Type: High Pressure Laminate
   Color: by Architect
   Finish: Matte

G. Melamine Decorative Sheet: Provide Melamine on all interior surfaces of enclosed cabinets, drawer interiors, interiors of open shelving cabinets, shelves and knee space of base cabinets unless noted otherwise in the drawings. Adhesive shall be per W.I. recommendation.

H. Edgeband at doors, drawer fronts and false fronts shall be 3mm ABS.

I. Other Materials: All other materials, not specifically described but required for a complete and proper installation of the architectural woodwork, shall be as allowed per Woodwork Institute "Custom Grade" modular casework unless otherwise noted in the drawings and CHPS credits indicated.

PART 3 - EXECUTION:

3.1 WORKMANSHIP

A. Field Measurements: Take all necessary measurements in the field to ensure proper dimensions for cabinets.

B. Inspection: Carefully inspect the installed work of other trades and verify all such work is complete to the point where this work can properly commence. Notify the Architect of any significant discrepancy. Do not proceed with the work in areas of any discrepancy until the discrepancies have been resolved.

C. Fastening:

1. Install cabinets true, square, level, plumb and firmly anchored in place.

2. Exposed glue or other imperfections will not be accepted.

D. Exposed Faces: The surface of exposed faces of groups of modular cabinets shall match in height and depth.

E. Shim and/or shave toe space of base cabinets and wardrobe cabinets as necessary to maintain minimum and/or maximum dimensions for use by persons with disabilities.

F. Fabrication: Fabricate all cabinets in accordance with the approved shop drawings and referenced standards.

G. Scribe trim: Provide scribe trim with finish to match the cabinets. Provide plastic laminate finish in field where necessary to cover nails or other attachment methods.

3.2 FINAL INSPECTION

A. General: Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the Work, free from accumulation of sawdust, cut-ends, and debris.

B. Compliance: The Owner reserves the right to request and pay for an inspection by a representative of the Woodwork Institute to determine that all work of this section has been performed in accordance with the referenced standards. In the event such inspection determines that the work of this section does not comply with the referenced standards, the Contractor shall pay all costs of the initial inspection and any re-inspection and shall immediately remove all non-complying work and replace with countertop work complying with the referenced standards at no additional cost to the Owner.

END OF SECTION

BUILDING INSULATION
SECTION 072100

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Thermal insulation at following locations unless otherwise indicated or specified:
      a. In all exterior parapets.
      b. In all exterior walls above grade, except where louvers, vision glass and doors occur.
      c. In all wood rafter locations.
   2. Supplementary parts and components, such as clips, fasteners, supplementary framing, and other miscellaneous accessories required for a complete installation.

B. Related work:
   1. Division 23 for pipe and duct insulation.
   2. Division 9 for acoustical insulation and sealing.

1.2 SUBMITTALS

A. Data: For materials specified below.

B. Samples:
   1. Of each type of insulation, 24 inches square.
   2. 12 inches long samples of tape.

1.3 HANDLING

A. Packaging: Provide unopened containers and packages with labels bearing producer(s) name and source of product and date of manufacture, with UL classification on package.

B. Storage:
   1. Keep insulation protected while stored; keep dry during application.
   2. Outdoors, store off ground on pallets, protected with breathing type covers.
   3. Insulation shall be dry when installed.
   4. Remove insulation that becomes wet or damp immediately from the job site.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Install insulation in dry weather, unless building is enclosed.

B. If insulation will be exposed to the elements after installation, cover with waterproof membrane each day.

PART 2 - PRODUCTS

2.1 THERMAL INSULATION

A. "R" value: As indicated on Drawings.
   1. Type:
      a. R-21: 5.5" stud walls.
      b. R-30: wood rafters (size varies see plans).
   2. Type:
      a. Concealed: Kraft-faced Glass fiber or mineral wool batt or blanket insulation complying with ASTM C 665, Type Ill, Class C, formaldehyde-free by Johns Manville, Knauf, or equal and have stapling tabs.
      b. Exposed: Unfaced, glass fiber or mineral wood batt or blanket insulation complying with ASTM C 665, Type I, with a flame spread of 25 and a smoke developed of 50 or less, formaldehyde-free by Johns Manville, Knauf, or equal.
   3. Width: Batt width shall match the stud or rafter spacing. Provide wire supports for insulation to be installed where framing members exceed standard widths.

2.2 INSTALLATION MATERIALS

A. Staples, zinc-coated wires and other devices for fastening insulation: As recommended by the insulation manufacturer.

B. Insulation tape: "FSK Copolymer" by Compac Corp., (800. 631.9347), General Purpose FSK Facing Tape by Venture Tape, (800.343.1076) or equal FSK-faced cold weather tape a minimum of 2 inches wide.

C. Supplementary wood framing where required for insulation support: As specified in Section 061000.

PART 3- EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct detrimental conditions before proceeding with installation.

C. Before installing insulation in stud walls, thoroughly clean space of debris.

3.2 INSTALLATION

A. Install insulation where shown and specified. Cut to fit irregular spaces, butt edges into firm contact with each other and adjoining surfaces.
   1. Hand pack around pipes, ducts, conduits, electrical boxes, and other penetrations as required to thoroughly fill all voids and spaces between framing members and to form a continuous thermal barrier.
   2. Do not compress insulation more than 10 percent.
   3. Where door and window frames occur in insulated assemblies, cut additional strips of insulation and hand-pack to fill all voids in and around the frames.
   4. Comply with the California Electrical Code (CEC) for installation in proximity to light fixtures. Do not install insulation closer than recommended by CEC.
   5. Install kraft-faced insulation with kraft facing the building interior.

B. Where insulation in stud walls or roof rafters is not self-supporting, hold it in place with wires spaced not more than 16 inches o.c. horizontally or by other methods acceptable to the Architect.

C. After installation is complete, tape penetrations and ruptures in kraft facing.

3.3 FIELD QUALITY CONTROL

A. Prior to closing-in of insulated assemblies, or prior to Substantial Completion for insulation that will remain exposed in the building, refit, reinstall and/or replace wet, damaged and displaced insulation.

END OF SECTION

UNDERSLAB VAPOR BARRIER
SECTION 072613

PART 1 - GENERAL

1.1 SUMMARY

A. Products supplied under this section:
   1. Vapor barrier and installation accessories for installation under concrete slabs.

B. Related Sections:
   1. Section 03 3000 Cast-In-Place Concrete
   2. Division 31 for grading and compacting subgrade to receive vapor retarder.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E1745-11 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
   2. ASTM E1643 - 11 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. Technical Reference - American Concrete Institute (ACI):
   1. ACI 302.2 R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.3 SUBMITTALS

A. Quality control/assurance:
   1. Summary of test results per paragraph 9.3 of ASTM E 1745.
   2. Manufacturer’s samples and literature.
   3. Manufacturer’s installation instructions for placement, seaming and penetration repair instructions.
   4. All mandatory ASTM E1745 testing must be performed on a single production roll per ASTM E1745 Section 8.1.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Vapor barrier shall have all of the following qualities:
   1. Maintain permeance of less than0.01 Perms [grains/(ft² -hr-inHg)] as tested in accordance with mandatory conditions tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).

2. Other performance criteria:
   a. Strength: ASTM E1745 Class A.
   b. Thickness: 15 mils minimum

B. Vapor barrier products:
1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877)464-7834, www.stegoindustries.com

2.2 ACCESSORIES

A. Seams:
1. Stego Tape by Stego Industries LLC., (877)464-7834, www.stegoindustries.com

B. Penetrations of Vapor barrier:
1. Stego Mastic by Stego Industries LLC., (877)464-7834, www.stegoindustries.com

C. Perimeter/edge seal:
1. Stego 6" Crete Claw (seams and/or perimeter) by Stego Industries LLC., (877)464-7834, www.stegoindustries.com
2. Stego 3" Crete Claw (perimeter only) by Stego Industries LLC., (877)464-7834, www.stegoindustries.com
3. Stego Term Bar by Stego Industries LLC., (877)464-7834, www.stegoindustries.com
4. StegoTack Tape (double sided) by Stego Industries LLC., (877)464-7834, www.stegoindustries.com

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure the subsoil is approved by Architect or Geotechnical Engineer.
1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance ASTM E1643
1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
2. Extend vapor barrier over footings and grade beams to a distance acceptable to the structural engineer or stop at impediments such as dowels and waterstops.
3. Seal vapor barrier to slab perimeter/edge using Stego Crete Claw and remove dirt, debris, and must from Crete Claw prior to concrete placement.

4. Seal vapor barrier to an existing footing, grade beam, or stem wall, use StegoTack Tape or Stego Term Bar.
5. Overlap joints 6 inches and seal with manufacturer's tape.
6. Apply tape/ Crete Claw to clean and dry vapor barrier.
7. Seal all penetrations (including pipes) per manufacturer's instructions.
8. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
9. Repair damaged areas by cutting patches of vapor barrier, overlapping damamged area 6 inches and taping all sides with tape.

END OF SECTION

SELF-ADHERING WATER RESISTIVE AIR BARRIER MEMBRANE
SECTION 072700

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. General Conditions, Supplementary Conditions, Instructions to Bidders and Division 1 General Requirements shall be read in conjunction with and govern this Section.

1.2 DESCRIPTION

A. Supply labor, materials and equipment to complete the Work as specified herein to bridge and seal the following air leakage pathways and gaps:
   1. Complete coverage of the exterior building walls.
   2. Connections of the walls to the roof air barrier.
   3. Connections of the walls to the foundations.
   4. Openings and penetrations of window and door frames.
   5. Piping, conduit, duct and similar penetrations.
   6. All other air leakage pathways in the building envelope.

B. Materials and installation methods of the primary vapor permeable air barrier membrane system and accessories.

C. Materials and installation methods of through-wall flashing membranes.

1.3 PERFORMANCE REQUIREMENTS

A. Provide an air barrier membrane system constructed to perform as a continuous air barrier, and as a liquid water drainage plane flashed to discharge to the exterior ant incidental condensation or water penetration. Membrane system shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air sealant materials at such locations, changes in substrate, perimeter conditions and penetrations.

1.4 RELATED SECTIONS

A.	Concrete	Section 03 3000
B.	Plywood Sheathing	Section 06 1000
C.	Insulation	Section 07 2100
D.	Metal Flashings	Section 07 6000
E.	Flexible Flashings	Section 07 6500
F.	Sealants	Section 07 9200
G.	Doors and Frames	Section 08 1113

H. Aluminum Storefront Window Systems Section 08 4113
I. Lath and Portland Cement Plaster Section 09 2400

1.5 REFERENCES

A. The following standards are applicable to this section:
1. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
2. ASTM E2178: Standard Test Method for Air Permeance of Building Materials.
3. ASTM E283: Standard Test Methods for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
4. ASTM E96: Water Vapor Transmission of Materials.
5. ASTM C1193: Standard Guide for Use of Joint Sealants.
6. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
7. NFPA: Class A 0-25 Flame Spread Index 0 -450 Smoke Developed Index.
8. ICC-ES AC-38: Acceptance Criteria for Water-Resistive Barriers.
9. AAMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.
10. ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.
11. AAMA 711-05: Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

B. AATCC - American Association of Textile Chemists and Colorists.
1. Test Method 127 Water Resistance: Hydrostatic Pressure Test.

C. TAPPI
1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area).
2. Test Method T-460; Air Resistance (Gurley Hill Method).

1.6 SUBMITTALS

A. Submit documentation from an approved independent testing laboratory certifying compliance with a) the air leakage rates of the air barrier membrane assembly, including primary membrane, primer and sealants have been tested to meet ASTM E2357, b) ICC-AC 38, c) Peel adhesion to unprimed plywood and cyclic and elongation per ICC-AC 48, d) Class A flame spread index and smoke development per ASTM E-84.

B. Submit documentation from an approved independent testing laboratory cerifying the air leakage and vapor permeance rates of the air barrier membrane, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178.

1. Test report submittals shall include test results of sustained wind loads and gust load air leakage results.

C. Submit manufacturers' current product data sheets for the air barrier membrane system.

1.7 QUALITY ASSURANCE

A. Submit document stating the applicator of the primary air barrier membranes specified in this section is authorized by the manufacturer as suitable for the execution of the Work.

B. Perform Work in accordance with manufacturer's written instructions and this specification.

C. Maintain one copy of manufacturer's written instructions on site.

D. Allow access to Work site by the air barrier membrane manufacturer's representatives.

E. Components used shall be sourced from one manufacture, including sheet membrane, air barrier sealants, primers, mastics, flashings and adhesives.

F. Single-Source Responsibility:
1. Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
2. Provide products which comply with all federal, state, and local regulations controlling use of volatile organic compounds (VOCs).

1.8 DELIVERY, STORAGE AND HANDLING

A. Refer to current Product MSDS for proper storage and handling.

B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

C. Store roll materials on end in original packaging. Protect rolls from direct sunlight and weather until ready for use.

D. Store air barrier membranes, adhesives and primers at temperature of 40 degrees F and rising.

E. Keep solvent away from open flame or excessive heat.

F. Wasted Management and Disposal:
1. Separate and recycle waste materials in accordance with Section [01 7419 - Waste Management and Disposal], and with the Waste Reduction Work Plan.

G. Contractor to verify compliance for Volatile Organic Compounds (VOC) limitations of products to comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).

1.9 CO-ORDINATION

A. Ensure continuity of the specified membranes throughout the scope of this section.
   1. Air barrier membrane to include self-adhered air barrier, transition membrane and sealants at penetrations.
   2. Drainage plane to include water resistive barrier and flexible flashings to exterior.

1.10 ALTERNATES

A. Submit request for alternates in accordance with Section 01 2500 - Substitution Procedures.

B. Submit requests for alternates a minimum of ten (10) working days prior to bid date.

C. Alternate submission to include:
   1. Evidence that alternate materials meet or exceed performance characteristics of Product requirements as well as documentation from an approved independent testing laboratory certifying the air leakage rates and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets meet the requirements of ASTM E2357, the Massachusetts Energy Code and in accordanve with ASTM E2178.
   2. Manufacturer's complete set of details for air barrier membrane system showing a continuous plane of air tightness throughout the building envelope.

D. Acceptable alternates will be confirmed by addendum. Substitute materials not approved in writing prior to bid date shall not be permitted for use on this project.

1.11 WARRANTY

A. Provide manufacture's standard 12-year material warranty for air barrier membrane materials, sealant and flashing membrane.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Air barrier membrane components and accessories must be obtained as single-source from the membrane manufacturer to ensure total system compatibility and integrity.
   1. Acceptable Manufacturer: Henry Company, 999 N. Sepulveda Blvd Ste 800, El Segundo, CA 90245, (800)486-1278, website: www.henry.com

2. Acceptable Alternative: Air Shield SMP, By IN. R. Meadows.

2.2 MEMBRANES

A. Primary water resistive air barrier membrane shall be Blueskin VP™ 160 manufactured by Henry; a self-adhering air barrier membrane with an engineered film specifically designed to be water resistant and vapor permeable. Membrane shall have the following physical properties:
   1. Air leakage: <0.004 CFM/ft² @ 1.57 lbs/ft² [<0.02L/s/m² @ 75Pa] when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 29 perms to ASTM E96, Method B.
   3. Tested to ASTM E2357 for Air Leakage of Air Barrier Assemblies.
   4. Resistance to Water Penetration: Pass ICC-ES AC 38.
   5. Water Penetration Resistance around Nails: Pass when tested to AAMA 711-05 & ASTM D 1970 modified.
   6. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: Flame Spread Rating of 0 and Smoke Development Classification of 105.
   7. Basis Weight: Minimum 160 gm/m², when tested in accordance with TAPPI Test Method T-410.
   8. Tensile Strength: 40 lbF MD and 29 lbF CD per ASTM D828.
   9. Average Dry Breaking Force: 127 lbF MD, and 91 lbF CD per ASTM D 5034.
   10. Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC-ES AC 48.

B. Self-adhering membrane for window sill pan flashings shall be Blueskin® SA, LT, or HT manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane which is integrally laminated to a blue polyethylene film. Membrane shall have the following physical properties:
   1. Membrane Thickness: 0.040 inches (40 mils)
   2. Low temperature flexibility: -30 degrees F to ASTM D146
   3. Elongation: 200% minimum to ASTM D412- modified.
   4. Minimum Puncture Resistance 40lbf to ASTM E154
   5. Lap Peel Strength 10 lbf/in width to ASTM D903 180○ bend
   6. Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

C. Self-adhering membrane for all window jambs, headers, door openings, inside and outside corners, and other transitions shall be pre-cut BlueskinVP™ 160 manufactured by Henry; a self-adhering sheet air barrier membrane with an engineered film specifically designed to be water resistant and vapor permeable. Membrane shall have the following physical properties:
   1. Air leakage: <0.004 CFM/ft² @ 1.57 lbs/ft² [<0.02L/s/m² @ 75Pa] when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 29 perms to ASTM E96, Method B.

3. Tested in ASTM E2357 for Air Leakage of Air Barrier Assemblies.
4. Resistance to Water Penetration: Pass ICC-ES AC 38.
5. Water Penetration Resistance around Nails: Pass when tested to AAMA 711-05 & ASTM D 1970 modified.
6. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: Flame Spread Rating of 0 and Smoke Development Classification of 105.
7. Basis Weight: Minimum 160 gm/m², when tested in accordance with TAPPI Test Method T-410.
8. Tensile Strength: 40 lbF MD and 29 lbF CD per ASTM D828.
9. Average Dry Breaking Force: 127 lbF MD, and 91 lbF CD per ASTM D5034.
10. Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC-ES AC 48.

D. Through-wall flashing membrane (Self-Adhering) shall be Blueskin® TWF manufactured by Henry; an SBS modified bitumen, self-adhering (yellow) sheet membrane complete with a cross-laminated polyethylene film. Membrane shall have the following physical properties:
1. Membrane Thickness: 0.0394 inches (40 mils)
2. Film Thickness: 4.0 mils
3. Flow (ASTM D5147): Pass @ 212 degrees F
4. Puncture Resistance: 134 lbf to ASTM E154
5. Tensile Strength (film): 5723 psi ASTM D882.
6. Tear Resistance: 13lbs. MD to ASTM D1004.
7. Low temperature flexibility: -22 degrees F to CGSB 37-GP- 56M

2.3 ADHESIVE PRIMERS

A. Low VOC adhesive primer for primary self-adhering water resistive air barrier membrane, self-adhering transition membrane and SBS modified bitumen membranes at all temperature shall be Blueskin® LVC Adhesive as supplied by Henry; a low V.O.C. quick setting rubber based adhesive. Adhesive Primer shall have the following physical properties.
1. Color: Blue
2. Weight: 7.68 lbs/gal
3. Solids by weight: 40%
4. Max. V.O.C. <240 grams/liter
5. Drying time (initial set): 30 minutes at 50% PH and 70 degrees F

2.4 PENETRATION & TERMINATION SEALANT

A. Termination Sealant shall be HE925 BES Sealnt manufactured by Henry; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:

1. Compatible with sheet air barrier, roofing and waterproofing membranes and substrates.
2. Complies with Fed. Spec. TT-S-00230C, Type II, Class A
3. Complies with ASTM C 920, Type S, Grade NS, Class 25
4. Elongation: 450-550%
5. Remains flexible with aging.
6. Seals construction joints up to 1 inch wide.
7. Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

PART 3 - EXECUTION

3.1 EXAMINATION

A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane.

B. Curing compounds or release agents used in concrete construction must be resin based without oil, wax, or pigments.

C. Condition materials to room temperature prior to application to facilitate handling.

3.2 SURFACE PREPARATION

A. Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.

B. New concrete should be cured for a minimum of 14 days and must be dry before primer for air barrier membranes are applied.

C. Ensure all preparatory Work is complete prior to applying primary air barrier membrane.

D. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

3.3 APPLICATION OF ADHESIVE PRIMER

A. Required ADHESIVE Primer for SBS Modified Self-adhering Membranes.
   1. For the application of SBS modified self-adhering window sill pan flashings, through-wall flashings and other applications of SBS modified self-adhering transition membranes, the substrate needs to be conditioned with applicable adhesive primer.

2. Apply adhesive primer at rate recommended by manufacturer to all areas to receive SBS modified self-adhering sheet membrane as indicated on drawings by roller or spray and allow to dry.
3. For applications of SBS modified self-adhered membranes installed over the primary self-adhered water resistive air barrier membrane, the surface of the primary self-adhered water resistive air barrier membrane must be primed and allowed to cure prior to the placement of the SBS modified self-adhered membrane.

B. Adhesive Primer for Primary Water Resistive Air Barrier Membrane.
1. Apply adhesive primer as required depending on substrate type and condition of substrate.
2. Where appropriate surface adhesion can not be achieved, prime substrate with specified primer, at a rate of 200-250 sq ft/gal as per Technical Data Sheet.
3. All pre-cast concrete and concrete block substrates are required to be primed prior to application of self-adhering water resistive air barrier membrane.
4. Apply adhesive primer as required on surface of Blueskin VP160 where subsequent Blueskin VP160 membrane will overlap such as selvage edge and end laps.

3.4 INSTALLATION OF AIR BARRIER SYSTEM

A. INSIDE AND OUTSIDE CORNERS
1. Seal inside and outside corners of sheathing boards with a strip of self-adhering vapor permeable membrane extending a minimum of 3 inches on either side of the corner detail.
   a. For inside corners, pre-treat the corner with a continuous ½ inch bead of termination sealant.
   b. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate the achieve surface adhesion as per manufacturer's instruction and allow to dry.
   c. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
   d. Roll all laps and membrane with a counter top roller to ensure seal.

B. TRANSITION ARES
1. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering water resistive air barrier transition membrane.
   a. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.

b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.
c. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
d. Roll all laps and membrane with a counter top roller to ensure seal.

C. WINDOWS AND ROUGH OPENINGS
1. Place specified SBS modified self-adhering window sill pan flashing membrane across window sills. Pre-treat inside corners with a bead of termination sealant. Install window sill pan membrane and end dam terminations, seal cuts and terminations with termination sealant.
2. Wrap jamb of rough openings with specified self-adhering water resistive air barrier transition membrane.
3. Extend specified self-adhering water resistive air barrier membrane into rough window openings sufficient to provide a connection to interior vapor retarder.
a. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instruction and allow to dry.
b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
c. Roll all laps and membrane with a counter top roller to ensure seal.

D. THROUGH-WALL FLASHING MEMBRANE
1. Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.
a. Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.
b. Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.
c. Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.
d. Install through-wall flashing membrane ½ inch from outside edge of veneer. Provide "end dam" flashing as detailed.

E. PRIMARY WATER RESISTIVE AIR BARRIER
1. Apply self-adhering water resistive air barrier membrane complete and continuous to substrate in a sequential overlapping weatherboard method starting at bottom or base of wall and working up in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.

a. Cut to manageable sections, align and position self-adhering membrane to substrate, remove top panel of protective release film and press firmly into place.
b. Ensure alignment, hold membrane in place to avoid wrinkles and sequentially remove remaining panels of protective film and press firmly into place.
c. Ensure minimum 3 inch overlap at all ends and 2 inch side laps of subsequent membrane applications.
d. Pressure roll all membrane surfaces, laps and flashings with a counter top roller or 'J-roller" to ensure appropriate surface adhesion.
e. At the end of each days work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

3.5 APPLICATION OF TERMINATION SEALANT

A. Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane termination at window and door frames with specified termination sealant.

B. Seal the leading edge of membrane terminations and reverse laps.

3.6 FIELD QUALITY CONTROL

A. Make notification when sections of Work are complete to allow review prior to covering air barrier system.

3.7 PROTECTION

A. Damp substrates must not be inhibited from drying out. Drying time varies depending on temperature and relative humidity. Do not expose the backside of the substrate to moisture or rain.

B. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed air barrier installations. Protect air barrier membrane from damage and inclement weather during the construction phase.

C. Water resistive air barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible, not to exceed 150 days.

D. Regional weather conditions and daytime sunlight temperatures may require the membrane to be protected under the 150 days exposure limit.

END OF SECTION

THERMOPLASTIC-POLYOLEFIN ROOFING (TPO)
SECTION 075440

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thermoplastic membrane roofing system, including all components specified.

B. Comply with the published recommendations and instructions of the roofing membrane manufacturer, at http://manual.fsbp.com.

C. Commencement of work by Contractor shall constitute acknowledgement by Contractor that this specification can be satisfactorily executed, under the project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of the Contract Sum will be made for failure to adequately examine the Contract Documents or the project conditions.

1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Wood nailers associated with roofing and roof insulation.

B. Section 076000 – Metal Flashing and Sheet Metal Work: Formed metal flashing and trim items associated with roofing.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 for definition of terms related to roofing work not otherwise defined in the section.

B. LTTR: Long Term Thermal Resistance, as defined by CAN-ULC S770.

1.4 REFERENCE STANDARDS

A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2008.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2012.

C. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2009.

D. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2010.

E. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting; 2009.

F. ASTM D1079 - Standard Terminology Relating to Roofing and Waterproofing; 2010.

G. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2008.

H. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.

I. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2011a.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.

K. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.

L. CAN-ULC-S770 - Standard Test Method Determination of L-Term Thermal Resistance Of Closed-Cell Thermal Insulating Foams; 2009.

M. PS 1 - Structural Plywood; 2009.

N. PS 20 - American Softwood Lumber Standard; 2010.

O. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2003. (ANSI/SPRI ES-1)

1.5 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Before start of roofing work, Contractor shall hold a meeting to discuss the proper installation of materials and requirements to achieve the warranty.

1. Require attendance with all parties directly influencing the quality of roofing work or affected by the performance of roofing work.
2. Notify Architect well in advance of meeting.

1.6 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data:
1. Provide membrane manufacturer's printed data sufficient to show that all components of roofing system, including insulation and fasteners, comply with the specified requirements and with the membrane manufacturer's requirements and recommendations for the system type specified; include data for each product used in conjunction with roofing membrane.
2. Installation Instructions: Provide manufacturer's instructions to installer, marked up to show exactly how all components will be installed; where instructions allow installation options, clearly indicate which option will be used.

C. Samples: Submit samples of each product to be used.

D. Shop Drawings: Provide:
1. The roof membrane manufacturer's standard details customized for this project for all relevant conditions, including flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains.

E. Specimen Warranty: Submit prior to starting work.

F. Executed Warranty.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Roofing installer shall have the following:
1. Current approval, license, or authorization as applicator by the manufacturer.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact and legible.

B. Store materials clear of ground and moisture with weather protective covering.

C. Keep combustible materials away from ignition sources.

1.9 WARRANTY

A. See Section 017823 and 017833 – Project Record Documents, for additional warranty requirements.

B. Comply with all warranty procedures required by manufacturer, including notifications, scheduling, and inspections.

C. Warranty: Firestone Limited Warranty covering membrane, roof insulation, and other indicated components of the system, for the term indicated.
   1. Limit of Liability: No dollar limitation.
   2. Scope of Coverage: Repair leaks in the roofing system caused by:
      a. Ordinary wear and tear of the elements.
      b. Manufacturing defect in Firestone brand materials.
      c. Defective workmanship used to install these materials.
      d. Damage due to winds up to 55 mph (88 km/h).
   3. Not Covered:
      a. Damage due to winds in excess of 55 mph (88 km/h).

D. Repair defects within the warranty period at no cost to the Owner.

E. Roof Maintenance / Service Agreement for three (3) years, which is to include cleaning and repair of roof, drains, flashings and caulking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design - Roofing System: Firestone Building Products LLC, Carmel, IN: www.firestonebpco.com.
   1. Approved alternates
      a. Sika Sarnafil fully adhered, 20 year PVC Roof System with felt back (G410-15 felt back 60 mil membrane).
      b. Or equal

B. Manufacturer of Insulation and Cover Boards: Same manufacturer as roof membrane.

C. Manufacturer of Metal Roof Edging: Same manufacturer as roof membrane.
   1. Metal roof edging products by other manufacturers are not acceptable.
   2. Field- or shop-fabricated metal roof edgings are not acceptable.

2.2 ROOFING SYSTEM DESCRIPTION

A. Roofing System: Felt backed Thermoplastic Olefin (TPO) single-ply membrane.
   1. Membrane Attachment: Fully adhered in low rise foam adhesive
   2. Warranty: Full system warranty; Firestone 20 year Red Shield Limited Warranty covering membrane, roof insulation, and membrane accessories.
   3. Comply with applicable local building code requirements.
   4. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A Fire Hazard Classification.

B. Roofing System Components: Listed in order from the top of the roof down:
   1. Membrane: TPO XR 115 (060 mil)
   2. Insulation Cover Board: Gypsum-based board, 1/4 inch thick; cold adhesive attached in manufacturers low rise foam.
   3. Insulation:
      a. ISO 95+GL by Firestone attached with manufacturer's low rise foam.
      b. Thickness as indicated on the Drawings.

2.3 MEMBRANE MATERIALS

A. Membrane: Flexible, heat weldable sheet composed of thermoplastic polyolefin polymer and ethylene propylene rubber; complying with ASTM D6878, with polyester weft inserted reinforcement and the following additional characteristics:
   1. Polyester fleece backing.
   2. Thickness: 0.060 inch (1.52 mm) plus/minus 10 percent, with coating thickness over reinforcement of 0.024 inch (0.61 mm) plus/minus 10 percent.
   3. Puncture Resistance: 265 lbf (1174 N), minimum, when tested in accordance FTM 101C Method 2031.
   4. Solar Reflectance: 0.79, minimum, when tested in accordance with ASTM C1549.
   5. Color: White.
   6. Acceptable Product: UltraPly TPO XR 115 by Firestone, Sika Sarnafil G410-15, felt back 60 mil.

B. Membrane Attachment: Provide fully adhered attachment as required by roof membrane manufacturer for roofing system and warranty to be provided; use only adhesive furnished by roof membrane manufacturer.

C. Curb and Parapet Flashing: Same material as membrane, with encapsulated edge which eliminates need for seam sealing the flashing-to-roof splice; precut to 18 inches (457 mm) wide.

D. Formable Flashing: Non-reinforced, flexible, heat weldable sheet, composed of thermoplastic polyolefin polymer and ethylene propylene rubber.
   1. Thickness: 0.060 inch (1.52 mm) plus/minus 10 percent.

2. Tensile Strength: 1550 psi (10.7 MPa), minimum, when tested in accordance with ASTM D638 after heat aging.
3. Elongation at Break: 650 percent, minimum, when tested in accordance with ASTM D638 after heat aging.
4. Tearing Strength: 12 lbf (53 N), minimum, when tested in accordance with ASTM D1004 after heat aging.
5. Color: White.
6. Acceptable Product: UltraPly TPO Flashing by Firestone.

E. Tape Flashing: 5-1/2 inch (140 mm) nominal wide TPO membrane laminated to cured rubber polymer seaming tape, overall thickness 0.065 inch (1.6 mm) nominal; TPO QuickSeam Flashing by Firestone.

F. Bonding Adhesive: Neoprene and SBR rubber blend, formulated for compatibility with the membrane other substrate materials, including masonry, wood, and insulation facings; UltraPly Bonding Adhesive by Firestone.

G. Pourable Sealer: Two-part polyurethane, two-color for reliable mixing; Pourable Sealer by Firestone.

H. Seam Plates: Steel with barbs and Galvalume coating; corrosion-resistance complying with FM 4470.

I. Termination Bars: Aluminum bars with integral caulk ledge; 1.3 inches (33 mm) wide by 0.10 inch (2.5 mm) thick; Firestone Termination Bar by Firestone.

J. Cut Edge Sealant: Synthetic rubber-based, for use where membrane reinforcement is exposed; UltraPly TPO LVOC Cut Edge Sealant by Firestone.

K. General Purpose Sealant: EPDM-based, one part, white general purpose sealant; UltraPly TPO General Purpose Sealant by Firestone.

L. Coated Metal Flashing and Edgings: Galvanized steel with roofing manufacturer's bonded TPO coating; UltraPly TPO Coated Metal by Firestone.

M. Molded Flashing Accessories: Unreinforced TPO membrane pre-molded to suit a variety of flashing details, including pipe boots, inside corners, outside corners, etc.; UltraPly TPO Small and Large Pipe Flashing by Firestone.

N. Water Block Seal: Butyl rubber sealant for use between two surfaces, not exposed; Water Block Seal by Firestone.

O. Roof Walkway Pads: Non-reinforced TPO walkway pads, 0.130 inch (3 mm) by 30 inches (760 mm) by 40 feet (12.19 m) long with patterned traffic bearing surface; UltraPly TPO White Walkway Pads by Firestone.

2.4 ROOF INSULATION AND COVER BOARDS

A. Gypsum-Based Cover Board: Non-combustible, water resistant gypsum core with embedded glass mat facers, complying with ASTM C1177/C1177M, and with the following additional characteristics:
   1. Thickness: 1/4", unless noted otherwise.
   2. Surface Water Absorption: 2.5 g, maximum, when tested in accordance with ASTM C473.
   3. Spanning Capability: Recommended by manufacturer for following minimum flute spans: 5”
   4. Surface Burning Characteristics: Flame spread of 0, smoke developed of 0, when tested in accordance with ASTM E84.
   5. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
   6. Factory Mutual approved for use with FM 1-60 and 1-90 rated roofing assemblies.
   7. Mold Growth Resistance: Zero growth, when tested in accordance with ASTM D3273 for minimum of 4 weeks.
   8. Pre-primed for better adhesion.
   9. Acceptable Product: Georgia-Pacific DensDeck Prime Roof Guard.

B. Adhesive for Insulation Attachment: Firestone ISO Spray S adhesive or equal low rise foam.

C. Polyisocyanurate Board Insulation: Closed cell polyisocyanurate foam with black glass reinforced mat laminated to faces, complying with ASTM C1289 Type II Class 1, with the following additional characteristics:
   1. Thickness: As indicated on the drawings.
   2. Size: 48 inches by 48 inches nominal.
   3. R-Value (LTTR):
      a. 2.0 inch Thickness: 10.0, minimum.
   4. Compressive Strength: 20 psi (138 kPa) when tested in accordance with ASTM C1289.
   5. Ozone Depletion Potential: Zero; made without CFC or HCFC blowing agents.
   6. Recycled Content: 19 percent post-consumer and 15 percent post-industrial, average.
   7. Acceptable Product: ISO 95+GL Polyisocyanurate Insulation by Firestone.

PART 3 – INSTALLATION

3.1 GENERAL

A. Install roofing, coverboard, flashings, and accessories in accordance with roofing manufacturer's published instructions and recommendations for the specified roofing system. Where manufacturer provides no instructions or recommendations, follow good roofing practices and industry standards. Comply with federal, state, and local regulations.

B. Obtain all relevant instructions and maintain copies at project site for duration of installation period.

C. Do not start work until Pre-Installation Notice has been submitted to manufacturer as notification that this project requires a manufacturer's warranty.

D. Perform work using competent and properly equipped personnel.

E. Temporary closures, which ensure that moisture does not damage any completed section of the new roofing system, are the responsibility of the applicator. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition.

F. Install roofing membrane only when surfaces are clean, dry, smooth and free of snow or ice; do not apply roofing membrane during inclement weather or when ambient conditions will not allow proper application; consult manufacturer for recommended procedures during cold weather. Do not work with sealants and adhesives when material temperature is outside the range of 60 to 80 degrees F (15 to 25 degrees C).

G. Protect adjacent construction, property, vehicles, and persons from damage related to roofing work; repair or restore damage caused by roofing work.
   1. Protect from spills and overspray from bitumen, adhesives, sealants and coatings.
   2. Particularly protect metal, glass, plastic, and painted surfaces from bitumen, adhesives, and sealants within the range of wind-borne overspray.
   3. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

H. Until ready for use, keep materials in their original containers as labeled by the manufacturer.

I. Consult membrane manufacturer's instructions, container labels, and Material Safety Data Sheets (MSDS) for specific safety instructions. Keep all adhesives, sealants, primers and cleaning materials away from all sources of ignition.

3.2 EXAMINATION

A. Examine roof deck to determine that it is sufficiently rigid to support installers and their mechanical equipment and that deflection will not strain or rupture roof components or deform deck.

B. Verify that surfaces and site conditions are ready to receive work. Correct defects in the substrate before commencing with roofing work.

C. Examine roof substrate to verify that it is properly sloped to drains.

D. Verify that the specifications and drawing details are workable and not in conflict with the roofing manufacturer's recommendations and instructions; start of work constitutes acceptable of project conditions and requirements.

3.3 PREPARATION

A. Remove all of the existing roof system down to the roof deck including all existing composition base flashings. Dispose of all materials properly. Perform asbestos removal in accordance with federal, state and local regulations and dispose of waste in legal manner.
   1. At penetrations, remove all existing flashings, including lead, asphalt, mastic, etc.
   2. At walls, curbs, and other vertical and sloped surfaces, remove loose and unsecured flashings; remove mineral surfaced and coated flashings; remove excessive asphalt to provide a smooth, sound surface for new flashings.

B. Take appropriate measures to ensure that fumes from adhesive solvents are not drawn into the building through air intakes.

C. Prior to proceeding, prepare roof surface so that it is clean, dry, and smooth, and free of sharp edges, fins, roughened surfaces, loose or foreign materials, oil, grease and other materials that may damage the membrane.

D. Fill all surface voids in the immediate substrate that are greater than 1/4 inch (6 mm) wide with fill material acceptable insulation to membrane manufacturer.

E. Seal, grout, or tape deck joints, where needed, to prevent bitumen seepage into building.

3.4 COVER BOARD INSTALLATION

A. Install coverboard in configuration and with attachment method(s) specified in PART 2, under Roofing System.

B. Install only as much coverboard as can be covered with the completed roofing system before the end of the day's work or before the onset of inclement weather.

C. Lay roof coverboard in courses parallel to roof edges.

D. Neatly and tightly fit coverboard to all penetrations, projections, and nailers, with gaps not greater than 1/4 inch (6 mm). Fill gaps greater than 1/4 inch (6 mm) with acceptable insulation. Do not leave the roofing membrane unsupported over a space greater than 1/4 inch (6 mm).

3.5 SINGLE-PLY MEMBRANE INSTALLATION

A. Beginning at low point of roof, place membrane without stretching over substrate and allow to relax at least 30 minutes before attachment or splicing; in colder weather allow for longer relax time.

B. Lay out the membrane pieces so that field and flashing splices are installed to shed water.

C. Install membrane without wrinkles and without gaps or fishmouths in seams; bond and test seams and laps in accordance with membrane manufacturer's instructions and details.

D. Install membrane adhered to the substrate, with edge securement as specified.

E. Adhered Membrane: Bond membrane sheet to substrate using membrane manufacturer's recommended bonding material, application rate, and procedures.
   1. Do not apply low rise foam material to fleece backing or to seaming area of membrane.

F. Edge Securement: Secure membrane at all locations where membrane terminates or goes through an angle change greater than 2 in 12 inches (1:6) using mechanically fastened reinforced perimeter fastening strips, plates, or metal edging as indicated or as recommended by roofing manufacturer.
   1. Exceptions: Round pipe penetrations less than 18 inches (460 mm) in diameter and square penetrations less than 4 inches (200 mm) square.
   2. Metal edging is not merely decorative; ensure anchorage of membrane as intended by roofing manufacturer.

3.6 FLASHING AND ACCESSORIES INSTALLATION

A. Install flashings, including laps, splices, joints, bonding, adhesion, and attachment, as required by membrane manufacturer's recommendations and details.

B. Metal Accessories: Install metal edgings, gravel stops, and copings in locations indicated on the drawings, with horizontal leg of edge member over membrane and flashing over metal onto membrane.
   1. Follow roofing manufacturer's instructions.
   2. Remove protective plastic surface film immediately before installation.
   3. Install water block sealant under the membrane anchorage leg.
   4. Flash with manufacturer's recommended flashing sheet unless otherwise indicated.
   5. Where single application of flashing will not completely cover the metal flange, install additional piece of flashing to cover the metal edge.
   6. If the roof edge includes a gravel stop and sealant is not applied between the laps in the metal edging, install an additional piece of self-adhesive flashing membrane over the metal lap to the top of the gravel stop; apply seam edge treatment at the intersections of the two flashing sections.
   7. When the roof slope is greater than 1:12, apply seam edge treatment along the back edge of the flashing.

C. Scuppers: Set in sealant and secure to structure; flash as recommended by manufacturer.

D. Roof Drains:
   1. Taper insulation around drain to provide smooth transition from roof surface to drain. Use specified pre-manufactured tapered insulation with facer or suitable bonding surface to achieve slope; slope not to exceed manufacturer's recommendations.
   2. Position membrane, then cut a hole for roof drain to allow 1/2 to 3/4 inch (12 to 19 mm) of membrane to extend inside clamping ring past drain bolts.
   3. Make round holes in membrane to align with clamping bolts; do not cut membrane back to bolt holes.
   4. Apply sealant on top of drain bowl where clamping ring seats below the membrane
   5. Install roof drain clamping ring and clamping bolts; tighten clamping bolts to achieve constant compression.

3.7 FINISHING AND WALKWAY INSTALLATION

A. Install walkways at access points to the roof, around rooftop equipment that may require maintenance, and where indicated on the drawings.

3.8 FIELD QUALITY CONTROL

A. Inspection by Manufacturer: Provide final inspection of the roofing system by a Technical Representative employed by roofing system manufacturer specifically to inspect installation for warranty purposes (i.e. not a sales person).

B. Perform all corrections necessary for issuance of warranty.

3.9 CLEANING

A. Clean all contaminants generated by roofing work from building and surrounding areas, including bitumen, adhesives, sealants, and coatings.

B. Repair or replace building components and finished surfaces damaged or defaced due to the work of this section; comply with recommendations of manufacturers of components and surfaces.

C. Remove leftover materials, trash, debris, equipment from project site and surrounding areas.

3.10 PROTECTION

A. Where construction traffic must continue over finished roof membrane, provide durable protection and replace or repair damaged roofing to original condition.

END OF SECTION

METAL FLASHINGS AND SHEET METALWORK
SECTION 076000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Prefabricated counterflashing assemblies.

   2. Prefabricated curbs.

   3. HVAC on Electrical Platform Caps.

   4. All other flashings and sheet metal items shown or required to make the building weathertight and not specified in other Sections.

B. Related work:
   1. Division 7 for single ply roofing.

   2. Division 7 for roof hatches.

   3. Division 9 for finish painting flashings and sheet metalwork.

   4. Division 23 for mechanical sheet metal work, and flashings and collars for mechanical and electrical work, except as specified herein for roof drains.

1.2 PERFORMANCE REQUIREMENTS

A. General: Install the work of this Section to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Thermal movements:
   1. Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

   2. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements.

3. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

4. Temperature change (range) of 120-degree F ambient; 180-degree F, material surfaces.

C. Water infiltration: Provide sheet metalwork and flashings that do not allow water infiltration to building interior, and to damage materials, such as insulation, in exterior walls.

1.3 SUBMITTALS

A. Data: Printed specifications, installation instructions and general recommendations for installation of prefabricated assemblies.

B. Shop drawings:
1. Show typical and atypical details, material weight, methods of joining and attachment, and relationship with adjacent materials and supports.
2. Detail interface with adjacent materials. For interface between flashings with different profiles and conditions difficult to illustrate in 2-dimension, furnish isometric drawings.

C. Samples: Assembled samples of the following. Make samples at least 6 inches long, except as otherwise specified. Mount on plywood and include all components to be installed under this Section for each sample.
1. Counterfiashing with receiver.

1.4 HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet steel: Commercial quality carbon steel sheets complying with ASTM A 653, lock-forming grade, galvanized with a G90 zinc coating, 20-gage minimum unless otherwise indicated.

B. Nails for attaching sheet steel to wood: Large fiat head "stronghold" type roofing nails with barbed point, formed of hot-dip galvanized steel of sufficient length to penetrate a minimum of 1- inch into the wood nailer.

C. Hot dip galvanized self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
   1. Fasteners for fiashing and trim: Blind fasteners or self-drilling screws, gasketed with hex washer head.

   2. Blind fasteners: High-strength aluminum or stainless-steel rivets.

D. Solder and flux:
   1. For galvanized sheet metal: 50-50 lead/tin solder complying with ASTM B 32, used with a non-corrosive flux.

   2. For lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

E. Burning rod for lead: Same composition as lead sheet.

F. Sealing tape:
   1. Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing.

   2. Provide permanently elastic, nonsag, non-toxic, non-staining tape.

G. Expansion-joint sealant: For hooked-type expansion joints, which must be free to move, provide non-setting, non-hardening, non-migrating, heavy-bodied polyisobutylene sealant.

H. Bituminous coating:
   1. Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.

   2. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.2 PREFABRICATED ASSEMBLIES

A. Counterflashing assemblies: Formed of 24-gage galvanized sheet steel, of the profiles shown on the Drawings, complete with factory-formed internal and external corners, and end closures by one of the following.
   1. Basis of design is for Fry Reglet Corp. Type ST (stucco).

   2. Keystone Flashing Co.

3. CF Cheney Flashing Co.

4. MM Systems Corp.

B. Sheet metal curbs:
1. Of the sizes and profiles indicated, by Thybar Corp., Pate Co. or Custom Curb, Inc., with an 18-gage (min) galvanized steel shell and base plate fully welded, factory installed insulation, and continuous wood nailer.

2. Reinforce curb as required to safely support the equipment thereon.

2.3 FABRICATION

A. General:
1. Shop fabricate fiashings and sheet metal work to comply with profiles and sizes indicated on the Drawings and standard Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) detail plates of the "Architectural Sheet Metal Manual".

2. Form sheet metal on bending brake with straight, sharp edges. Shape, trim, and hand seam sheet metal on bench; keep job site forming to a minimum.

3. Comply with metal producers' recommendations for tinning, soldering, and cleaning flux from metal.

4. Fabricate with joints and corners accurately machined, filed and fitted, and rigidly framed together and connected.

B. Fabricate in as long length as possible to minimize field joints.

C. Prefabricate intersections, including counterfiashings, with mitered, riveted joints. Make corners and intersections with legs a minimum of 24-inch long extending in each direction.

D. Tinning and soldering:
1. Tin edges on both sides of sheet steel to be soldered.

2. Perform soldering slowly, thoroughly heating seams and completely sweating solder through full width of seams.

E. Exposed edges: Neatly double back sheet metal 1/2 inch to stiffen edges and to provide a finished appearance.

F. Provisions for attachment to structure: Furnish supports, hangers, bracing, anchors and other devices shown, specified or necessary for reinforcement and proper attachment of flashings and sheet metal to building.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 GENERAL REQUIREMENTS

A. In addition to the assemblies listed above, provide required prefinished sheet metal flashings, counterflashings, transitional and interface flashings required to achieve a properly weatherproofed, flashed and counterflashed building envelope, including sheet metal flashings in the angles formed where exterior waterproofed decks abut walls, and as well at curbs, platforms, ventilators, pipes, roof hatches, and other vertical and horizontal surfaces, where indicated and necessary to make the Work weatherproof. Flashings in contact with single-ply roofing is specified in Section 075440.

B. Comply with manufacturer's installation instructions, where applicable, and applicable SMACNA and NRCA details, except as indicated and specified.

C. Install counterflashing assemblies at a constant height above the roof.
   1. Anchor counterflashing securely into reglet by friction, or provide lead wedges spaced 2- foot o.c. maximum.

   2. Use manufacturer's standard splice plates and preformed corners for a weathertight assembly.

D. Coordinate this work with other trades whose work penetrates, intersects and adjoins flashings and sheet metal work, to permit the correct sequencing and the watertightness of the assemblies.

3.3 INSTALLATION

A. General:
   1. Install sheet metal work in accordance with the approved shop drawings.
   2. Attach work securely to supporting construction, plumb, level, with tight, flush joints allowing for thermal movements.

3. Install work with lines, arises, and angles sharp and true.

4. Fold exposed edges neatly to form a 1/2-inch hem on the concealed side; hem all exposed edges, unless otherwise indicated.

5. Assemble work so that face of metal in contact has hairline joints, except where required for expansion or fitting. Provide back-up plates at joints.

6. Conceal fastenings and reinforcement where they would be visible by the public and the building occupants.

7. Finish work shall be straight, smooth and continuous, without dimples, dents and other damage.

B. Soldering: Solder all joints not intended for expansion and contraction.
   1. Clean material and tin prior to soldering.

   2. Solder slowly. Heat the seams thoroughly, and completely fill with solder.

   3. Make exposed soldering on finish surfaces neatly, full flowing and smooth.

   4. Wash acid flux with a soda solution after soldering and remove soldering flux on exposed surfaces.

C. Nailing:
   1. Confine nailing of sheet metal generally to sheet metal having a maximum width of 18 inches. Nailing of fiashings shall be confined to one edge only.

   2. Space nails evenly not over 12 inches o.c., and approximately 2 inches from the edge.

   3. Face nailing is not permitted. Do not nail sheet metal assemblies on horizontal surfaces.

   4. Where sheet metal is applied to surfaces other than wood, furnish detailed shop drawings showing locations of required sleepers and nailing strips specified in Section 061000.

D. Bolts, rivets, and screws:
   1. Install bolts, rivets, and screws where indicated or required.

   2. Provide compatible washers to protect surface of sheet metal and to provide a watertight connection.

E. Dissimilar material protection:
   1. Protect sheet metal in contact with dissimilar metals, concrete, masonry and plaster with a heavy coating of bituminous paint, approved separation tape, or building felt or paper.

   2. Set sheet metal assemblies supported by pressure-treated wood on building paper or felt attached to the wood nailer, except set copings on flexible fiashing specified. Lap on vertical surfaces at least 2 inches.

F. Seams- general: Make seams straight, and uniform in width and height with no solder showing on the face.
   1. Flat-lock seams: Finish not less than 3/4 inch wide made in the direction of water flow.

   2. Lap seams: Finish soldered seams not less than 1 inch wide. Overlap seams not soldered at least 3 inches.

   3. Loose-lock expansion seams: No less than 3-inch wide, designed to provide minimum 1 inch movement within the joint. Fill joint completely with sealant applied at not less than 1/8 inch thick bed.

   4. Standing seams: Not less than 1 inch high, double locked without solder.

G. Expansion and contraction:
   1. Provide for thermal and building movement without over-stressing the material, breaking connections or producing wrinkles and distortion in finished surfaces. Make sheet metal installations weathertight at all locations.

   2. Provide expansion and contraction joints at not more than 40-foot intervals, except that where the distance between the last expansion joint and the end of the continuous run is more than half the required interval spacing, provide an additional joint. Where expansion and contraction joints are exposed to view, their location is subject to the Architect's approval.

   3. Exposed surfaces shall be free from visible wave, warp, and buckle.

H. Install roof curbs level and square with tight, waterproof joints; attach securely to deck.

I. Completed work: Completed fiashings and sheet metal work shall be watertight, free of tool marks, dents, scratches and other damages, with joints and corners accurately machined, filed and fitted, and rigidly framed together and connected.

END OF SECTION

ROOF HATCH GUARD
SECTION 077233.01

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This specification is for a non-penetrating FRP (Fiberglass Reinforced Plastic) round tube hatch guardrail system in compliance with Section 1015.3, 1015.4.4, 1015.6, 1015.7, 1607.8.1, 16078.1.1, and 1607.8.1.2 of the 2021 California 2022 Building Code and OSHA 29 CFR 1910.28 (b)(1) Protection from Fall Hazards, 1910.29 (b) Guardrail Systems, 1926.501 (b)(1) Fall Protection, and 1926.502 (b) Guardrail Systems.

1.2 REFERENCE

A. The publications listed below (latest revision applicable) form a part of this specification to the extent reference herein. The publications are referred to within the text by the designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) Test Methods and Standards:

ASTM D-638- Tensile Properties of Plastics

ASTM D-790- Flexural Properties of Unreinforced and Reinforced Plastics

ASTM D-2344- Apparent Interlaminar Shear Strength of Parallel Fiber Composites by Short Beam Method

ASTM D-696- Coefficient of Linear Thermal Expansion for Plastics

ASTM E-84- Surface Burning Characteristics of Building Materials

ASTM A47- Standard Specification for Ferrite Malleable Iron Castings

ASTM A153- Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

2022 California Building Code

THE OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION
Code of Federal Regulations (CFR), Title 29, Section 1910.29, 1910.29, 1926.501, 1926.502

1.3 SUBMITTALS

A. The CONTRACTOR shall furnish shop drawings the roof hatch guardrail system in accordance with the provisions of this Section.

B. The CONTRACTOR shall submit the manufacturer's published product data including product data sheets, installation instructions, and typical assembly details.

C. The CONTRACTOR may be requested to submit sample pieces of each item specified herein for acceptance by the ENGINEER as to quality and color. Sample pieces shall be manufactured by the method to be used in the WORK.

1.4 QUALITY ASSURANCE

A. All items to be provided under this Section shall be furnished only by manufacturers having a minimum of ten (10) years' experience in the design and manufacture of similar products and systems. Additionally, if requested, a record of at least five (5) previous, separate, similar successful installations in the last five (5) years shall be provided.

B. Manufacturer shall offer a 3-year limited warranty on all FRP products against defects in materials and workmanship.

C. Manufacturer shall be certified to the ISO 3001-2015 standard.

D. Manufacturer shall provide proof of certification from at least two other quality assurance programs for its facilities or products (DNV, ABS, USCG, AARR).

1.5 PRODUCT DELIVERY AND STORAGE

A. Delivery of Materials: Manufactured materials shall be delivered in original, unbroken pallets, package, containers, or bundles bearing the labe of the manufacturer.

B. Storage of Products: Store products in the manufacturer's original packaging until needed. All materials shall be carefully handled to prevent them from abrasion, cracking, chipping, twisting, other deformations, and other types of damage.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

A. Roof Hatch Guardrail system to be DynaRound Hatch Guard as manufactured by:

Fibergrate Composite Structures Inc.
5151 Belt Line Road, Suite 1212
Dallas, Texas 75254-7028 USA
(800)527-4043 Phone (972)250-1530 Fax

Website: www.fibergrate.com
E-mail: info@fibergrate.com

2.2 SYSTEM

A. The installed Hatch Guard System is to have a minimum finished height of 42 inches (1067 mm) with a mid-rail installed at 21 inches (533 mm) above the walking surface. The completed system should include posts, rails, fittings, and non-penetrating connection to the hatch body sufficient to fulfill the requirements of this specification.

B. The FRP rails, posts, and safety gate are to be finished in a high visibility safety yellow or a light gray polyurethane paint system.

C. The installed Hatch Guard System must not penetrate the roof or hatch in any way. The Hatch Guard is to clamp to the body of the hatch using a system of FRP channels and clamp angels to secure the Hatch Guard in place. The roof should be protected from abrasion by thermoplastic caps at the bottom ends of the posts and by any additional means as recommended by the roofing manufacturer.

D. The Hatch Guard is to feature a 30 inch (762 mm) clear opening in the guardrail for accessing the hatch. This opening is to be protected by a self-closing, two rail FRP gate that swings outward, away from the hatch. The gate is to be equipped with corrosion resistant, field adjustable self-closing hinges that are factory mounted to the post supporting the gate.

E. The DynaRound Hatch Guard is to be available in three standard sizes and two standard colors, available for order by a single part number, adjustable to fit hatch bodies within the dimension ranges listed below:

Light Gray/UV Coated:

PN 5041212: 30-36 inches x 30-54 inches (762-914 mm x 762-1372 mm)

F. Structural Performance - The completed system is to be capable of withstanding a 200 lb (890 N) load applied downward or outward to any point on the top rail without failure. When the 200 lb load is applied in a downward direction, the top rail must not deflect to a height of less than 39 inches (990 mm) above the walking surface. The midrail must be capable of withstanding a force of 150 lb (667 N) applied in either a downward or outward direction without failure. Top rail and mid-rail load do not need to be applied concurrently.

2.3 MATERIALS

A. All posts, rails, channels, and safety gate are to be DYNAFORM® FRP structural shapes manufactured by the pultrusion process. The structural shapes shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet the design requirements and dimensions specified in the Contract Documents.

B. Fiberglass reinforcement shall be a combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by the application and/or physical properties required.

C. Resin shall be DYNAFORM® VEFR, fire retardant vinyl ester with a chemical formulation necessary to provide the corrosion resistance, strength and other physical properties as required.

D. All finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.

E. The fiberglass posts, rails, and safety gate are to be further protected from ultraviolet (UV) attach with 1) integral UV inhibitors in the resin, 2) a synthetic surfacing veil to help produce a resin rich surface, and 3) an appropriate UV resistant coating for outdoor exposures.

F. All FRP products shall have a tested flame spread rating of 25 or less per ASTM E84.

G. Posts, rails, and safety gate are to be fabricated from pultruded 1.9" OD x 0.2" wall (48.3 mm x 5.1 mm) round tube, integrally pigmented yellow, with the minimum longitudinal mechanical properties listed below:

Property	**ASTM Method**	**Value**	**Units**
Flexural Strength (Full Section)	---	70,000 (482)	psi (MPa)
Flexural Modulus (Full Section)	---	5.0 x 10_6 (34.4)	psi (GPa)
Short Beam Shear (Transverse)	D2344	4,500 (31)	psi (MPa)
Shear Modulus (Transverse)	N/A	4.5 x 10_5 (3.1)	Psi(GPa)
Density	D792	0.062-0.070 (1.71-1.93)	lb/in³ (g/cc)
Coefficient of Thermal Expansion	D696	8.0 x 10-$_6$ 1.4 x 10-$_{6)}$	in/in/◦F (cm/cm/◦C)
Flame Spread	E84	25 or less	N/A

H. The Hatch Guard posts in contact with the building roof are to be supplied with a thermoplastic cap to protect with the roof from abrasion.

I. All other fittings used for the roof hatch guardrail assembly are to be galvanized cast iron and feature 9/16-inch diameter socket head set screws for clamping to the 1.9" OD x 0.2" wall (48.3mm x 5.1mm) FRP round tube.

2.4 FABRICATION

A. All posts, rails, channels, and safety gate are to be shop fabricated to the correct size and labeled to insure correct assembly. Caps are to be shop bonded to the ends of the posts prevent the intrusion of foreign material. The safety gate is to be factory attached to the supporting post to insure correct assembly.

B. The cut ends and drilled holes on all FRP components are to be sealed at the factory.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspect and inventory all DynaRound Hatch Guard components to verify that all materials are available for installation and to verify that no components are damaged prior to installation.

B. Inspect the hatch and surrounding roof to verify that the area where the DyanRound Hatch Guard is to be installed is prepared for installation. Remove any debris/obstructions in the installation area and verify all field dimensions prior to assembling the DynaRound Hatch Guard System.

3.2 INSTALLATION

A. Install the DynaRound Hatch Guard System following the manufacture's detailed installation instructions. The installation instructions shall be shipped along with the Hatch Guard System and are available at the manufacturer's website: www.fibergrate.com

B. The set screws in the fittings should be torqued to the values listed in the installation instructions and thread locking compound applied at final assembly to prevent loosening.

3.4 INSPECTION

A. The complete installation is to be inspected to verify correct assembly, proper function of the safety gate, and that all set screws have been properly torqued and thread lock compound applied.

END OF SECTION

ROOF HATCH
SECTION 077233

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Single leaf roof hatch.

   2. Supplementary parts and components, such as inserts, clips, bracing, fasteners, and other miscellaneous supports and accessories required for a complete installation.

B. Related work:
   1. Division 5 for safety post.

   2. Division 7 for roof hatch guard.

   3. Division 9 for finish painting of hatch.

1.2 PERFORMANCE REQUIREMENTS

A. Design loads: Design, fabricate, and install hatch so tat the completed assembly will withstand dead and live loads caused by personnel and wind pressure and wind uplift. Provide additional support and reinforcement to manufacturer standard assembly as required to meet specified performance requirements.
   1. FM rating: Comply with insurance rating bureau requirements for class and securement rating (wind uplift resistance) of Factory Mutual (FM) Class 1-90 requirements.

   2. Live load: 40 psf minimum.

   3. Concentrated load: 250 lbs.

   4. Design loads shall be supported without permanent deformation, or disengagement of seals or anchors.

1.3 SUBMITTALS

A. Shop drawings:
   1. Large scale, dimensioned drawings, showing fabrication and installation details. Indicate dimensions, weights, loading, required clearances, method of field assembly, and components.

2. Include plans, elevations, sections, details, and attachments to other work.

B. Data:
1. Manufacturer's data for the hatch.

2. Supplement with details showing attachment to supports and interface with adjacent construction, including roof membrane.

1.4 HANDLING

A. Protect roof specialties and accessories by storing above grade on required skids or supports. Protect from physical damage and do not install bent and/or damaged materials.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. The Bilco Co., Babcock-Davis Hatchways, Inc., Nystrom Inc., Precision Stair Corp., Williams Brothers Corp., or lnryco, Inc.

2.2 MATERIALS/CONSTRUCTION

A. Cover: 14-gage hot-dip galvanized steel with 3-inch beaded and welded flange, insulated with 1-inch thick fiber glass insulation, and lined with a 22-gage galvanized steel liner. B. Curb:
1. Fabricate from 14-gage hot-dip galvanized steel with integral flanges.

2. Continuously weld the curb at corners to insure watertightness. (12" min. curb, 24" max. tall curb, see drawings for insulation thickness.

3. Insulate the exterior face of the curb with 1-inch thick rigid fiberboard or Perlite insulation.

C. Hardware: Assemble the hatch with heavy pintle hinges and compressive spring operators enclosed in telescopic tubes.
1. Provide positive snap latch with turn handles and padlock hasps inside and outside.

2. Equip cover with an automatic hold-open arm complete with vinyl grip handle for one hand release, and weatherstrip with neoprene draft seals.

D. Finishes:
1. Hardware: Zinc- or cadmium-plating standard with the manufacturer.

2. All other surfaces: Bonderized for paint adhesion and painted with manufacturer's standard rust-inhibitive primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine adjacent construction and supports.

B. Verify that opening is within allowable tolerances, plumb, level, will provide a solid anchoring surface, and that other conditions detrimental to the proper or timely completion of this work are corrected before proceeding with installation.

3.2 INSTALLATION

A. Comply with the hatch manufacturer's instructions.

B. Install the hatch over the opening, plumb, level and square.

C. Attach securely to supporting structure with a minimum of 2 bolts per side.

D. Verify operation, and adjust and lubricate the cover for ease of operation and watertightness.

END OF SECTION

JOINT SEALERS
SECTION 079200

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
   a. Control and expansion joints in unit masonry.
   b. Control and expansion joints in Portland cement plaster.
   c. Joints between different materials listed above.
   d. Perimeter joints between materials listed above and frames of doors and glazed assemblies.
   e. Control and expansion joints in ceiling and overhead surfaces.
   f. Other joints as indicated and required to make the building weathertight.

2. Exterior joints in horizontal traffic surfaces as indicated below:
   a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
   b. Joints between different materials listed above.
   c. Other joints as indicated and required to make the building weathertight.

3. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:
   a. Perimeter joints of exterior openings where indicated.
   b. Tile control and expansion joints.
   c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
   d. Perimeter joints of toilet fixtures.
   e. Other joints as indicated.

4. Interior joints in horizontal traffic surfaces as indicated below:
   a. Control and expansion joints in cast-in-place concrete slabs.
   b. Control and expansion joints in tile flooring.
   c. Other joints as indicated.

B. Related work:
   1. Division 3 for preformed compressible expansion joint fillers for concrete slabs.

   2. Division 7 for firestopping sealants.

   3. Division 9 for acoustical sealants .

4. Division 23 for duct sealants.

1.2 SYSTEM DESCRIPTION

A. Joint sealants are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, with recognized limitations of wear and aging as indicated for each application.

1.3 DEFINITIONS

A. Substrates:
   1. M type substrates: Concrete, concrete masonry units, brick, mortar, natural stone. The term "masonry" means brick, stone, and concrete masonry work.

   2. G type substrates: Glass and transparent plastic glazing sheets.

   3. A type substrates: Metals, porcelain, glazed tile, and smooth plastics.

   4. 0 type substrates: Wood, unglazed tile; substrates not included under other categories.

1.4 SUBMITTALS

A. Data:
   1. Data sheets and published instructions for each type of sealant, backing, bond breaker, and other accessory materials, together with statement that the proposed materials comply with these Specifications.

   2. Include manufacturers' recommendations for surface preparation and priming for all substrates to be in contact with sealant on the Project.

B. Certification: Sealant manufacturer certification that sealants, backing rods, and other materials proposed for use in the application of sealants, are chemically compatible with the materials which will come in contact with the sealants and will not cause deterioration, premature aging and staining of adjacent materials, or the sealants.

C. Test results: Results of adhesion and staining tests performed on same materials as those intended for use on the Project.

D. Samples: Cured samples of the various types and colors of materials proposed for use, approximately 12 inches long, mounted on hardboard backing.

1.5 QUALITY ASSURANCE

A. Uniformity: All sealants used in or on the exterior walls of the building shall be made by the same manufacturer.

B. Installer's qualifications: Firm with a minimum 5 years of experience with joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

C. Color selection:
   1. Final color selection of sealants to be used for exterior locations will be made by the Architect from job-applied samples on in-place materials.

   2. The Architect will select locations and extent of these samples, but length of sealant joints will not exceed 20-foot for vertical surfaces and 10-foot for horizontal surfaces.

D. Preconstruction field testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:
   1. Locate test joints where indicated or, if not indicated, as directed by Architect.
      a. Each type of elastomeric sealant and joint substrate for exterior joints only.
      b. Each type of non-elastomeric sealant and joint substrate indicated.

   2. Test method: Test joint sealants by hand pull method described below:
      a. Install joint sealants in 5-foot joint lengths using same materials and methods for joint preparation and joint sealant installation required for completed Work. Allow sealants to cure fully before testing.
      b. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches long at side of joint and meeting horizontal cut at top of 2-inch cuts. Place a mark 1 inch from top of 2-inch piece.
      c. Use fingers to grasp a 2-inch piece of sealant just above 1-inch mark; pull firmly down at a 90-degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.

   3. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.

4. Evaluation of field test results: Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.6 HANDLING

A. Storage:
   1. Store sealant containers in a protected location in compliance with their manufacturer's instructions until their use. Do not store at temperature higher than 80-degree F.

   2. Do not use sealants whose shelf life has expired.

1.7 JOB CONDITIONS

A. Do not install sealants under adverse weather conditions, or when temperatures are beyond manufacturer's recommended limits.

B. Proceed with the installation only when forecasted weather conditions are favorable for proper sealant cure and development of early bond strength.

1.8 WARRANTY

A. Warrant sealants against defective materials and workmanship for 10 years after Substantial completion.

B. Warranty shall further state that installed sealants are warranted against the following:
   1. Water leakage through exterior sealed joints.

   2. Adhesive or cohesive failure of sealant.

   3. Staining of adjacent surfaces caused by migration of sealants or primer.

   4. Chalking or visible color change of the cured sealants.

C. Make repairs during the warranty period at no cost to the District.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Colors: Match sealant color to color of adjacent materials as closely as possible using colors selected from the manufacturer's standard palette, as approved by the Architect.

B. Compatibility: Provide joint sealers, joint fillers and other related materials as follows:
   1. That will not cause staining, degradation and premature aging of the adjacent surfaces and the sealant itself, when in contact with these surfaces.

   2. Compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

C. Bulk sealants:
   1. Suitability for contact with food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

   2. For interior and exterior horizontal application subject to pedestrian or vehicular traffic: Multi-component pourable urethane sealant.
      a. Type and grade: M (multicomponent) and P (pourable).
      b. Class: 25.
      c. Use related to exposure: T (traffic).
      d. Uses related to joint substrates: M, A, and, as applicable to joint substrates indicated, 0.
      e. Products:
         1) Pacific Polymer, Inc.: Elasto-Thane 227.
         2) Pecora Corp.: Urexpan NR-200.
         3) Sika Corp., Inc.: Sikaftex 1CSL.
         4) Tremco: THC-900.
         5) Tremco: Vulkem 245.

   3. For all other exterior applications:
      a. Type and grade: S (single component) and NS (nonsag), neutral- and basic-curing silicone sealant.
      b. Class: 100/50.
      c. Use related to exposure: NT (non-traffic).
      d. Uses related to joint substrates: M, G, A, and, as applicable to joint substrates indicated, 0.

e. Products:
1) Dow Corning 795, 790, 756 SM.
2) General Electric- Silpruf, Silpruf LM, Silpruf NB.

4. For interior damp, wet and semi-wet locations, other than ftoors, such as toilet rooms where a mildew-resistant sealant is required: Provide white sealant, unless otherwise noted. Single-component mildew-resistant neutral-curing silicone sealant:
a. Type and Grade: S (single component) and NS (nonsag).
b. Class: 25.
c. Use related to exposure: NT (non-traffic).
d. Uses related to joint substrates: M, G, A, and, as applicable to joint substrates indicated, 0.
e. Products:
1) Pecora Corp.: 898.
2) General Electric Corp.: 1700.
3) Dow Corning Corp.: 786.

5. For all other interior vertical applications: Latex sealant complying with ASTM C 834, Type P, Grade NF.
a. Products:
1) Pecora Corp.: AC-20+.
2) Schnee-Morehead, Inc.: SM 8200.
3) Sonneborn, Division of ChemRex Inc.: Sonolac.
4) Tremco: Tremfiex 834 or Acrylic Latex 384.

D. Tape sealants:
1. Norton Specialties Plastics Div.: Norseal 730 or 770.

2. Protective Treatments, Inc.: PTI 606.

3. Or equal.

2.2 JOINT CLEANER, PRIMER AND SEALER

A. As recommended by the sealant manufacturer, for the surfaces to be cleaned, primed or sealed.

2.3 BOND BREAKER TAPE

A. Polyethylene or other plastic tape recommended by the sealant manufacturer to prevent 3-sided adhesion where backer rod cannot be used.

B. Use self-adhering tape wherever possible.

2.4 BACKER ROD

A. General:
   1. Provide size, density and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

B. Type: ASTM C 1330, of type indicated below:
   1. Type C: Closed-cell material with a surface skin, Nomaco SOF ROD/Dual Rod, or equal.

   2. For fillet and cove joints, Nomaco HBR 1/4-inch Round.

C. Elastomeric tubing sealant backings:
   1. Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F.

   2. Provide products with low compression set.

2.5 MASKING TAPE

A. Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site. B.Correct detrimental conditions before proceeding with installation.

3.2 JOINT PREPARATION

A. Clean out joints immediately before installing sealants to comply with recommendations of joint sealant manufacturer and the following.

B. Remove foreign material from joint substrates that could interfere with adhesion of sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), oil, grease, waterproofing, water- repellents, water, surface dirt, and frost.

C. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
   1. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

D. Remove laitance and form release agents from concrete.

E. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other non-porous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

F. Do not proceed with sealant installation over surfaces that have been painted, lacquered, waterproofed or treated with water-repellent or other coating unless specifically approved in writing by the sealant manufacturer.

G. Use masking tape or other protection to limit coverage of sealant to joints to be sealed. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

A. Comply with sealant manufacturer's instructions and ASTM C 1193, except where more stringent requirements are specified herein. At the Architect's option, ASTM C 1193 may also be used for rejection of unacceptable installations.

B. Prime or seal surfaces when recommended by the sealant manufacturer; when the manufacturer's instructions on priming are optional, prime the surface. Do not allow primer/sealer to spill or migrate onto adjacent surfaces.

C. Install backer rod for all sealants, except (1) for exterior sealants subject to traffic (verify that joint filler in paving is installed at the proper depth), (2) where the size of joint prevents the insertion of a backer rod, and (3) where recommended otherwise by the sealant manufacturer.
   1. Install backer rods with blunt or rounded tools to avoid puncturing the material.

   2. Do not twist, stretch or braid the backer rod.

D. Install bond breaker tape where space limitation does not permit use of a backer rod.

E. In no case shall sealant have 3-sided adhesion.

F. Employ only proven installation techniques that will ensure that sealants are installed in uniform, continuous ribbons without gaps or air pockets and with complete "wetting" of the rabbet surfaces equally on opposite sides.
   1. Fill concave joints to the configuration shown on Figure SA of ASTM C 1193.

   2. Provide flush joints to the configuration shown on Figure 8B of ASTM C 1193.

   3. Provide recessed joints configuration as shown on Figure 8C of ASTM C 1193, unless otherwise indicated or required to match adjacent non-moving joint.

   4. Where horizontal joints occur between horizontal and vertical surfaces, fill joints to form a slight cove to prevent trapping moisture and dirt.

   5. Immediately after sealant application and prior to beginning of skinning or curing, tool sealant using tooling agents that will not discolor sealants or adjacent surfaces and are approved by sealant manufacturer.

G. Do not allow sealant or other compound to overflow, spill or migrate into voids of adjacent construction.

H. Remove excess sealant spillage promptly as this work progresses. Clean adjacent surfaces by recommended means to remove sealant, but not damage the surfaces.

3.4 CURING/PROTECTING

A. Cure sealants in compliance with their manufacturer's instructions to obtain high early bond strength, internal cohesive strength and durability. Do not disturb seals until completely cured.

B. Protect sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.

END OF SECTION

HOLLOW METAL DOORS AND FRAMES
SECTION 081113

PART 1 - GENERAL

1.1 RELATED WORK

A. Specifications apply to steel doors, steel door frames, sidelites, transom frames and architectural assemblies as shown on Drawings and schedules as conforming to ANSI A250.8-1998 (SDI 100).

1.2 RELATED WORK

A. See following sections for related work:
   1. Rough Carpentry - Section 06 1000.
   2. Finish Hardware - Section 08 7100.
   3. Glass and Glazing - Section 08 8000.
   4. Painting - Section 09 9000.

1.3 REFERENCES

A. American Society for Testing and Materials
   1. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
   2. ASTM E 152 – Standard Methods of Fire Tests of Door Assemblies.
   3. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   4. ASTM A 568 & A 569 – Standard Specification for Steel, Sheet, Carbon, Hot-Rolled, Commercial Quality.
   5. ASTM A 653 – Standard Specification for Steel, Sheet, Zinc-Coated (Galvannealed) by the Hot-Dip Process.
   6. ASTM A 924 – Standard Specification for General Requirements for Steel, Sheet, Metallic Coated by the Hot-Dip Process.
   7. ASTM D 1735 - Standard Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.

B. American National Standards Institute
   1. ANSI/UL 10B Fire Tests of Door Assemblies.
   2. ANSI/NFPA 80 Standards for Fire Doors and Fire Windows.
   3. ANSI/NFPA252 Fire Tests of Door Assemblies.
   4. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
   5. ANSI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.

6. ANSI A250.6 (SDI 107) – Hardware on Standard Steel Doors (Reinforcement-Application).
7. ANSI A250.7 – Nomenclature for Steel Doors and Steel Door Frames.
8. ANSI A250.8 (SDI-100) – Recommended Specifications for Steel Doors & Frames.
9. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
10. ANSI/DHI A115 Specifications for Hardware Preparations in Standard Steel Doors and Frames.
11. ANSI/DHI A115.IG Installation Guide for Doors and Frames.

C. Steel Door Institute:
1. SDI 105 – Recommended Erection Instructions for Steel Frames.
2. SDI 106 – Recommended Standard Door Type Nomenclature.
3. SDI 108 – Recommended Selection and Usage Guide for Standard Steel Doors.
4. SDI 109 – Hardware for Standard Steel Doors & Frames.
5. SDI 110 – Standard Steel Doors & Frames for Modular Masonry Construction.
6. SDI 111 – Recommended Standard Details for Steel Doors and Frames.
7. SDI 112 – Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors & Frames.
8. SDI 122 – Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
9. SDI 124 – Maintenance of Standard Steel Doors and Frames.

D. Fire Protection
1. UL 10B Fire Tests of Door Assemblies (Neutral test pressure).
2. UL 10C Standard for Safety for Positive Pressure Fire Tests of Door Assemblies.
3. NFPA 252 Fire Tests of Door Assemblies (Neutral test pressure).
4. UBC 7-2-1997 Positive Pressure Fire Tests of Door Assemblies.
5. NFPA 80 Standard for Fire Doors and Fire Windows.

1.4 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8-1998 (SDI-100), ANSI A151.1, and other specifications herein named. Test reports shall be submitted upon request.

B. Acoustical qualities: Doors shall have a minimum sound transmission classification of 28 as tested under ASTM designation E490 and ASTM designation E413.

C. Insulation properties: Doors shall have a U factor .363 (R factor of 2.85) for honeycomb core, U factor for polystyrene core of .263 (R factor of 3.8), U factor for polyurethane core of 0.09 (R factor of 11.1).

D. Underwriters' Laboratories and Warnock Hersey, labeled fire doors and frames:
   1. All labeled fire doors and frames shall be of a type which has been investigated and tested in accordance with either UL-10(b), ASTM E-152, NFPA 252, ANSI A2.2, or UL-10(c), UBC 7-2-1997.

   2. Underwriters' Laboratories labeled doors and frames shall be manufactured under the UL factory inspection program and in strict compliance to UL procedures, and shall provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.

   3. Warnock Hersey labeled doors and frames shall be manufactured to meet the specific requirements of that labeling agency's current procedure for the tested hourly rating designated and shall be subject to inspection by representatives of the labeling agency.

   4. A physical label or approved marking shall be affixed to the fire door or fire door frame, at an authorized facility as evidence of compliance with procedures of the labeling agency.

1.5 REGULATORY REQUIREMENTS

A. Doors and frames shall conform to applicable codes for fire ratings.

1.6 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 013300.

B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.

C. Indicate door elevations, internal reinforcement, closure method, and cutouts for glazing and louvers.

D. Submit manufacturer's installation instructions under provisions of Section 013300.

1.7 DELIVERY, STORAGE AND PROTECTION

A. Storage of Doors:
   1. Doors shall be stored in an upright position under cover. Place the units on at least 4" (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non vented plastic or canvas shelters which create humidity chamber and promote rusting. If the corrugated wrapper on the door becomes wet, or moisture appears, remove the wrapper immediately. Provide a 1/4" space between the doors to promote air circulation.

B. Storage of Frames:
   1. Frames shall be stored under cover on 4" wood sills on floors in a manner that will prevent rust and damage. Do not use non vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Assembled frames shall be stored in a vertical position, five units maximum in a stack. Provide a 1/4" space between frames to promote air circulation.

PART 2: PRODUCTS

2.1 MATERIALS

A. Acceptable manufacturers:
   1. Steelcraft.
   2. Curries.
   3. Ceco.
   4. Stiles Custom Metal, Inc.

B. Frames and frame components shall be manufactured from commercial quality carbon steel conforming to ASTM designation A568 and A569 or hot-dipped galvannealed steel having an A60 zinc-iron alloy coating conforming to ASTM designation A653. Embossed CE-Series EmCraft doors shall have as standard, hot-dipped galvannealed steel face sheets having an A40 zinc-iron alloy coating conforming to ASTM designation A653. Galvannealed steel shall be treated to insure proper paint adhesion. All steel component parts used in galvannealed doors and/or frames shall meet the galvanized specification. Stainless steel shall be fabricated from type 304 or 316 stainless steel polished to a number 4 matte finish. All steel component parts used in stainless doors and/or frames shall also be stainless steel.

C. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of rust inhibiting prime paint in accordance with ANSI A250.10.

2.2 DOORS

A. Exterior doors shall be 16 gauge hot dipped galvannealed steel, with closed tops.

B. Interior doors shall be 18 gauge commercial quality carbon steel, with closed tops.

C. Construction of Doors:
   1. Flush Doors:
      a. Steel Stiffened Core doors - B-Series Doors shall be full-flush seamless construction, fabricated from commercial quality carbon steel or hot-dipped galvannealed steel (see Section 2.1). Doors shall be reinforced, with 20 gauge hat section stiffeners at 6" o.c., and insulated.Door shall have continuous

vertical mechanical interlocking joints at lock and hinge edges with visible edge seams or with edge seam filled and ground smooth. The internal portion of the seam shall be sealed with epoxy. An intermittent fastening along the seam is not permitted. Doors shall have beveled hinge and lock edges. Top and bottom steel reinforcement channels shall be galvannealed 14 gage and projection welded to both panels.

b. Hinge reinforcements shall be 7 gage for 1-3/4" doors. Lock reinforcements shall be 12 gauge and closer reinforcements 12 gauge - box minimum 6" high and 20" long. Hinge and lock reinforcements shall be projection welded to the edge of the door. Galvannealed doors shall have galvannealed hardware reinforcements. Adequate reinforcements shall be provided for other hardware as required.

c. Glass trim for doors with cutouts shall be 24 gage conforming to ASTM designation A 366 cold rolled steel or ASTM designation A 924 hot dipped galvannealed steel with a zinc coating of 0.06 ounces per square foot (A60). The trim shall be installed into the door as a four sided welded assembly. The trim shall fit into a formed area of the door face, shall not extend beyond the door face and shall interlock into the recessed area. The corners of the assembly shall be mitered, reinforced and welded. The trim shall be the same on both sides of the door. Exposed fasteners shall not be permitted. Label and non-label doors shall use the same trim.

d. Doors indicating divided glass lites shall be made using a door with a cutout and trim for one piece of glass. The small lites shall be created by an extruded aluminum grille work mechanically fastened to the glass lite trim on both sides of the door. The grille work sections shall be beveled on the exposed side and shall have a flange on the unexposed side to which glazing tape can be applied. The grille work shall be installed into both sets of glass trim prior to installing into the door. One glass trim and muntin assembly shall be installed into the door prior to glazing. After glazing the other glass trim and muntin assembly shall be installed into the door.

e. All exterior out swing doors shall have the tops closed to eliminate moisture penetration. Door tops shall no have holes or openings. Top caps are permitted.

2.3 FRAMES

A. Exterior frames shall be 16 gauge hot dipped galvannealed steel.

B. Interior frames shall be 16 gauge commercial quality carbon steel

C. Construction Frames:
   1. Flush Frames
      a. F-Series flush frames shall be formed from 16 gauge commercial quality carbon steel or galvannealed steel see Section 2.1. Frames shall be set-up and back welded (full weld) with full penetration through to the face, ground down and smoothed. Miter corners shall have reinforcements with four concealed integral tabs for secure and easy interlocking of jambs to head.

      b. Frames for 1-3/4" doors shall have 7 gage universal steel hinge reinforcements prepared for 4-1/2" x 4-1/2" standard or heavy weight template hinges. Strike reinforcements shall be 12 gage and prepared for an ANSI-A115.1-2 strike.

      c. Steel plaster guards shall be provided for all mortised cutouts. All hinge and strike reinforcements shall be projection welded to the door frame. Reinforcements for surface applied door closers shall be 12 gage steel.

      d. Galvannealed frames shall have galvannealed hardware reinforcements. Adequate reinforcements shall be provided for other hardware when required. F-Series frames shall be furnished with a minimum of six wall anchors and two adjustable base anchors of manufacturer's standard design.

2.4 ACCESSORIES

A. Vision Lites shall be as indicated on the drawings; moldings shall be manufacturer's standard.

B. Louvers within door panel shall be as indicated on the drawings.
   1. Manufacturer: Anemostat Louver with security grille. Model PLSL in size shown on drawings. Custom baked enamel paint color be selected by architect. Provide louver with zinc plated finish and attached bird screen. Stainless steel thru-bolt attachment at each corner and 12" O.C.

C. Transom Louvers - See Drawings and see Section 08 9000.

2.5 FABRICATION

A. Frames shall be supplied
   1. Set up and welded with faces welded and ground smooth. Miters of frames shall be back welded. Weld shall penetrate the outside face. Faces shall be dressed smooth and prime painted. Filler materials are not permitted.

2.7 FINISH

A. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of rust inhibiting prime paint in accordance with the ANSI A250.10 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames".

B. Factory finish painted doors and frames shall be cleaned, phosphatized and finished with rust inhibiting paint capable of passing a 200-hour salt spray and 480-hour humidity test in accordance with ASTM designation B117 and ASTM designation D1735. Finish paint shall be in accordance with ANSI/SDI A250.3, “Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames”.

PART 3: EXECUTION

3.1 INSTALLATION

A. Doors and frames shall be installed in accordance with ANSI/DHI A115.IG Installation Guide for Doors and Frames and/or Steelcraft installation instructions.

B. Label doors and frames shall be installed per NFPA 80 and/or as noted in item number 3.01A.

END OF SECTION

ACCESS PANELS AND FRAMES
SECTION 083116

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Access panels not provided by other trades but required for access to concealed equipment and assemblies.

B. Work installed but furnished in other Sections:
   1. Access panels furnished by other trades.

C. Related work:
   1. Division 8 for cylinder locks.

   2. Division 9 for finish painting access panels, except stainless steel surfaces.

1.2 SUBMITTALS

A. Data: Submit the following manufacturer product data.
   1. For each type of door and frame indicated, including compliance with Code requirements for those in fire-resistive assemblies.

   2. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings for access doors and frames.

   3. Supplement with shop drawings where required to show special installation conditions.

B. Samples: Submit samples for each door face material, at least 3 by 5 inches, in specified finish.

C. Schedule: Submit complete door and frame schedule, including types, genera/locations, sizes, construction details, latching or locking provisions, and other data pertinent to installation.

D. Closeout: Deliver keys properly tagged to the District.

1.3 QUALITY ASSURANCE

A. All access panels for the Project shall be made by the same manufacturer.

B. In fire-resistive construction, provide fire-resistive assemblies bearing the label of a testing agency acceptable to DSA and CSFM for the fire resistance indicated.

PART 2 - PRODUCTS

2.1 ACCESS PANELS

A. General: Provide flanged, prime-coated units, except where stainless steel is specified, equipped with flush, key-operated cam lock.

B. Manufacturers: Basis of design is for Nystrom products. Equal products by one of the following manufacturers will be accepted if approved by the Architect.
   1. Elmdor Manufacturing Co.
   2. JL Industries.
   3. Karp Associates, Inc.
   4. Milcor.
   5. Williams Brothers Corp.

C. Models:
   1. In gypsum board surfaces, except as specified below for toilet room walls: Nystrom Type NT.
      a. Material: Commercial grade cold-rolled steel with 16-gage (0.053 inch) frame and 14-gage (0.067 inch) door.
      b. Trim: 22-gage (0.0299 inch) steel drywall bead.
   2. In plaster surfaces: Nystrom Type NP where door is painted.
      a. Material: Commercial grade cold-rolled steel with 16-gage (0.053 inch) frame and 14-gage (0.067 inch) door.
      b. Trim: 22-gage (0.0299 inch) steel plaster bead with expanded metal lath.
   3. Toilet rooms and kitchen walls: Nystrom Type NT.
      a. Material: Stainless steel, 16-gage (0.053 inch) frame and 14-gage (0.067 inch) door.
      b. Trim: 22-gage (0.0299 inch) stainless steel drywall bead.
   4. In fire-resistive assemblies: Nystrom Type IP as required by surrounding material.
      a. Material: Commercial grade cold-rolled steel with 16-gage (0.053 inch) frame and 20-gage (0.032 inch) door.
      b. Insulation: 2-inch thick fire-resistive insulation sandwiched between the faces.

c. Trim: 22-gage (0.0299 inch) steel drywall bead or plaster casing bead, as required by job conditions.

5. In exterior attic walls: Nystom XTA 36"x36" with continuous stainless steel hinge.
   a. Material: Galvannealed 24 gauge steel with paint grip finish.
   b. Trim: Flange.
   c. Handle: Non-Locking.

6. Size: Unless otherwise indicated on the Drawings, provide 24-inch square or larger opening where a serviceman needs to enter the space accessible through the access door or panel; elsewhere not less than 12-inch square.

7. Where door cannot swing open, provide lift off type with safety wire or chain; Similar to Karp Type DSC-212.

2.2 MATERIALS

A. General:
   1. Provide sheet metal selected for its surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit.

   2. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher- leveled metal sheet, stains, discoloration or other imperfections.

B. Galvanized steel sheet: ASTM A 653 CQ (commercial quality), or ASTM A 653 LQ (lock-forming quality), coating designation G90, mill-phosphatized, stretcher-leveled.

C. Steel sheet: Commercial quality cold-rolled carbon steel sheet, stretcher-leveled, complying with the following requirements at the fabricator's option.
   1. Electrolytic zinc-coated steel sheet: ASTM A 591, with Class C zinc coating; chemically treated in mill with phosphate solution and light chromate rinse.

   2. Cold-rolled steel sheet: ASTM A 1008.

D. Stainless steel sheet: ASTM A 167, Type 302 or 304, stretcher-leveled.

E. Hardware:
   1. Hinges: Concealed spring hinges or concealed continuous piano hinge set to open 175- degree. For fire-resistive units, provide self-closing mechanism.

2. Locking device:
   a. At exterior soffits and other locations shown on Drawings or scheduled, provide one cylinder lock per access door. Furnish 2 keys per lock. Key all locks alike, unless other wise noted.

   b. At all other locations, provide flush, screwdriver-operated cam lock of number required to hold door in fiush, smooth plane when closed.

   c. For recessed panel, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

   d. For locks on panels 24 inches in any dimension, provide interior latch mechanism to allow door to be opened from the inside without a key.

2.3 FABRICATION

A. Fabricate to profiles indicated without exposed cut edges.

B. Produce fiat, fiush surfaces without cracking and grain separation at bends.

C. Continuously weld exposed joints and seams; grind, fill, and dress welds to produce smooth flush exposed surfaces in which welds are invisible after final finishing is completed.

D. Provide exterior access panels with weatherproof extruded door gasket.

E. Finish:
   1. When installed in restroom, kitchen, or ceramic tile wall surfaces, provide stainless steel panels finished with a NAAMM No. 4 (brushed) finish.

   2. When installed in an exterior wall or soffit, fabricate assemblies from commercial quality carbon steel sheets complying with ASTM A 653 CQ, hot-dip galvanized to comply with ASTM A 924, G90, or hot-dip galvanize after fabrication to provide an equivalent zinc coating weight.

   3. Elsewhere provide access panels with a baked-on rust-inhibitive primer. Paint to match adjacent walls.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine adjacent construction and supports.

B. Verify that openings are properly framed, within allowable tolerances, plumb, level, clean, will provide a solid anchoring surface, and that other conditions detrimental to the proper or timely completion of this work are corrected before proceeding with installation.

3.2 INSTALLATION

A. Install at indicated locations, plumb, level, and square with adjacent construction.

B. Attach assemblies securely to supports.

C. When installed in ceramic tile surfaces, coordinate panel location with the tilework so that the panel will align and fit within the tile module with no tile cutting, or a minimum of cutting.

3.3 FIELD QUALITY CONTROL

A. Adjust hardware so that panels operate freely, but not loosely, without sticking or hinge binding, with hardware adjusted and functioning properly.

END OF SECTION

ALUMINUM WINDOWS
SECTION 08 5113

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This section specifies Architectural Aluminum fixed windows with integral glazing units and accessories.

B. Related Requirements:
1. Section 07 2700 - Air Barriers
2. Section 07 6000 - Flashing and Sheet Metal
3. Section 07 9200 - Joint Sealants
4. Section 08 8000 - Glazing

1.2 REFERENCES

A. Reference Standards:
1. American Architectural Manufacturer's Association (AAMA):
   a. AAMA/ WDMA/ CSA101/ I.S.2/ A440, North American Fenestration Standard/Specification for Windows, Doors, and Skylights, Includes Update No.1
   b. AAMA 502-12 Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
   c. AAMA 609 Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
   d. AAMA 611 Voluntary Standards for Anodized Architectural Aluminum.
   e. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).
2. Glass Association of North America (GANA):
   a. GANA 01-0300 Proper Procedures for Cleaning Architectural Glass Products.
3. ASTM International (ASTM):
   a. ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across for Specimen.
   b. ASTM E330 Standard Test Methods for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
   c. ASTM E547 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.

d. ASTM F588 Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.

4. National Fenestration Rating Council (NFRC):
   a. NFRC 100A Procedure for Determining Fenestration Attachment Product U-Factors.
   b. NFRC 200A Procedure for Determining Attachment Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
   c. NFRC 500 Procedure for Determining Fenestration Product Condensation Resistance Values.
5. US Green Building Council (USGBC):
   a. LEED NC Version 2.2, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package for New Construction and Major Renovations.

1.3 SUBMITTALS

A. Make submittals in accordance with Section 01 3300 - Submittal Procedures.

B. Product Data: Manufacturer's standard specifications and descriptive literature, including:
1. Certified test laboratory reports to show compliance with requirements.
   a. Windows with sizes exceeding the gateway sizes do not qualify under these tests.
   b. Windows manufactured with configurations different than the tested configurations do not qualify under these tests; windows can be tested for performance outside the already tested gateway sizes.
   c. Windows with hardware different from what is referenced on the test reports do not qualify under these tests.
2. Manufacturer's standard head, jamb and sill details.
3. Installation methods.
   a. Submit manufacturer's written installation instructions.

C. Manufacturer's Certificates: Submit certified independent testing agency reports indicating window unit meets or exceeds specified performance requirements.

D. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
1. Provide shop drawings indicating details of construction and installation including, but not limited to, window location chart, window schedule, size, muntin type and design, sections and details of multiple window assemblies, hardware, glazing details, frame type, STC, glass types, screens and handing operation.

E. Samples
   1. Window Section:
      a. Submit 8x8 inch minimum corner section sample of frame for each glazing type specified.
      b. Sample will be used to verify construction, corner joint, frame finish and color.
      c. Quantity: 5.
   2. Glazing:
      a. Insulated Glazing 12x12 inch.
   3. Finish: AAMA 611 Anodized Architectural Coatings; AAMA 2605 Organic Coatings on Aluminum Extrusions.
      a. Class 1 Anodized.

F. Manufacturer's written instructions, including;
   1. Delivery, storage and handling recommendations.
   2. Preparation and installation recommendations.

G. Installer's Experience: Submit verification of evidence of work similar to work of this section.

H. Warranty: Fully executed, issued in Owner's name and registered with manufacturer, including:
   1. Manufacturer's 10 year warranty from date of accepted delivery, covering defects in materials.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 10 years experience in producing aluminum windows of the type specified.
   1. Manufacturer must be certified through the PPG Certified Window Fabricator Program.

B. Installer Qualifications: Licensed contractor with a minimum 3 years experience installing similar windows.

C. Mock-ups: Provide and install at job site a mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner's and Architect's acceptance of finish color and workmanship standard.
   1. Size: See Drawings.
   2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose mock-up with no longer required.
   3. Incorporation: Mock-up may be incorporated into final construction upon Owner's and Architect's approval.
   4. Modify mock-up as required to produce acceptable work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery
   1. Deliver materials in accordance with manufacturer's written instructions and labeling.
   2. Deliver materials in manufacturer's original, unopened, undamaged containers or packaged with identification labels intact, and product name and manufacturer clearly visible and in sizes to suit project.

B. Storage
   1. Store materials upright and protected form exposure to harmful environmental conditions, clean, dry, frost-free and at manufacturer's recommended temperature and humidity levels.

C. Handling:
   1. Exercise care during off-loading and installation to avoid damage and marring of finishes.
   2. Handle in a manner to evenly distribute material load and prevent twisting, ending and cracking of windows doors and associated parts.
   3. Replace materials damaged during handling.

1.6 WARRANTY

A. Manufacturer's warranty:
   1. Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
   2. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer: All Weather Architectural Aluminum, 777 Aldridge Road, Vacaville, California 95688; Phone (707)452-1600; Fax (707)452-1616; Email: info@allweatheraa.com

B. Basis for Design: Series 5000 by All Weather Architectural Aluminum.

C. Related Requirements:
   1. Submit comparable product submittals for products by listing manufacturers.

   2. Information, including sample (size and configuration per Architect's requirements) must be submitted for consideration a minimum of 10 days before project bid date.

2.2 PERFORMANCE REQUIREMENTS

A. Design pressure, air filtration and water penetration.
   1. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 [CW-PG35]

B. Uniform Load Deflection and Uniform Load Structural to ASTM E330.

C. ASTM E283, Air Leakage: 1.57 psf: 0.3 cfm/ft2 maximum.

D. ASTM E547, Water Penetration: at 4.59 psf: no leakage.

E. ASTM F588, Forced Entry Resistance: Type B Grade 10: Pass for no entry.

F. Glazing - See section 08 8000 for glazing specification.

2.3 DESCRIPTION

A. Acceptable Material: Series 5000 Windows by All Weather Architectural Aluminum.

B. Aluminum framed fixed insulating glazing units (IGU) and accessories.
   1. Window Dimensions:
      a. See drawings for window types and configurations.

2.4 MATERIALS

A. Frames: 2 1/4 inches Pour and Debridge, thermally broken extruded aluminum Type 6063 age hardened to T-6 rating for strength and durability.
   1. Integral extrusion wall thickness: 0.094 inches.
   2. Nominal web thickness: 1/8 inch.
   3. Include full perimeter exterior snap in glazing stops.
   4. Corners of frame and ventilators: Mitered and welded; muntin and intermediate bars attached to cross joints and abutting sash sections.
   5. Operating Sash: Mitered, corner keyed and crimped frames.
   6. Finish Types:
      a. Aluminum to AA DAF-45, Class 1, bronze anodized.

B. Glazing in accordance with Section 08 8000.
   1. Insulated glass 1 inch.

2.5 FABRICATION

A. Miter and weld corner joints of frames.

B. Vents; mitered, corner keyed and crimped.

C. Attach muntin and intermediate bars to cross joints and abutting sections.

D. Ensure sill, vents and intermediate bars have weep holes and are sloped for positive drainage to exterior.

E. Pre-drill and tap frames to receive screen attachment hardware as required.

F. Ensure surfaces to be glazed include bead retaining notch.

G. Ensure operable windows include two rows of weather-stripping in extruded slot at perimeter of vent or opening.

H. Install hardware specified.

2.6 SOURCE QUALITY CONTROL

A. Use only fabricators who have training and experience with similar work of this Section.

B. Ensure all window framing materials come from single manufacturer.

PART 3 - EXECUTION

3.1 INSTALLER

A. Use only licensed installers who have training and experience with similar work of this Section.

3.2 EXAMINATION

A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for aluminum window installation in accordance with manufacturer's written recommendations.
   1. Visually inspect substrate.
   2. Verify openings are dimensionally correct and within allowable tolerances, and substrates are plumb, level and clean.
   3. Verify in the presence of the Architect that anchoring surface is in accordance with approved shop drawings.
   4. Inform Architect of unacceptable conditions immediately upon discovery.
   5. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Architect.
   6. Starting window installation implies substrate conditions are acceptable for Work of this Section.

3.3 INSTALLATION

A. Install aluminum windows in accordance with manufacturer's written recommendations.
   1. Ensure operable windows are closed and locked during installation.

3.4 SEALANTS

A. Apply sealant in accordance with manufacturer's written installation guidelines.

3.5 FIELD QUALITY CONTROL

A. Comply with AAMA 502-12.

B. Field Testing Performance:
   1. To AAMA 502-12, Section 1.1.

C. Proper Execution of the Field Test:
   1. Ensure window is plumb, level and square.
      a. If conditions fall outside the +/- ½ inch tolerance, do not test product.
      b. Test at a pressure greater than 2/3 the fenestration product laboratory test pressure.

D. Qualification of the agency performing the test:
   1. Enure agency is an AAMA accredited independent testing agency.

E. Site Visits:
   1. Schedule site visits to review work at stages listed:
      a. After delivery and storage of aluminum windows and when preparatory work on which work of this Section depends is complete, but before application begins.
      b. Twice during progress of work at 25% and 60% complete.
      c. Upon completion of work, after cleaning is carried out.
      d. Obtain reports within three days of review and submit immediately to Architect.

3.6 CLEANING

A. Clean sealants, caulking and other materials from surfaces, including adjacent work.

B. Clean window frames, casings and glass using materials and methods recommended by the window and glass manufacturer that do not cause defacement of work.
   1. Clean using methods which comply with AAMA 609.
   2. Clean glass using methods which comply with GANA 01-0300.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

3.7 PROTECTION

A. Protect installed aluminum windows from damage during construction.

B. Repair or replace adjacent materials damaged by installation of aluminum windows.

END OF SECTION

TUBULAR DAYLIGHTING DEVICES
SECTION 086223

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Tubular daylighting devices and accessories.

1.2 RELATED SECTIONS

A. Section 076000 – Metal Flashings and Sheet Metal Work.

B. Section 26 0943 - Lighting Controls.

1.3 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process.

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process.

E. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

F. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.

G. ASTM E 283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

H. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference.

I. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.

J. ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.

K. ASTM D 1929 - Test Method for Ignition Properties of Plastics.

L. ASTM D 2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.

M. ASTM F 1642 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loading.

N. ASTM F 2912 - Standard Specification for Glazing and Glazing Systems Subject to Airblast Loading.

O. AAMA/WDMA/CSA 101/I.S.2/A440 - Standard/Specification for Windows, Doors, and Unit Skylights; 2011

P. FM Standard 4431 - The Approval Standard for Skylights

Q. UL 2108 - Low Voltage Lighting Systems

R. IBC Section 1710 - Load Test Procedure for Wind Load Testing on Rooftop Daylight Collecting System - Structural Performance Testing - Devised by ATI PE); 2012

S. IBC Section 2606.7.2 - Installation - Diffuser Fall Out Test (Devised by PE); 2012

T. OSHA 29 CFR - 1910.23 (e)(8) (Guarding Requirements for Skylights); 1926 Subpart M (Fall Protection); 1926.501(b)(4)(i); 1926.501(i)(2); 1926.501(b)(4)(ii)

U. California State OSHA Fall Protection Code of Regulations, Title 8, Section 3212 (e)(1)

1.4 PERFORMANCE REQUIREMENTS

A. Daylight Reflective Tubes: Spectralight Infinity with INFRAREDuction Technology combines ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields an average total- and specular-reflectance greater than 99.5% percent for the Visible Light spectrum (400 nm to 700 nm) providing maximized visible light transmission and less than 25% reflectance for Infrared (IR) heat wavelengths (750 nm to 2500 nm) for minimized heat transmission, resulting in a spectrally-selective Total Solar Spectrum (250 nm to 2500 nm) reflectance less than 37 percent, as measured using a Perkin Elmer Lambda 1050 spectrophotometer with a Universal Reflectance Accessory. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.

B. Air Infiltration Test:
   1. Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.

C. Water Resistance Test:
   1. Passes water resistance; no uncontrolled water leakage with a pressure differential of 10.7 psf (512 Pa) or 15 percent of the design load (whichever is greater) and a water spray rate of 5 gallons/hour/sf for 24 minutes when tested in accordance with ASTM E 547 and ASTM E 331.

D. Uniform Load Test: All units tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
   1. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).

E. Fire Testing:
   1. Fire Rated Roof Assemblies:
      a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the International Building Code for Class A, B, and C roof assemblies.
   2. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the International Building Code.
   3. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
   4. Smoke Density: Rating no greater than 450 per ASTM E 84 in way intended for use. Classification C.
   5. Rate of Burn and/or Extent: Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.
   6. Rate of Burn and/or Extent: Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D 635.

F. Fall Protection Performance:
   1. Passes fall protection test: No penetration of dome or curb cap when subject to 400 lb (160 Kg)/42 inch (1066 mm) impact drop test when tested in accordance with OSHA 29 CFR 1926.506(c) Safety Net Systems.
   2. Passes fall protection test: California State OSHA Fall Protection Code of Regulations, Title 8, Section 3212 (e)(1) Skylight Screens.

1.5 SUBMITTALS

A. Submit under provisions of Section 013310.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Data sheets showing roof dome assembly, flashing base, reflective tubes, diffuser assembly, and accessories.
   4. Installation requirements.

C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including rough opening and framing dimensions, anchorage, roof flashings and accessories.

D. Electrical wiring diagrams and recommendations for power and control wiring.

E. Verification Samples: As requested by Architect.

F. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 20 years.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.8 PROJECT CONDITIONS

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

1.9 WARRANTY

A. Daylighting Device: Manufacturer's standard warranty for 10 years.

B. Electrical Parts: Manufacturer's standard warranty for 5 years, unless otherwise indicated.

C. LED Emitters, Drivers and Controls: Manufacturer's standard warranty for 3 years against failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Solatube International, Inc., which is located at: Solatube International 2210 Oak Ridge Way; Vista, CA 92081-8341; Toll Free Tel: 888-765-2882; Tel: (760) 477-1120; Fax: (760) 597-4488; Email: request info (commsales@solatube.com); Web: http://www.solatube.com

B. Requests for substitutions will be considered in accordance with provisions of Section 012500.

2.2 TUBULAR DAYLIGHTING DEVICES IN CLASSROOMS

A. SolaMaster Series: Solatube Model 330 DS-C Closed Ceiling 21 inch (530 mm) Daylighting System:
   1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
      a. Glazing: Type DA, 0.143 inch (3.7 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting, impact modified acrylic blend.
   2. LightTracker Reflector, made of aluminum sheet, thickness 0.015 inch (0.4 mm) with Spectralight Infinity. Positioned in the dome to capture low angle sunlight.
   3. Curb Cap Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
      a. Base Material: Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M, 0.028 inch (0.7 mm) thick.
      b. Base Style: Type FC
   4. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
   5. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm).
   6. Reflective Tube: Aluminum sheet, thickness 0.018 inch (0.5 mm).
      a. Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 93 percent.
      b. Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
      c. Top Tube Angle Adapter, Type TA:
         1) Reflective 30 degree adjustable Top Tube Angle Adapter, 16 inches (406 mm) long.

d. Bottom Tube Angle Adapter, Type BA:
   1) Reflective 30 degree adjustable Bottom Tube Angle Adapter, 16 inches (406 mm) long, required for transition box.
e. Extension Tube:
   1) Reflective extension tube, Type EXX, 24 inches (610 mm) long amount needed.

7. Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 330 DSC. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube, with compression seal to minimize condensation and bug or dirt infiltration; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
   a. Round to square transition box made of opaque polymeric material, classified as CC2, Class C, 0.110 inch (2.8 mm) thick.
   b. Natural Effect Lens made of acrylic, classified as CC2, Class C, 0.060 inch (1.5 mm) thick, with open cell foam seal to minimize condensation and bug, dirt, and air-infiltration per ASTM E 283.
   c. Lens: Type L1 OptiView Fresnel lens design to maximize light output and diffusion with extruded aluminum frame. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.
8. Diffuser Assemblies for Tubes Not Penetrating Ceilings (Open Ceiling): Solatube Model 330 DS-O. 21 inch (530 mm) diameter diffuser attached directly to bottom of tube.
   a. Lens: Type L5 (wide), OptiView Micro-replicated lens design to maximize light output and diffusion. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.
   b. Diffuser Seal: Open cell foam, acrylic adhesive backed, 0.75 inch (19mm) wide by 0.125 inch (3.2mm) thick to minimize condensation and bug, dirt, and air infiltration per ASTM E283.
   c. Diffuser Trim Ring: Injection molded acrylic. Nominal wall thickness 0.172 inches (4.4 mm).
9. Accessories:
   a. Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening.
   b. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.
   c. Daylight Dimmer: Provide butterfly baffle dimmer assembly including dimmer wall switch, all low voltage wiring, transformer for complete installation. Electrical contractor to provide one point of connection for dimmer operation per room.
10. Curbs: Metal Insulated Roof Curb: Corrosion resistant 18 gauge hot-dipped galvanized steel conforming to ASTM A653 G90 with continuous welded seams, integrated base plate for water tightness and extra strength, lined with 1-1/2 inch fiberglass fireproof sound attenuating thermal insulation, factory installed 2 by 2

treated wood nailer secured to top ledge of curb. Curb designed for single-ply roofing, lightweight fill, or tapered insulation low slope roof types.

a. C20 20 inch (min.) high Metal insulated curb.

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.

C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions.

C. If substrate and rough opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Coordinate requirements for power supply, conduit and wiring.

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

3.3 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.

B. Coordinate installation with substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing to ensure that each element of the Work performs properly and that finished installation is weather tight.
   1. Install flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.
   2. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.
   3. Coordinate attachment and seal of perimeter air and vapor barrier material.

C. Where metal surfaces of tubular unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, provide permanent separation as recommended by manufacturer

D. Align device free of warp or twist, maintain dimensional tolerances.

E. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

F. Inspect installation to verify secure and proper mounting. Test each fixture to verify operation, control functions, and performance. Correct deficiencies.

3.4 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

FINISH HARDWARE
SECTION 08 7100

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installing of all finish hardware complete as shown and noted on the drawings and as specified. The Conditions of the Contract and Division 1 apply to this section as fully as if repeated herein.

B. 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.

C. Doors shall include locks that allow doors to Classrooms, and any room with an occupancy of five or more people, to be locked from the inside, CBC1010.2.8.2.

1.2 RELATED SECTIONS

D. See following sections for related work:
   5. Hollow Metal Doors and Frames - Section 08 1113.
   6. Signage - Section 10 1400.
   7. Electrical - Division 26.

1.3 GENERAL REQUIREMENTS

A. Packing, Marking and Delivering: Each unit of hardware shall be individually packaged, complete with proper fastenings and 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 jobsite.

B. Guarantee: Hardware shall be guaranteed for a period of two years from date of acceptance of the work, in the manner specified under Division 1. Defects in materials and workmanship occurring during the guarantee period shall be corrected to the satisfaction of the Architect.

C. Adjustment and Inspection: During the installation of hardware, a periodic inspection in company with the Architect shall be made by the Architectural Hardware Supplier. 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.

1.4 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3300.

B. Hardware List: Prepare and submit a hardware list for review. The list shall identify each hardware by manufacturer, manufacturer's catalog number and exact location in the work. Hardware list shall be in suitable form to facilitate ready checking and review. Review of the hardware schedule 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.

C. Samples: When so directed by the Architect, a sample of each item of hardware proposed in the work shall be submitted for review.

D. Templates: In order to insure proper placement and fit, hardware in connection with metal doors or metal frames shall be made to template. Templates or physical hardware items, shall be furnished to manufacturers concerned and shall be supplied sufficiently in advance to avoid delay in the work.

E. Catalog Cuts: When so directed by the Architect, provide catalog cuts of every item furnished for this project. Show finishes, sizes, catalog numbers and pictures. Explain fully all abbreviations.

1.5 KEYING

A. Locksets and cylinders shall be keyed, master keyed, and grand master keyed into the school districts established keying system. District standard Schlage keyway is to be verified.

B. When two or more doors requiring a cylinder lock enter into any one room, these locks shall be keyed alike, unless otherwise noted.

C. Provide two (2) uncut keys per lockset.

D. Contractor is to utilize construction cores during the course of construction and change to permanent cores at the end of the job.

E. Final keying is to take place by the Contractor.

F. Provide Primus “P” keyways at all new and existing exterior doors.

PART 2 - PRODUCTS

2.1 FINISH OF HARDWARE

A. The finish of hardware shall be as herein specified. Special care shall be taken to co-ordinate the finish of the various manufacturers to insure a uniform acceptable finish. The finish of hardware shall match the finish of the locksets unless otherwise specified.

2.2 LOCK UNIFORMITY

A. Except where otherwise specified, locksets, latchsets, cylinders and component parts, as specified hereinafter shall be by Schlage or approved equal.
   1. Locksets shall be lever operated, Heavy Duty, Key in Lever Lock, D Series, Schlage Rhodes.
   2. Mortise locksets shall be lever operated, extra heavy duty, L900 series, Schlage Rhodes, N escutcheon.
   3. Locksets and cylinders shall have a minimum of six pins.
   4. Lock strikes shall be boxed, and shall have a curved lip of sufficient length to protect the trim and jamb.
   5. Exit doors shall be openable from the inside without the use of a key or any special knowledge or effort.

B. Operating Hardware is to conform to CBC 11B-404.2.7.

2.3 HINGES

A. Hinges shall be full mortise, template type, unless otherwise scheduled. Hinges shall have non-rising loose pins, ball or oilite bearings, and flat button tips, except when otherwise specified. Where necessary to keep door leaf clear of walls, casings, jambs or reveals in door openings, wide throw hinges of an approved type shall be furnished. Provide three (3) hinges minimum and all doors over 7' 6" shall have one extra hinge for each two and one half feet of height.

B. Exterior Door Hinges: Provide out-swinging door hinges with non-removable pins and security studs.

2.4 HARDWARE SCHEDULE

A. Refer to Hardware Schedule at the end of this Section.

2.5 EXIT DEVICES

A. Exit devices shall be Von Duprin series XP99 Touch Bar or equal, approved in accordance with Section 01 2500. Devices shall be U.L. listed for panic safety and fire exit hardware to

meet U.L. labeled door requirements, and shall conform to local code requirements. Panic shall be listed with the State of California Fire Marshall and Certification of listing shall be furnished in duplicate with submittals. Exit devices shall comply with CBC standard 12-10-3 and CBC Section 1008.1.9 and the unlatching force shall not exceed 15 pounds applied in the direction of travel.

2.6 DOOR CLOSERS

A. Door closers shall be LCN Closers or equal, approved in accordance with Section 01 2500. Furnish flat rectangular type closers with covers. Size closers in accordance with the manufacturers recommendations and good standard practice. Surface mounted closers shall be the product of a single manufacturer. Closers shall have nonferrous covers and cast iron cases. Closers operation and speed are to comply with CBC Sections 11B-404.2.9 and 11B-404.2.8.1.

B. Provide for the appropriate arm application. All closers shall be installed on the inside of rooms, not on the exterior or corridor side.

C. Door closers are to provide a sweep period so that from an open position of 90 degrees the door will take at least five seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per CBC 11B-404.2.8.

D. Maximum effort to operate interior and exterior doors shall not exceed 5#, such pull or push effort being applied at right angles to hinged doors. Fire doors shall have minimum opening force allowable by appropriate administrative authority, not to exceed 15 lbf.

E. Provide sex-bolted or through-bolt mounting for all door closers.

2.7 DOOR STOPS AND HOLDERS

A. Place door stops in such a position that they permit maximum door swing but do not present a hazard or obstruction. Furnish strikes of proper height to engage holders on doors. For floor mounted hardware, mount a maximum of 4" from face of wall or other surface.

2.8 THRESHOLD

A. Thresholds are to comply with CBC Section 11B-404.2.5.

B. Thresholds are not to exceed ½" in height with a beveled surface of 1:2 maximum slope per CBC Section 11B-404.2.5.

2.9 PROPRIETARY PRODUCTS

A. References to specific proprietary products are used to establish minimum standards of utility and quality. Design is based on the materials specified; other materials may be considered in accordance with the provisions of Section 01 2500.

2.10 MAINTENANCE RELATED ITEMS

A. Provide one (1) set of Installation and Adjusting Tools, one (1) set of Maintenance Manuals for locksets, door closers and panic devices direct to the Owner.

2.11 ACCEPTABLE MANUFACTURERS

A. Catalog numbers used in the Hardware Selection were taken from the indicated manufacturers.

	Manufacturer	Item	Acceptable Substitutes
3.	Ives	Butts	Stanley
4.	Schlage Rhodes Lever	Locks	No Substitutions
5.	LCN	Closers	No Substitutions
6.	Ives	Miscellaneous Rockwood	
7.	Pemko	Threshold	
8.	Von Duprin	Panic	No Substitutions
9.	Select Products	Continuous Hinge	PEMKO

2.12 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper finish hardware installation, shall be as selected by the Contractor subject to Architect's review and approval.

B. Furnish silencers on all doors, three for single doors, two for pais of doors. Omit where weatherstrip, sound or fire rated door assemblies.

2.13 DELIVERIES

A. Stockpile all items sufficiently in advance to ensure their availability and make all necessary deliveries in a timely manner to ensure orderly progress of the total work.

PART 3 - EXECUTION

3.1 DOOR CLEARANCE

A. Unless detailed otherwise on the drawings, provide the following door clearances:
   1. Floor Clearance:
      No Threshold 3/8" max for all doors
      Carpet 1/8" typical
      Labeled Doors3/32" max over floor or threshold
   2. Head and Jamb Clearance: 1/8" max.

3.2 HARDWARE PLACEMENT

A. Unless detailed otherwise, place hardware at the following heights above finish floor:

1.	Strike (Centerline) for Knob Locks, Handle Sets, Roller Latches, Exit Bolt Locks:	40-5/16"
2.	Push bar and Pull (Centerline):	44"
3.	Push Plate (Centerline)	44"
4.	Deadlock Strike	40"
5.	Hinges, Kick Plates:	Manufacturer's Standard

3.3 INSTALLATION

A. Install hardware in precise manner, per manufacturer's instructions. Predrill pilot holes in wood for screws. Drill and tap for surface mounted hardware on metal. Set hinge leaves snug and flat in mortises, turn screws to flat seat (do not drive).

B. Mount door closers for maximum swing of door before setting stops. Silencers shall be in place before adjusting strikes. Drive hinge pins down and tighten set screws. Provide through bolts on wood doors for closers.

C. Install locks with keyways in proper position, with knobs, roses and escutcheons firmly affixed.

D. Set thresholds in waterproof sealant and secure with lead shields and countersunk screws of same finish as threshold.

E. Except for hinges, do not install hardware until completion of painting and finishing work.

F. Adjust hardware so that moving parts operate freely without bind, or excessive play. Installed hardware shall be free from paint, corrosion or damage.

G. Adjust door closers for closing speed, (5 seconds) latching, back checking, and adjust hold open devices for full control of door. Maximum pull exterior doors five (5) pounds, interior doors - five (5) pounds.

H. Upon completion of installation and adjustment, provide required dogging keys, closer valve keys, lock spanner wrenches, and other factory furnished installation aids, instructions and maintenance guides.

3.4 HARDWARE KEY

A. Unless otherwise noted all hardware shall be as specified below, all finish shall be US26D, or aluminum, all doors and frames are hollow metal:

1.	Hinges:	Continuous: Select Products SL-24HD. Heavy Duty: IVES 5BB1HWxNRP - 4 ½" x 4 ½" (exterior doors). IVES 5BB1HW - 4 ½" x 4 ½" (interior doors).
2.	Lockset:	Schlage 'ND' Series Cylinder Lock (626), the lock function will be noted. With Primus cores as indicated.
3.	Panic Hardware:	Von Duprin, Series NL99 Rim device with cylinder dogging, (less cylinders, provide Schlage cylinders).
4.	Latch Protector:	Ives LG-12, Rockwood 321.
5.	Closer:	LCN 4040XP Super Smoothie, adjust pull to 5# exterior doors and 5# interior doors.
6.	Kick Plates:	10" (U.N.O.) x full width of doors less 2" x .050" thick, Ives 8400. See hardware group for additional sizes.
7.	Bumper/Holder:	Ives, WS45, mounted at top of door. (Provide solid blocking in wall). Ives, FS43 at floor. (Maximum 4" from walls).
7B.	Bumper:	Ives: Interior floor, FS18S/FS18L. (Maximum 4" from wall).
8.	Thresholds:	See plans and details.
9.	Weatherstrip:	National Guard Products, #162SA (Jamb) and #700SA (Head)
10.	Flush Bolt:	IVES FB51PW/DP2.
11.	Removable Mullion:	Von Duprin, keyed removable.
12.	Push/Pull Plate:	IVES 8200CFC x 8302CFC - 4x16.
13.	Deadbolt:	Not Used.
14.	Drip Cap:	National Guard Products, #17x4".
15.	Door Shoe:	PEMKO 217APK.

16. Door Silencers: Ives SR64.
17. Sound Gasket: PEMKO S88 (double row).
18. Astragal: Per Specification Section 08 1113.
19. Smoke Seal: National Guard Products, #2525B
20. Magnetic Hold Open: Not Used.
21. Keyway: Schlage Primus (exterior) EF keyway, Schlage Cylinder 40-100-6 (interior)
22. Astragal

HARDWARE SCHEDULE: See Section 3.4 Hardware Key for details.

Hardware Group 1 – Exterior Classroom – Panic 108A, 108B

Key	Item	Description
1	Hinges	Continuous
3	Panic Hardware	
5	Closer	
6	Kick Plate	
7	Bumper/Holder	
8	Threshold	
9	Weatherstrip	

Hardware Group 2 – Exterior Classrooms – 100, 101, 102, 103, 104, 105, 106, 107

Key	Item	Description	
1	Hinges	Continuous	
2	Lockset	ND 95PD-RHO-626	SCH
	IC Permanent Core	23-030 perm core (1-bitted)	SCH
4	Latch Protector		
5	Closer		
6	Kick Plate		
7	Bumper/Holder		
8	Threshold		
9	Weatherstrip		
15	Door Shoe		
21	Keyway	EF Keyway	

Hardware Group 3 – Exterior Staff Restroom – 109

Key	Item	Description	
1	Hinges	Heavy Duty	
2	Lockset	CO-200-CY-40-KP	SCH
5	Closer		
6	Kick Plate		
8	Threshold		
7B	Bumper/Holder		
9	Weatherstrip		
15	Door Shoe		

Hardware Group 4 – Exterior Utility/Storeroom – 110, 111, 112

Key	Item	Description	
1	Hinges	Heavy Duty	
2	Lockset	ND 80PD-RHO	SCH
6	Kickplate		
8	Threshold		
7B	Bumper	At Floor	
9	Weatherstrip		
15	Door Shoe		

END OF SECTION

GLASS AND GLAZING
SECTION 088000

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference in this Section:
   1. Window units.
   2. Doors, Vision Panels.

B. Related Sections:
   1. Hollow Metal Doors and Frames - Section 08 1113.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

B. Glass Design: Glass thicknesses to be 1/4" at door vision panels and windows (safety glazing where required by code).

1.4 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Section 01 3300.

B. Substitution to conform to Section 01 2500.

1.5 QUALITY ASSURANCE

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in the Section or in referenced standards.
   1. FGMA Publications: “FGMA Glazing Manual.”
   2. LSGA Publications: “LSGA Design Guide.”

B. Safety Glass: Products complying with 2022 CBC, 2406 and testing requirements of CPSC 16 CFR 1201 for Category II materials.
   1. Per 2022 CBC, 2406.3, provide safety glass permanently marked with certification label of Safety Glazing Certification council (SGCC) or other certification agency acceptable to authorities having jurisdiction and requirements of 2022 CBC, 2406.

C. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

D. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:
   1. Primary glass of each (ASTM C 1036) type and class indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products specified in product Data Sheet at end of this Section.

2.2 PRIMARY FLOAT GLASS PRODUCTS

A. Clear Float Glass - Quality Q-3 Glazing Select Glass, 1/4" thickness or heavier where required. ASTM C1036-91 Standard Specifications for flat glass, by LOF or equal tempered where indicated.

B. Tempered Float Glass - ASTM C1048, Fully Horizontal Tempered (after cutting to final size) to achieve a flexural strength four (4) times normal glass strength. All tempered glass is to have permanent logo signifying compliance with Public Safety Commission.

2.3 TEMPERED GLASS IN DOORS

A. Door vision panels to be fully tempered clear 1/4"(min) thickness, meeting the safety requirements of Section 2406.4.1, 2022 CBC. (See plans for insulated glazing locations).

2.4 ELASTOMERIC GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:
   1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

   2. Suitability: comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicat4ed and conditions existing at time of installation.

   3. Colors: provide color of exposed joint sealants to comply with the following:
      a. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

B. Elastomeric Glazing Sealant standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C 920 requirements.

2.5 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with AAMA 800 for products indicated below:
   1. AAMA 804.1.

B. Expanded Cellular Glazing Tape: Closed-cell, polyvinyl chloride foam tape, factory coated with adhesive on both surfaces, packaged on rolls with release liner prot4ecting adhesive, and complying with AAMA 800 for product 810.5.

C. Products: Subject to compliance with requirements, provide one of the following:
   1. Back-Bedding Mastic Glazing Tape Without Spacer Rod:
      a. PTI 303 Glazing Tape (shimless), Protective Treatments, Inc.
      b. S-M 5700 Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.
      c. Tremco 440 Tape, Tremco Inc.
      d. Extru-Seal, Pecora Corp.
      e. PTI 606 Architectural Sealant Tape, Protective Treatments, Inc.
      f. Dyna-Seal, Pecora Corp.

g. PTI 626 Architectural Sealant Tape, Protective Treatments, Inc.
h. S-M 5710 H.P Poly-Glaze tape Sealant, Schnee-Morehead, Ind.
i. SST-800 Tape, Tremco, Inc.

2. Back-Bedding Mastic Glazing Tape With Spacer Rod:
   a. PTI 303 Glazing Tape (with shim), Protective Treatments, Inc.
   b. Pre-shimmed Tremco 440 Tape, Tremco, Inc.
   c. PTI 606 Architectural Sealant Tape, Protective Treatments, Inc.

3. Expanded Cellular Glazing Tape:
   a. Norseal V-980 Closed-Cell Glazing Tape, Norton Company.

2.6 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).

2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

B. Clean cut or flat grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.2 GLAZING, GENERAL

A. Comply with combined recommendations of manufactures of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.

B. Provide spacers for glass sizes larger than 50 united inches (1250 mm) (length plus height) as follows:
   1. Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve require face clearances, except where gaskets and glazing tapes are used that have demonstrate ability to maintain required face clearances and comply with system performance requirements.

   2. Provide 1/8 inch (3 mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

C. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.

D. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.3 PROTECTION AND CLEANING

A. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

B. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.

C. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

3.4 GLASS SCHEDULE

A. Type GL-1: Exterior Windows - ASTME-2190; double pane with low conductivity spacer dual seal silicone edge seal: IGCC class CBA rating..

1. Acceptable Products: Low E 366, as manufactured by Cardinal Glass.
2. Outer Pane: 1/4 inch Low E 366 (coating on #2 surface), Tempered Interior Cavity: Purged by dry air, filled with argon gas. Provide Cardinal Preserve Protective Film on exterior surface (#1) and interior surface (#4).
3. Inner Pane: 1/4 inch clear glass, tempered.
4. Total Thickness: 1" inch overall.
5. Visible Light Transmittance (VLT): 63% minimum.
6. Winter U-Factor: 0.24 maximum.
7. Solar Heat Gain Coefficient (SHGC): 0.22 maximum.
8. Solar Energy Transmittance: 24% maximum.
9. Light to Solar Gain Ratio (LSG): 2.37 minimum.
10. Ultraviolet Light Transmission (TUV): 5% maximum.

B. Type GL-2: Same as GL-1 with total thickness of 3/4".

D. Type GL-3: Door Vision Panels - 1/4" thick, clear, tempered, flat glass.

END OF SECTION

LOUVERS AND VENTS
SECTION 08 9000

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, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Fixed, formed-metal louvers.

B. Related Sections include the following:
   1. Division 7, Section - 07 6000 “Sheet Metal”.
   2. Division 7, Section - 07 9200 for sealants installed in perimeter joints between louver frames and adjoining construction.
   3. Division 23, Section - 23 0800 “Heating, Ventilating and Air Conditioning”.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section, unless otherwise defined in this Section or in referenced standards.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.
   1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward or outward.

B. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacture’s stock units 48 inches (1220 mm) wide by 48 inches (1220 mm) high. Test units according to AMCA 500.
   1. Perform testing on unpainted, cleaned, degreased units.
   2. Perform water-penetration testing on louvers without screens.

1.5 SUBMITTALS

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

B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jambs, heads, and sills; and anchorage details and locations.

C. Product Certificates: Signed by manufacturers of louvers certifying that the products furnished comply with requirements and are licensed to bear the AMCA seal based on tests made according to AMCA 500 and complying with AMCA's Certified Ratings Program.

D. Product Test Reports: Indicate compliance of products with requirements based on comprehensive testing of current products.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.

B. Welding Standards: As follows:
   1. Comply with AWS D1.3 "Structural Welding Code -- Sheet Steel."
   2. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

C. SMACNA Standard: Comply with SMACNA's Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Ruskin Manufacturing; Tomkins Industries, Inc.

2.2 EXTRUDED ALUMINUM COMBINATION LOUVERS

A. Fabrication:
   1. Model: ELBD812.
   2. Frame:
      a. Material: Extruded aluminum, Alloy 6063-T5.
      b. Wall Thickness: 0.081 inch (2.1 mm) nominal.
      c. Depth: 4 inches.
      d. Construction: Standard.
      e. Caulking surfaces.
      f. Insect screen.
   3. Louver Blades:
      a. Style: Stationary, J-style.
      b. Material: Extruded aluminum, Alloy 6063-T5.
      c. Wall Thickness: 0.081 inch nominal.
   4. Backdraft Damper Blades:
      a. Style: Gravity.
      b. Material: Roll formed aluminum.
      c. Wall Thickness: 0.031 inch, nominal.
   5. Seals: Synthetic seals mounted on louver blade edges to provide quiet operation.
   6. Assembly: Factory assemble louver components.

B. Fabrication:
   1. Model L-VRSG-2-TB by National Guard Products, vandal resistant.
   2. Louver in doors - see Door Schedule for locations.

2.3 FACTORY FINISH

A. Kynar 500 Fluoropolymer Coating:
   1. Conform to AAMA 605.2.
   2. Apply coating following cleaning and pretreatment.
   3. Cleaning: AA-C12C42R1X.
   4. Dry lovers before final finish application.
   5. Total Dry Film Thickness: Approximately 1.2 mils (0.03 mm) when baked at 450 degrees F (232 degrees C) for 10 minutes.

B. Color for Fluoropolymer Coating: Color as selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louver units level, plumb, and at indicated alignment with adjacent work.

3.2 ADJUSTING, CLEANING, AND PROTECTING

A. Periodically clean exposed surfaces of louvers and vents that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Protect louvers and vents from damage during construction. Use temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at the time of Substantial Completion.

D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION

GYPSUM BOARD
SECTION 092000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Gypsum board.
   2. Fasteners, joint reinforcing and finishing compound.

B. Related work:
   1. Division 6 for wood framing supporting gypsum board.
   2. Division 5 for steel framing supporting gypsum board.
   3. Division 9 for painting.
   4. Division 9 for fiberglass reinforced plastic (FRP) wall finish.
   5. Refer to Section 092813 for Cementitious Backer Board (all tile location)

1.2 REFERENCES

A. ASTM C 840, Specification for Installation and Finishing of Gypsum Board.

B. GA-216, Application and Finishing of Gypsum Board

C. ASTM E 497, Installing Sound Isolating Lightweight Partitions.

1.3 SUBMITTALS

A. Data: Submit manufacturer's data for all materials to be used in gypsum board construction

B. Samples: Submit three 24-inch samples with the medium orange peel spatter coat specified for Architect's approval. Approved sample will become Architect's control sample.

1.4 QUALITY ASSURANCE

A. Requirements of regulatory agencies:
   1. Comply with fire resistance ratings indicated and required by Code.
   2. Provide materials, accessories and application procedures listed by UL or tested in compliance with ASTM E 119 for the type of construction shown.

B. Mockup:
   1. Where directed, construct a mockup of a gypsum board wall and ceiling inside the building. Make mockup full height (minimum 8 feet high by 8 feet wide) with a 4-foot return.
   2. Tape and finish joints, trim and screw heads as specified for Level 4 herein with orange peel finish. Refer to Section 09900 for painting of the mockup with a semi-gloss paint.
   3. The Architect will review the mockup under various light conditions for defects and improperly finished joints, trim and screw heads. Provide a portable light for that purpose when so requested.
   4. Make corrections requested by the Architect, or remove and replace mockup when the corrective work is not acceptable to the Architect.
   5. The approved mockup shall remain in the building until its removal is directed, and will be used as a standard for the gypsum board work for the Project.

1.5 HANDLING

A. Procedure: In accordance with GA 801 "Handling Gypsum Board."

B. Storage: Do not overload the floors with localized concentration of gypsum board.

1.6 JOB CONDITIONS

A. Comply with the gypsum board manufacturer's recommendations and GA "Application and Finishing of Gypsum Board" for temperature limitations and ventilation before, during and after installation of gypsum board.

B. Protect installed materials from drafts during hot, dry weather.

C. Illuminate work areas during installation to provide the same or greater level of illumination required to properly perform the work and as will occur in the room or space after the building is in operation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. US Gypsum Co., G-P Gypsum Products.

2.2 GYPSUM BOARD

A. General:
   1. Provide boards 5/8 in. thick boards complying with ASTM C 1396 as follows and in maximum lengths available to minimize end butt joints.
   2. Unless otherwise acceptable to the Architect, no end-to-end butt joints are allowed on walls or ceilings less than 12-foot in length or width.
   3. At all gypsum board surfaces : Provide boards with moisture and mold-resistant gypsum core that is encased in moisture and mold-resistant paper suitable to receive decorative finish, and long edges tapered to receive joint compound.
   4. Us Gypsum Co, mold tough firecode x panels.

2.3 ACCESSORIES

A. Screws: The following sized in compliance with the gypsum board manufacturer's instructions and Code requirements.
   1. ASTM C 954 for fastening to supporting studs and furring.
   2. ASTM C 1002, Type W for gypsum board-to-wood framing and Type S for gypsum board-to-steel framing.

B. Metal trim: Galvanized steel of the types specified hereafter complying with ASTM C 1047.
   1. LC-Bead: J-shaped; exposed long flange to receive joint compound; use at exposed panel edges.
   2. L-Bead: L-shaped; exposed long leg to receive joint compound; use where indicated.
   3. U-Bead: J-shaped; exposed short flange not to receive joint compound; use at exposed panel edges.
   4. Expansion (Control) Joint: Use where indicated.
   5. Control joint: USG No. 093 or Goldbond Building Products E-Z Strip.

C. Joint tape, compound and laminating adhesive: ASTM C 475, low or very low shrinkage, type recommended by the manufacturer, by Hamilton Materials, basis of design, Murco, or one of the gypsum board manufacturers.
   1. Taping, and fastener and metal trim concealment: Red Dot Lite.
   2. Topping, finish and skim coats: Green Dot Lite.

D. Spatter coats (light orange peel): Sheetrock Brand Wall and Ceiling Spray, or equal.

E. Sealants: As specified in Section 079200.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions affecting the work of this Section at site.

B. Verify framing members straightness and alignment.

C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

D. Before enclosing stud walls, thoroughly clean floor tracks of debris.

3.2 GYPSUM BOARD INSTALLATION- GENERAL

A. Comply with the applicable provisions of the references standards and the following.

B. Use only full size boards above door and window openings; joints at corners of heads are not acceptable.

C. Minimize butt joints and avoid butt joints centered on walls, over protruding studs, and above doors and windows. Avoid abutting end joints in the central area of each ceiling.

D. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back blocking is provided behind end joints.

E. Position adjoining panels so that tapered edges abut tapered edges, and field-cut edges abut field-cut edges and ends.
   1. Do not place tapered edges against cut edges or ends.

F. Stagger vertical joints over different studs on opposite sides of partitions.

G. Attach gypsum panels to steel studs so that the leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

H. Attach gypsum panels to framing provided at openings and cutouts.

I. Except where frames are solidly grouted, spot grout hollow metal door frames. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.

J. Provide perimeter relief where board abuts structural decks, ceilings, vertical structural elements, or glazed assembly.

K. Install horizontal boards first. Butt joints between boards loosely. Do not force boards into place. Place tapered or wrapped edges next to one another.

L. Attach boards to all studs and furring members with power-driven screws securely engaging supporting member, and with fastener heads uniformly depressed not over 1/32-inch below surface of board (except for first layer of multiple layer assembly) without breaking face paper.

M. After boards have been installed over screws and backing plates, tap boards with a rubber mallet to depress backside of board over heads to eliminate unacceptable bulges.

3.3 SINGLE LAYER APPLICATION

A. Horizontal surfaces:
   1. Install board with long dimension at right angle to supports, with end joints located over supports.
   2. Use maximum practical length boards to minimize end joints. Stagger end joints in alternate boards.

B. Vertical surfaces: Unless otherwise acceptable to the Architect, install board vertically. Use floor-to-ceiling length boards (unless height exceeds 12-foot) with vertical joints located over supports.
   1. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
   2. Offset joints at least one stud on opposite sides of partition/walls.
   3. Extend gypsum board continuously from finish floor to underside of structure above, except where indicated otherwise on the Drawings.

3.4 ALLOWABLE TOLERANCES

A. Do not exceed 3/16 inch in 8 feet, and 1/8 inch in 4 feet from plumb, level and flat (all directions) in gypsum board surfaces.

B. Do not exceed 1/16 inch offset at joints between boards.

C. Shim boards as necessary to comply with these tolerances.

3.5 FINISHING

A. Finish gypsum board surfaces with exposed joints, corners and edges reinforced or trimmed in compliance with the following:
   1. Level 0: Not used.

2. Level 1: Use in plenum areas above ceilings, in attics, and in areas where the assembly will generally be concealed including behind large tackboards.
    a. 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.
3. Level 2: Not used.
4. Level 3: Not used
5. Level 4: All other locations.
    a. Joints and interior angles shall have tape embedded in joint compound and apply 3 separate coats of joint compound over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges.
5. Level 5: Not Used.
6. Light orange peel wall and ceiling coat over level 4: Spray-apply in long, even strokes as uniformly as possible avoiding lap marks, and to achieve spatter sizes and density to match Architect's control sample.
7. Refer to Painting Specification Section 09 9000, for coordination of primer application. Prime gypsum surface prior to texture coat.

B. General:
1. Fill joints, fastener heads, trim accessory flanges and surface defects with joint compound in compliance with the gypsum board manufacturer's recommendations to obtain a smooth, flush surface.
2. All joints, fastener heads and trim fianges in surfaces which will remain exposed to view in the building, shall be invisible after application of joint tape and compound.

C. Install trim in single unjointed length, unless length exceeds manufacturer's standard. Attach to gypsum board in compliance with manufacturer's instructions.
1. Install Type CB trim at external corners.
2. Install Type LC trim where gypsum board edges are exposed in the finish work.
3. Install Type CB or LC trim where gypsum board abuts a different material, and the edges are not covered by a finish material.
4. Install control joints as recommended in paragraph 5.6 of the reference standard. Joint locations are subject to the Architect's approval.

D. Reinforce joints between gypsum boards, and interior corners and angles with tape set in joint compound.
1. Apply skim coat over tape in one application.
2. Where space greater than 1/16 inch occurs between abutting gypsum boards (except at control joints and for concealed layers of multiple layer assemblies), pre-fill joints with joint compound and allow to dry before applying joint tape.

E. Joint compound:
   1. Lap each coat not less than 4 inches over the preceding coat (2 inches on each edge). Width of joint compound on tapered board edges shall be not less than 12 inches; width of joint compound on square board edges not less than 18 inches.
   2. Allow at least 24 hours drying time between applications of joint compound.
   3. Finish joint compound so that little or no sanding is required. When sanding, use sandpaper or mesh cloth with grit as fine as possible; do not scuff face paper. Remove all sanding dust before painting or applying other finishes.

F. Leave gypsum board surfaces smooth, undamaged and ready to receive scheduled finishes.

END OF SECTION

LATH AND PORTLAND CEMENT PLASTER
SECTION 092400

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Metal lath and lathing accessories.

   2. Portland cement plaster with fiber additive and acrylic finish.

   3. Miscellaneous materials and accessories not listed, but required for complete installations.

B. Related Sections:
   1. Division 7: Air Barrier Membrane.
   2. Division 9: Ceramic Tile.
   3. Division 9: Painting.

1.2 SYSTEM DESCRIPTION

A. Provide the following systems with a fine sand finish, minimum 7/8 inches thick:
   1. 3-coat work over water resistive barrier on plywood sheathing.

   2. 3-coat work on metal lath on soffits.

1.3 SUBMITTALS

A. Data: Submit a list of proposed products, materials and components to be provided for a complete plaster assembly, along with manufacturer's product data, specifications, typical installation details and other data as necessary to demonstrate compliance with the specified requirements for each item listed.

B. Shop drawings:
   1. Submit large scale, dimensioned drawings showing materials, profiles, joints, finishes and details of attachments to other work. Furnish edge details where plaster abuts adjacent materials.

   2. Submit elevation drawings of each plane to be covered with plaster. Show location of all trim and accessories, including control joints locations.

C. Samples:
   1. Submit color samples from manufacturer's standard color palette for color selection by the Architect.

   2. Submit 4-foot square sample panel of proposed plaster finished as specified mounted to hardboard backing. Approved sample will become Architect's control sample.

1.4 QUALITY ASSURANCE

A. Mockup:
   1. Provide at the Project site, where directed by the Architect, a mockup representative of the plaster texture and color proposed for the Project for the Architect's evaluation.

   2. Make mockup a minimum of 8 feet square, mount on lath/gypsum base/wood studs, with a typical window approximately centered in the panel, complete with moisture barrier, flashing and trim. Provide finished corners at each end.

   3. Provide a control joint at mid-height.

   4. Finish mockup to match the control sample panel available for the Contractor's review in the Architect's office.

   5. Demonstrate patching that will be required for a typical scaffolding tie on one side of the panel.

   6. Repeat mockup(s) until Architect's approval is obtained.

   7. Protect approved mockup, which will be used as a standard for the Project, until its removal is authorized.

   8. After the mockup is approved, start application of the plaster on the building where directed by the Architect. Obtain Architect's approval of a panel full height on the building before proceeding further.

1.5 HANDLING

A. Delivery: Deliver materials, except sand and water, to the site in sealed containers or bags clearly identified with manufacturer's name, brand, type and grade.

B. Storage:
   1. Keep metal lath and accessories dry by storing off the ground on platforms under plastic sheeting.

2. Store plastering materials, including sand, on platforms under plastic sheeting to prevent hydration or contamination.
3. Store aggregates on clean platforms and cover with plastic sheeting to exclude dirt and other foreign materials that would adversely affect the plaster.

1.6 JOB CONDITIONS

A. Protect adjacent surfaces from damage as a result of plastering operations.

B. Protect plaster against extreme climatic conditions, including uneven and excessive evaporation from hot dry air.

C. Do not leave weather barrier exposed to the elements longer than recommended by its manufacturer.

D. Ambient temperature shall be 50º and rising for all stucco product application.

PART 2 - PRODUCTS

2.1 WEATHER BARRIER

A. Complying with FS UU-B-790a, Type I, GradeD (vapor permeable), Style 2, with a water resistance of 60 minutes (min) ASTM D779; Fortifiber Corp. "Super Jumbo Tex" or eqaul

2.2 LATH

A. Self-furred welded wire Structa Mega Lath, 1.95 lbs/sq yd (an alternate to 3.4# diamond mesh) made from Class1 galvanized coated steel, to produce lath complying with ASTM A641. Install per CIAPMO , as made by Structa-Wire Corp..

B. V Truss Ceiling - Rib lath, weight 22lb/sq yd, galvanized coated steel (an alternate to 3/4 lbs/sq yd Diamond mesh), complying with ASTM A641. Install per UES 2017, as manufactured by Structa-Wire Corporation.

2.3 ACCESSORIES

A. Metal trim members:
1. Extruded aluminum trim: Alloy 6063 T5, furnished in longest possible single lengths. Factory fabricate intersections with back-up plates and legs at least 24 in. long. Provide end caps where required. All intersections shall be open. Exposed members shall have a clear anodized finish.
a. Soffit vents: Fry Reglet Corp. PCS-75-V-200. Width as indicated on drawings.

2. Basis of design is for minimum 26-gage, zinc trim, supplied in longest obtainable single lengths to minimize joints, by ClarkWestern Metal Lath or Stockton Products as indicated.
    a. Cntrol joints: "No. 15" by ClarkWestern Metal Lath.
    b. Casing bead expansion flange: "No. 66" by ClarkWestern Metal Lath.
    c. Corner reinforcement:
        1) Outside corners: V Truss Straight Corner.
        2) Inside corners: "No. 30" by ClarkWestern Metal Lath.
    d. Foundation screed: SJB J-Bead with weep holes and 3-1/2 in. flange by Superior.
    e. Door and window flashing: "WTP" Stockton Products.

B. Tie-wire: 18-gage galvanized, annealed steel wire for accessories-to-lath.

C. Fasteners:
1. At Wood Studs: 12 gage, 2" long (minimum) galvanized steel wire roofing nails having 3/8 inch diameter head and 3/4 inch diameter galvanized steel washer.
2. At Steel Studs: #10 SMS, 2" long (minimum) having 3/8 inch diameter head and 3/4 inch width diameter galvanized steel washer.

2.4 ACRYLIC FINISH COAT

A. “Color Prime” Primer/Base Coat: Apply pigmented acrylic primer over cement plaster brown coat, before application of finish color coat.

B. “DPR Sandpebble Acrylic” Finish Coat: Apply at no greater than 130 s.f. per 70lb pail.

C. Exterior Plaster is to have a three (3) custom color finish scheme as indicated on the Drawings. The arcylic finish coat colors are to be custom to match colors provided by the architect.

2.5 PLASTERING MATERIALS

A. Portland cement: ASTM C 150, Type I or II. Use only one brand throughout this work.

B. Hydrated lime: ASTM C 206, Type S.

C. Sand: ASTM C 897, graded as follows, except for finish coat.

PERCENTAGE RETAINED ON EACH SIEVE

Sieve Size	Maximum	Minimum
No.4	0	0
No.8	10	0
No. 16	40	10
No. 30	65	30
No. 50	90	70
No. 100	100	90
No. 200	100	97

D. Water: Potable, fresh from domestic source.

E. Fiber reinforcement: Provide one of the following, or equal shorts expressly manufactured and in current use as a plaster base course reinforcement:

1. Glass fiber: "Dur-0-Fibar" 1/2-inch long alkaline-resistant chopped glass fiber strands by Dur-O-Wall, Inc. or "Cem-Fil" by Pilkington

2. Nylon: 1/2-inch long nylon/Caprolan-RC fibers by Nycon, Inc.,

3. Polypropylene: 1/2-inch long polypropylene monofilament fibers by Grace Construction Products.

2.6 PLASTER MIXES

A. Scratch coat (by volume): One part Portland cement, maximum one part dry hydrated lime, maximum 4 parts loose sand aggregate of the total volume of cement/lime.

B. Brown coat (by volume): Same as specified for scratch coat except that sand may be increased to 4-1/2 parts of the total volume of cement/lime.

C. Mix ingredients thoroughly, measuring as accurately as possible. Add to the mixer from calibrated containers. Do not use materials that are caked, lumpy, dirty or contaminated by foreign materials.

D. If calibrated container supply interferes with progress of Work, shovels may be used provided they are measured to determine the accuracy of the volume of aggregate they carry, in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Before plastering begins, insure that adjacent finish work is well protected with waterproof covers securely taped in place.

C. Before enclosing stud walls, thoroughly clean space of debris.

D. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 GENERAL

A. The applicable provisions of ASTM C 1063 and ASTM C 926, govern the work of this Section, except as specified herein.

3.3 WEATHER BARRIER

A. General: Comply with ASTM C 926 and ASTM C 1063 for installation of materials, except as specified below, and where requirements of the authorities having jurisdiction are more stringent.

B. Install over weather-resistant membrane (see Section 07 2700), sheathing and framing members with a minimum of fasteners.

C. Lap shingle fashion 2 inches at horizontal joints and 6 inches at vertical joints. No weather barrier is required on soffits. Stagger vertical joints.

D. Continue weather barrier uninterrupted behind control joints.

E. Lap over flange of accessories to prevent direct contact between lath and accessories and to ensure water tightness.

F. Interface weather barrier with flashing materials at windows, doors, electrical boxes, pipes, and other penetrations to properly discharge water to the exterior face of the wall. Absence of flashing must be corrected prior to installing weather barrier.

G. Seal unused holes from fasteners in weather barrier with silicone sealant specified in Section 07 9200.

3.4 LATHING

A. Comply with ASTM C 1063, except as specified below, and where Code requirements are more stringent.

B. Apply lath taut with long dimension at right angle to supports.

C. Apply first course at bottom and work up.
   1. Install per manufacturer's written installation recommendations.

D. Attach lath to wood or metal supports, thru weather barrier, at 6 inches o.c.

E. Cut lath at control joints.

F. Hold lath 1/4 inch clear of electrical boxes, columns, and similar items projecting through the plaster.

G. Where lath is attached to horizontal wood supports, either of the following attachments shall be used in addition to the methods of attachment set forth in Table 2507.2 in accordance with CBC Section 2507.3.
   1. Secure lath to alternate supports with ties consisting of a double strand of No. 18 W&M gage galvanized annealed wire at one edge of each sheet of lath. Wire ties shall be installed not less than 3 inches back from the edge of each sheet and shall be looped around stripping, or attached to an 8d common wire nail driven into each side of the joist 2 inches above the bottom of the joist or to each end of a 16d common wire nail driven horizontally through the joist 2 inches above the bottom of the joist and the ends of the wire secured together with three twists of the wire.

   2. Secure lath to each support with ½ inch wide, 1-1/2 inch long No. 9 W&M gage, ring shank, hook staple placed around a 10d common nail laid flat under the surface of the lath not more than 3 inches from the edge of each sheet. Such staples may be placed over ribs of 3/8 inch rib lath or over back wire of welded wire fabric or other approved lath, omitting the 10d nails.

H. Where lath is attached to horizontal metal supports, metal lath shall be attached to metal support with not less than 0.049 inch (No. 18 BW gage) tie wire spaced not more than 6 inches apart or with (DSA) equivalent attachments.
   1. Screws (when applicable) shall be an approved type long enough to penetrate into wood framing not less than 5/8 inch and through metal supports adaptable for screw attachment not less than 1/4 inch.

3.5 PLASTER ACCESSORIES

A. Wire-tie at no more than 24 inches o.c. to metal lath or studs.

B. Use single length wherever length of run does not exceed longest standard stock length available.

C. Miter or cope at corners with hairline joints, and seal with sealant specified in Section 07 9200. Seal butt splices in the same manner.

D. Set accessories level, plumb and true to line with a tolerance of not more than 1/8 inch in 5 feet. Shim as required and align joints with concealed splice or tie plates

E. Install corner reinforcement at external corners.

F. At plaster terminations, provide casing bead at the following locations:
   1. Where plaster termination abuts other finishes, isolate casing bead from contact with adjacent finishes with 1/4 inch thick tape sealant specified in Section 07 9200.

   2. Where plaster termination is not covered by another finish or applied trim, provide cased opening by installing casing bead around perimeter of opening as detailed.

G. Control joints:
   1. Install vertical control joint first, continuous from top to bottom of wall; install horizontal control joints second and split where it meets the vertical control joint.

   2. Install joints plumb, level, evenly spaced where so indicated, and in one piece at the spacing indicated.

   3. Follow manufacturer's directions for their installation.

H. Accessories that butt each other need to be lapped, sealed, soldered or welded, and/or stripped with flexible flashing.

3.6 PLASTERING

A. General: Comply with ASTM C 926, except as specified below, and where Code requirements are more stringent.

B. Sequencing: Provide sufficient manpower and equipment to ensure a continuous operation free of cold joints, scaffold lines, texture variations, and other objectionable conditions.

C. Application: Plaster surfaces in one operation once the application of any coat has begun. Stop plaster at control joints, edges or corners only. Plaster in one operation, full height and width between control joints.

1. Scratch coat: Apply with sufficient material and pressure to form good full keys, and to cover well.
    a. Minimum thickness of scratch coat shall be 3/8 inch when measured from backing to crest of scored plaster.
    b. Scratch before plaster hardens to provide sufficient mechanical key for brown coat. Moist cure continuously for a minimum of 48 hours, including weekends and holidays.

2. Brown coat:
    a. Apply the brown coat approximately 3/8 inch thick in 2 coats. Bring to a true, even surface by rodding and floating and leave slightly rough to receive the finish coat.
    b. Begin floating only after hydration of the cement has commenced and sufficient moisture has evaporated, so that surface sheen has disappeared, but before plaster has become too rigid to be moved under the float.
    c. Moist cure continuously for a minimum of 48 hours, including weekends and holidays.

3. Finish coat: Apply not less than 7 days after brown coat has been applied. For application techniques refer to manufacturer's technical bulletins and recommendations. Level the brown coat surface with prime/base coat. Finish with manufacturer's finish coat in accordance with manufactures's recommendations for application, curing times, and temperature ranges.

4. Allowable tolerance: Maximum deviation from true planes of finish plaster shall not exceed 1/8 inch in 5 feet when measured with a straightedge placed at any point on plaster surfaces.

D. Do not use materials that are caked, lumpy, dirty, or contaminated by foreign materials.

E. Plaster flush with metal frames and other built-in metal items or accessories that act as plaster grounds.

F. Where permanent grounds are too far apart to serve as guides for rodding, provide supplemental plaster screeds as required.

1. Establish true surfaces with rods before setting the screeds.

2. Keep grounds clean and free of plaster.

3. Finish plaster in a true plane, plumb, or level as applicable, flush with grounds.

3.7 FIELD QUALITY CONTROL

A. The specified moist curing periods are minimum requirements. Be responsible for determining the most effective procedure for curing and time lapse between application of coats, based on climatic and job conditions.

B. Completed plaster shall match approved mockups, be within the tolerances specified, be uniform in thickness, texture and color when applicable, free of cracks, blisters, pits, checks and other defects.

C. Repair, or remove and replace, as determined by the Architect, lath/plaster that does not meet these requirements, with materials satisfactory to the Architect.

3.8 REPAIRING/CLEANING

A. Cut, patch, repair, and point-up defective plaster.
   1. Repair cracks and indented surfaces by moistening plaster and filling with new material, troweled and tamped to match adjoining surfaces.

   2. Point-up finished plaster surfaces around items that are built into or penetrate plaster.

B. Promptly remove plaster spatter and droppings from adjacent surfaces. Repair surfaces that have been stained, marred, or otherwise damaged during plastering.

END OF SECTION

CEMENTITIOUS BACKING BOARDS
SECTION 09 2813

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:
   1. Cement backer board for all wall tile locations.
   2. Joint tape.

1.2 SUBMITTALS

A. Data: Manufacturer data for board and fasteners proposed to use and installation instructions.

1.3 JOB CONDITIONS

A. Provide adequate ventilation to dissipate excess moisture.

B. Before installation of the backer board allow wood framing to stand in its normal service environment for as long as possible. Do not install backer board when it is wet.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cement backer board: One of the following 1/2 in. thick boards, furnished in longest available length to minimize end joints.
   1. Gold Bond Building Products Perma Base.
   2. James Hardie, Hardie Backer 500.
   3. National Gyspum PermaBase.
   4. FinPan Utii-A-Crete.
   5. Custom Building Products WonderBoard.

B. Joint reinforcement: Alkali-resistant, 2-inch wide, coated fiberglass mesh tape.

C. Fasteners:
   1. TypeS Hi-Lo thread, galvanized Bugle head screws by 1-1/4-inch long, for use with wood or 20-gage steel framing.

2. Type S-12 screws by 1-1/4-inch long galvanized No.3 screws, for use with framing thicker than 20-gage.

D. Washers: 3/4-inch diameter, countersunk, stainless steel washer for use where panels abut over a framing member.

E. Bonding materials: Latex Portland cement mortar meeting ANSI A118.4 standards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at the site. B. Correct detrimental conditions before proceeding with installation.

3.2 INSTALLATION

A. General:
1. Comply with the board manufacturer's installation instructions and the following.

2. Use longest possible board length for each application.

B. Walls:
1. Preparation: Edges of board parallel to framing shall be continuously supported.

2. Board installation:
a. Precut panels and make accurate cutouts for penetrations.

b. Install board leaving a 1/8-inch to 3/16-inch space at joints and corners. Stagger board joints with those of adjacent rows.

c. Fasten board every 8-inch o.c. in field and within 1/2-inch to 2-inch of edges around backer board perimeter.

d. Where open mesh wrapped edges meet fill gap completely with bonding material. On all other joints and corners pre-fill gap with bonding material then embed 2-inch mesh tape and smooth material over joint and corner.

END OF SECTION

CERAMIC TILE
SECTION 093013

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Ceramic floor and wall tile, and trim shapes.
   2. Setting materials, grouts and sealants.
   3. Waterproofing membrane.

B. Related work:
   1. Division 7 for sealants other than specified herein.

1.2 REFERENCES

A. TCNA, Handbook for Ceramic Tile Installation.

B. ANSI A108.1B, Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar.

C. ANSI A118.4, Latex-Portland Cement Mortar.

D. ANSI A118.7, Polymer Modified Tile Grouts for Tile Installation.

E. ANSI A108.5, Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.

F. ANSI A108.10, Installation of Grout in Tilework.

G. ANSI A118.9, Cementitious Backer Units.

H. ANSI A118.10, Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.

I. ANSI A118.13, Installation of Load Bearing, Bonded, Waterproof Membranes for Thinset Ceramic Tile and Dimension Stone.

J. ANSI A137.1, Ceramic Tile.

1.3 SUBMITTALS

A. Samples: Submit the following.
   1. 24-inch square samples, of each type and color of tile glued to hardboard backing; grout joints.
   2. Type, color and shape of trim and base.

B. Data: Submit manufacturer's data for waterproof membrane, pre-mixed mortars and grouts, with certification that they meet ANSI standards specified when applicable.

1.4 QUALITY ASSURANCE

A. Uniformity:
   1. Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
   2. Obtain materials of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

B. Installer's qualifications: Experienced firm who has successfully completed tile installations similar in material, design, and extent to that indicated for Project for at least 5 years.

C. Mockup: Before starting tile installation, erect mockups for each form of construction and finish required. Build mockups complying with the following, using materials indicated for final Work.
   1. Make mockups a minimum of 6-foot square. Locate on site where directed by the Architect.
   2. Make modifications requested by the Architect, or remove unsatisfactory mockups and construct new ones.
   3. Obtain Architect's acceptance of mockups before starting final installation.
   4. Retain and maintain mockups during construction in undisturbed condition as a standard for judging completed tile work.
   5. When accepted by the Architect, accepted mockups in undisturbed condition at time of Substantial Completion may become part of the Work.

D. Master grade certificate: Submit, bearing the Certification Mark of the Tile Council of America, Inc., signed by the tile manufacturer, stating the type and quality of each type of tile delivered to the job site.

1.5 HANDLING

A. Procedure: Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Delivery: Deliver tile cartons with grade seals unbroken.

1.6 JOB CONDITIONS

A. Set and grout this work when ambient temperature is at least 50 deg. For higher. Do not install materials on surfaces (or when ambient temperature) is less than 40 deg. F.

B. Illuminate interior work areas during installation to provide the same or greater level of illumination required to properly perform this work and as will occur in the room or space after the building is in operation.

1.7 MAINTENANCE

A. Furnish one full box of each type, color and size of tile properly packaged and identified, by room or area.

PART 2 - PRODUCTS

2.1 TILE

A. Make, size, colors, textures, and patterns: As scheduled at the end of this Section.
   1. Where manufacturer standard products are scheduled or specified for tile, grout and other products, provide specific products or materials complying with the following requirements.
   2. Where no color is scheduled or specified, provide selections made by Architect from manufacturer full range of standard colors, textures, and patterns for products of type indicated.

B. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
   1. Level Surfaces: Minimum 0.6.

C. Trim: Provide matching base, caps, stops, returns, trimmers and transitions required to complete the installation.

2.2 TRIM

A. Aluminum cover shaped trim between wall tile and floor. Provide with corners, connectors, and endcaps by Schluter (or approved equal) as shown in the drawings. Schluter DILEX-AHKA, color by architect.

2.3 SETTING MATERIALS AND GROUT

A. Latex modified dry-set mortar: Complying with ANSI A118.4, pre-sanded, latex-modified, TEC Full Flex Mortar, or equal.

B. Portland cement: ASTM C 150, Type 1.

C. Sand: ASTM C 144.

D. Water: Potable, fresh.

E. Setting bed reinforcing mesh: 2-inch by 2-inch by 16/16, 3-inch by 3-inch by 13/13 or 1-1/2-inch by 2-inch by 16/13 wire complying with ASTM A 82 or A 185.

F. Grout: Color(s) selected by the Architect.
   1. Complying with ANSI A 118.3 epoxy grout, laticrete "Spectra Lock Pro" premium grout.
      a. All grout materials shall be "Green Guard" certified.

2.4 MISCELLANEOUS MATERIALS

A. Sealant and back-up for control joints in tiles: As specified in Section 07 9200.

B. Cleavage membrane: 6-mil thick polyethylene complying with ASTM D 2103, Type 13300.

C. Waterproofing: One of the following.
   1. Triple Flex by TEC Specialty Products/HB Fuller (basis of design).
   2. Mapei Mapelastic HPG.
   3. Laticrete 9235 by Laticrete International, Inc.
   4. Custom 9240 by Custom Building Products.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Remove glaze and contaminants, including remaining curing compounds, from floors by wire-brushing or sandblasting.

C. Verify that surfaces to be tiled are firm, dry, clean, and free from oil or waxy films and curing compounds, and within the following tolerances:
   1. Thin-set tiles: 1/8 inch in 10 feet for floors and 1/8-inch in 8 feet for walls.

2. Mortar-set tiles: 1/4 inch in 10 feet for floors.

D. Examine that installation of grounds, anchors, recessed frames, electrical and mechanical work, and similar items located in or behind tile have been completed before installing tile.

E. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 WATERPROOFING UNDER TILE FLOORS

A. Application: Install in compliance with the membrane manufacturer instructions and the following.

B. Membrane application: Apply a continuous membrane at least 45 mils over the entire surface.
   1. Using the flat side of a 3/16-inch V-notch trowel, "key in" a thin coat of membrane to fill all surface voids.
   2. Immediately afterwards, apply additional material using the notched side of the trowel held at approximately a 45-degree angle to the substrate.
   3. Again using the flat side of the trowel, flatten the ridges to form a smooth, continuous layer approximately 45 to 50 mils OFT (1/18 to 1/20 inch). Make sure there are no voids, bubbles or breaks in the membrane after curing; if any should appear, apply a second coat to fill the imperfections.
   4. Periodically check membrane with a wet-film gage to verify film thickness.

C. Mesh application (flashing):
   1. Construction details:
      a. Flashing with TEC Waterproofing Mesh (Part C) at substrate joints- inside corners, outside corners, anywhere vertical surfaces meet horizontal surfaces such as curbs, bench seats, columns, etc., and where dissimilar materials meet.
      b. Pre-coat the substrate intersections 4 inches on each side with Triple Flex membrane compound. Then fully embed Part C mesh 3 inches in both directions into the pre-coated areas, and trowel-on additional Triple Flex membrane to completely cover and saturate the mesh. The minimum thickness of the flashing shall be 3/32 inch. Allow the flashing to dry before full application of waterproof membrane.
      c. Where 2 pieces of mesh meet, overlap the mesh 3 inches at the ends.

   2. Drain details:
      a. Extend Triple Flex membrane to the bottom drain flange, with sufficient coverage to channel water flow to and down the drain. Do not cover weep holes with membrane.

b. Install a continuous 45-mil thick membrane to cover the substrate and up to the drain opening, making sure to embed TEC Waterproofing Mesh (Part C) around the drain opening. The flange shall clamp down on the membrane, with the weep holes unobstructed.

3. Joint details: Verify that joint is clean and free from debris. Next, fill the joint with Triple Flex membrane compound and spread 4 inches on either side, embedding the waterproofing mesh over the joint. Install the membrane over the entire surface, ensuring a continuous 45 to 50-mil film as specified in "Membrane Application" above Place bond breaker tape over the joint and install tile without bridging the joint. After tile is set, fill joint with sealant.

3.3 TILE INSTALLATION

A. General: Install proprietary materials in compliance with their manufacturer's instructions. Press or beat the tiles to obtain 100 percent coverage of mortar on back of tile; back butter tile if necessary.
   1. Maintain minimum temperature limits and installation practices recommended by mortar and grout materials manufacturers in areas where this work is performed.
   2. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignment. Saw-cut and drill tiles to obtain tight fitting, clean, sharp, undamaged cut edges.
      a. Rub cuts smooth with fine abrasive stone.
      b. Cut and drill so that electrical outlets, plumbing fixtures, pipes, fixtures and fittings standard plates, escutcheon and collars will overlap the tile.
      c. Do not cut or split tile at penetrations.
   3. Install tile in patterns indicated with uniform joints and perimeter units not less than 1/2 unit wide. Adjust to minimize cutting.
   4. Accurately set tile with flush well-fitted joints, finished in true planes, plumb, square, sloped or level as required.
   5. Form corners, returns, and exposed tile edges with approved trimmers.
   6. Where tiles selected by the Architect are installed in the same plane, but are of a different thickness, it is the Contractor responsibility to adjust the setting bed or mortar thickness so that all tiles are flush.
   7. Maximum deviation from true lines and levels shall not exceed 1/8-inch in 10-foot for floors, and 1/8-inch in 8-foot for walls.
   8. Calk penetrations in tile with sealant and backing rod specified in Section 07920. Provide expansion joints where indicated or as recommended by TCNA Method EJ171.

B. Interior tile installations:
   1. Wall tile: Install over cementitious backer board in compliance with ANSI A108.5 and TCNA installation method W244-05.
   2. Floor tile except Porcelain tile: Install over waterproofing membrane in compliance with ANSI A108.5 and TCNA installation method F114-05.
   3. Porcelain floor tile: Install over thinset concrete slab in compliance with ANSI A108.5 and TCNA installation method F113-05.

C. Sound tile after setting. Replace or reset hollow sounding units.

3.4 GROUTING/CLEANING/CURING

A. Grouting: Comply with ANSI A108.10. Finish joints of square edge tiles flush with tile surfaces; finish joints of cushion edge tiles to depth of cushion. Grout shall be free of voids and pits.

B. Cleaning:
   1. Clean tile and repair faulty grouting. Sponge and clean surfaces with clean water and soft brushes.
   2. Polish glazed tile after cleaning with clean, dry cloths.

3.5 PROTECTION

A. Protect completed installations until acceptance by the District.

B. Protect floor tiles with reinforced Kraft paper or other heavy covering securely taped in place during the construction period to prevent damage and stains. Remove protection when no longer needed.

C. When recommended by tile manufacturer, apply a coat of neutral protective cleaner to completed tilework.

D. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

E. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

F. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tiles.

3.6 SCHEDULE

A. Wall Tiles:

1. Restroom: Wall Tile (Field Color)
   a. Manufacturer: DALTILE, www.daltile.com (Or pre-approved equal)
   7834 C.F. Hawn Freeway, Dallas, Texas 75217 (800)933-8453, (209)543-0924
   b. Type: Ceramic
   c. Style: Classic Color Wheel Collection, Card 1&2
   d. Finish: Matte/Gloss
   e. Size: 6" x 6"
   f. Color: Group 1,2 & 3 (NOTE: order lead time 10-12 weeks)
   g. Color to be selected by Architect (4 colors - see interior finish schedule)

2. Restroom: Wall Tile (Accent Color: 25% of area accent tile)
   a. Manufacturer: DALTILE, www.daltile.com (Or pre-approved equal)
   7834 C.F. Hawn Freeway, Dallas, Texas 75217 (800)933-8453, (209)543-0924
   b. Type: Ceramic
   c. Style: Classic Color Wheel Collection, Card 1&2
   d. Finish: Matte/Gloss
   e. Size" 6"x6"
   f. Color: Group 1, 2 & 3 (NOTE: order lead time 10-12 weeks)
   g. Color to be selected by Architect

END OF SECTION

ACOUSTICAL CEILINGS
SECTION 095113

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Acoustical ceiling panels.
   2. Metal suspension system.
   3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings, and supplementary parts and components, such as splay wires, compression posts, inserts, clips, bracing and other miscellaneous supports required for a complete installation.

B. Related work:
   1. Division 21, 23 and 26 for sprinkler, mechanical and electrical work in acoustical ceilings.

1.2 REFERENCES

A. Association of the Wall and Ceiling Industries International.

1.3 SYSTEM DESCRIPTION

A. Design requirements:
   1. Design ceiling components to ensure that light fixtures and installed accessories will not induce concentrated loads.
   2. Where components may induce rotation of ceiling system components, provide stabilizing reinforcement.

1.4 SUBMITTALS

A. Data: Submit the following.
   1. Manufacturer product specifications and installation instructions for ceiling materials, and suspension system.
   2. Include satisfactory test data certifying that the acoustical units comply with Code requirements.

B. Samples: Submit the following.
   1. Full size, of acoustical units showing the full range of color and texture to be expected in the completed work.
   2. 12-inch long samples of each linear components of the suspension system and samples of connectors.

C. Shop drawings: Submit the following.
   1. Show ceiling layouts, seismic bracing, method of suspension where interference such as ducts and pipes exists, with light fixtures, grilles, sprinkler heads, speakers and access panels accurately located, and typical details of constructions and installation.
   2. Where pipes, ducts and conduits prevent direct suspension, and trapezes have to be used, justify the suspension system with structural calculations.
   3. Reproduction of the Contract Drawings as shop drawings is not acceptable; take necessary measurements at the job site.

D. Closeout: Submit manufacturer's recommendations for cleaning and refinishing ceiling materials, including precautions against materials and methods which may be detrimental to finishes and acoustical performances.

1.5 QUALITY ASSURANCE

A. Design criteria: Suspension system shall have an "Heavy Duty" classification when tested in compliance with ASTM C 635 and ASTM E 580, Section 5.

B. Code Compliance: Provide materials tested, listed and labeled for flammability, combustibility, and smoke developed by a testing agency acceptable to authorities having jurisdiction.

C. Provide evidence that acoustical units, and adhesive when applicable, comply with Code for flammability, combustibility and toxicity.

1.6 HANDLING

A. Delivery: Deliver UL labeled cartons of acoustical units bearing label classification of acoustical and flammability characteristics.

B. Storage:
   1. Store acoustical panel cartons open at each end to stabilize moisture content and temperature, in fully enclosed space(s), in well-ventilated area protected from weather, moisture, soiling, extreme temperatures and humidity.
   2. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

C. Handling: To avoid chipping edges or damaging units.

1.7 JOB CONDITIONS

A. Do not install acoustical ceilings until the space to receive them has been enclosed, and is weathertight, until work above ceilings has been completed, and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

B. Illuminate work areas during installation to provide the same or greater level of illumination required to properly perform the work and as will occur in the room or space after the building is in operation.

1.8 MAINTENANCE

A. Full box of each type of acoustical units, matching those installed, packaged with protective covering for storage, and identified with appropriate labels.

1.9 WARRANTY

A. Manufacturer agrees to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:
   1. Acoustical Panels: Sagging and warping.
   2. Grid System: Rusting and manufacturer's defects.

B. Warranty Period:
   1. Acoustical panels: 10 years from date of substantial completion.
   2. Grid: 10 years from date of substantial completion.

C. The warranty shall not deprive the District of other rights the District may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2- PRODUCTS

2.1 ACOUSTICAL UNITS

A. C-1: Acoustical Panels - Armstrong World Industries, Inc. - Fine Fissured High NRC, Standard - 24" in. x 48" in. 7/8 in. thick, #1755, (White) Square edge, from a single production run or the same dye lot. Type: ASTM E 1264 classification of Type III, Form 2, pattern CD. Flame Spread of 25 or less and a smoke developed of 50 in accordance with Suspension System/SS-1. See reflected ceiling plans for location.

2.2 SUSPENSION SYSTEM

A. Grid:
   1. SS-1: Prelude® Xl® HD® 15/16", White, steel suspension system.
   2. Wall angles to be 7/8" molding with BERC-2 clips. Install per ESR 1308.
   3. Components die-cut and interlocking.
   4. Cope cross runners to lay flush with main runners, except at edge moldings.
   5. The system shall have a "Heavy Duty" classification complying with ASTM C 635 and ASTM E 580, Section 5.

B. Hanger wires: Galvanized carbon steel, ASTM A 641 soft-temper, prestretched, yield-stress load of at least 3 times design load, not less than 12-gage.

C. Accessories: Devices for attachment to overhead construction, secondary members, splines, splicers, connection slips, wall connectors and all other accessories required for a complete installation.
   1. Utilize Donn ACM7 wall attachment clip at unrestrained wall locations.

D. Trim:
   1. As required by construction, and compatible with design and appearance of ceiling.
   2. Perimeter trim and trim in ceiling penetrations shall permit lateral adjustment of at least 1/2-inch to accommodate irregularities in vertical surfaces interrupting ceiling.

E. Finish:
   1. Concealed ferrous metal surfaces: Galvanized, cadmium-plated or coated with a factory-applied rust-inhibitive paint.
   2. Exposed metal surfaces: Prime and apply a satin baked-on enamel finish matching the color of the acoustical units, as approved by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 INSTALLATION

A. General:
   1. Install materials in compliance with the Drawings, the Specifications, and their manufacturer's instructions. In case of confiict, the most stringent provisions apply.

2. Comply with ASTM C 636 and E 580, governing regulations and industry standards applicable to this work.
3. Install materials so that the sound insulation of adjacent construction materials and assemblies is not compromised by locally reducing their surface mass, or creating unsealed penetrations.
4. Plan layout to balance border widths at opposite edges of each ceiling area.
5. Avoid use of less than half-width acoustical units wherever possible.
6. Comply with reflected ceiling plans shown on the Contract Drawings.

3.3 SUSPENDED GRILLAGE INSTALLATION

A. Anchor hanger wires to overhead construction as indicated on the Drawings.

B. 12-gage (minimum) hanger wires may be used for up to and including 4-foot by 4-foot grid spacing along main runners.

C. Provide 12-gage hanger wires at the ends of all main and cross runners within 8 inches from the support or within 1/4 of the length of the end Tee, whichever is least, for the perimeter of the ceiling area. End connection for runners which are designed and detailed to resist the applied horizontal forces may be used in lieu of the 12-gage hanger wires subject to DSA review and approval.

D. Provide trapeze/other supplementary support members at obstructions to main hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than 1 in 6 out of plumb shall have counter- sloping wires.

E. Ceiling grid members may be attached to no more than 2 adjacent walls. Ceiling grid members shall be at least 3/4-inch free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runner should be free and a minimum of 3/4-inch clear of wall. Utilize BERC-2 clips with 3/4" clearance on unattached walls.

F. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or a 16-gage wire with a positive mechanical connection to the runners may be used where the perpendicular distance from the wall interlock is not required.

G. Provide sets of four 12-gage splayed bracing wires oriented 90 deg. from each other at the following ceilings:
1. Place sets of bracing wires at a spacing not more than 12-foot by 12-foot o.c.
2. Provide bracing wires at locations not more than 1/2 the spacing given above from each perimeter wall and at the edge of vertical ceiling offsets.

3. The slope of these wires shall not exceed 45 deg. from the plane of the ceiling and shall be taut without causing the ceiling to lift. Splices in bracing wires are not permitted without special DSA approval.
4. Fasten hanger wires with not less than 3 tight turns. Fasten bracing wires with 4 tight turns. Make tight turns within a distance of 1-1/2-inch Hanger or bracing wires anchors to the structure shall be installed in such a manner that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.

5. NOTE: Wire turns made by machine where both strands have been deformed or bent in wrapping are acceptable substitute for the 1-1/2-inch requirement, but the number of turns shall be maintained and be as tight as possible.

H. Separate all ceiling hanging and bracing wires at least 6-inch from all unbraced ducts, pipes, conduit, etc. Lightweight items, such as single electrical conduit, not exceeding 3/4-inch nominal diameter, may be attached to hanger wires using connectors acceptable to DSA.

I. Attach light fixtures to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures.

J. Flush or recessed light fixtures and air terminals or services weighing less than 56 lb. may be supported directly on the runners of a heavy duty grid system, but, in addition, they must have a minimum of two 12-gage slack safety wires attached to the fixture at diagonal corners and anchored to the structure above. All 4-foot by 4-foot light fixtures must have slack safety wires at each corner.

K. Flush and recessed light fixtures and air terminals or services weighing 56 lb. or more must be independently supported by not less than 4 taut 12-gage wires each attached to the fixture and to the structure above regardless of the type of ceiling grid system used.

L. The 4 taut 12-gage wires including their attachment to the structure above must be capable of supporting 4 times the weight of the unit.

M. Support surface-mounted light fixtures by at least 2 positive devices which surround the ceiling runners and which are each supported from the structure above by a 12-gage wire. Spring clips/clamps that connect only to the runners are not acceptable.

N. Provide additional supports when light fixtures are 8-foot or longer.

O. Classification of ceiling grid shall be Heavy Duty.

P. Pop rivets, screws, or other attachments are not acceptable unless specifically detailed on the Drawings and approved by ULand FM.

Q. Grilllage shall be installed with all lines straight, level and true

3.4 ACOUSTICAL UNITS

A. Match tile for color and pattern by using tile from cartons in the same sequence as manufactured.

B. Scribe and cut acoustical units for accurate fit at borders and around work which penetrates ceilings. Install with flush, tight joints.

C. For square-edged units, install units with edges fully hidden from view by flanges of suspension system runners and moldings.

D. For reveal-edged units on suspension system runners, install units with bottom of reveal in firm contact with top surface of runner flanges.

E. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.5 CLEANING

A. Clean soiled acoustical units and their suspension systems in compliance with their manufacturer's instructions.

3.6 FIELD QUALITY CONTROL

A. Remove and replace units that are damaged or cannot be cleaned, to the Architect's satisfaction.

END OF SECTION

RUBBER TOPSET BASE
SECTION 096513

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Resilient wall base and accessories.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:
   1. Section 09 6800 - Carpeting

C. References (Industry Standards):
   1. ASTM International (ASTM):
      a. ASTM F1861 Standard Specification for Resilient Wall Base

1.2 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures.

B. Samples: Submit representative samples of each product specified for verification.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.

B. Deliver materials sufficiently in advance of installation to condition materials to the required temperature for 48-hours prior to installation.

1.4 PROJECT CONDITIONS

A. Maintain temperature and humidity at service levels or the ambient temperature must remain steady (± 10° F) and be between 65° F and 85° F for at least 48-hours prior to, during and after installation. The ambient relative humidity is recommended to be between 40% and 65% RH; avoid dew point conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design: Roppe Corporation, 1602 N Union St., Fostoria, OH 44830. P: (800) 537 – 9527

B. Or Burke, Johnsonite, or equal.

2.2 RESILIENT WALL BASE

A. Rubber Wall Base:

1.	Product Name:	Pinnacles
2.	Material Specification:	
	ASTM F1861	Type TS – rubber, vulcanized thermoset Group 1 – solid, (homogenous) Style A – Cove
3.	Material Height:	4” (101.6 mm
4.	Material Thickness:	
	ASTM F386	1/8” (3.2 mm)
5.	Material Length:	48” sections (1.22 m), 120’ (36.58 m)
6.	Limited Warranty:	1 year, Manufacturing Only
7.	Color:	70 standard color, three colors to be selected by Architect.
8.	Surface Burning	
	ASTM E84/NFPA 255	Class B

2.3 INSTALLATION PRODUCTS:

A. Acrylic Adhesives

1.	Product Name:	WB-600 Acrylic Wall Base Adhesive
	Product Description:	Acrylic Wall Base Adhesive
	Product Usage:	For standard, interior wall base installations over porous substrates only.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Follow all relevant guidelines detailed in Division 01, as well as flooring and adhesive manufacturer’s technical data sheets.

B. Interface With Other Work: If caulking or sealing is required after installation, please contact the manufacturer for a suitable, matching caulk.

3.2 CLEANING & MAINTENANCE

A. General: Clean up installation area and sweep, dust or wipe material to remove any dirt, dust or debris.

B. Initial Maintenance: Conduct initial maintenance per the manufacturer's Care & Maintenance documents (www.roppe.com).

END OF SECTION

CARPETING
SECTION 096800

PART 1 - GENERAL

1.1 SUMMARY

A. The work to be done under this section shall include the labor, materials and services required to install carpet. This shall include the floor prep of new concrete slabs the proper installation of new carpet in line with this specification.

B. Related Documents: Job Order List per school site.

1.2 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns, colors available, and method of installation.

B. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial color selection.

C. Verification Samples: Submit two 24"x24" samples illustrating color and pattern for each carpet requiring special attention.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Maintenance Data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

F. Manufacturer's Carpet Warranty.

G. Certification and description of reclamation and recycling process per section 1.07 of this document.

H. Certifications: Manufacturer to submit copies of the following independent laboratory reports showing compliance with requirements per these methods outlined in Part 2 of this document. Submitted results shall represent average results for production goods of the specified style.
   1. ASTM E-648 Flooring Radiant Panel
   2. ASTM E-662 Smoke Density
   3. AATCC 134 Electrostatic Propensity
   4. CRI TM-102 Fluorine Analysis
   5. ASTM D-3936 Delamination

6. Other from methods specified in Part 2

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications
   1. Company specializing in manufacturing specified carpet with minimum 5 years documented experience.
   2. Upon request, manufacturer to provide representative to assist in project start-up and to inspect installation while in process and upon completion. Representative will notify designated contact if any installation instructions are not followed.
   3. Single Source Responsibility: Obtain each type of carpet from one source and by a single manufacturer.

B. Installer Qualifications
   1. Flooring contractor must be certified by the carpet manufacturer prior to bid.
   2. Flooring contractor to be a specialty contractor normally engaged in this type of work and shall have prior experience in the installation of these types of materials.
   3. Flooring contractor possessing Contract for the carpet installation shall not sub-contract the labor without written approval of the Project Manager.
   4. Flooring contractor will be responsible for proper product installation, including floor testing and preparation, as specified by the carpet manufacturer and JOB CONDITIONS herein.
   5. Flooring contractor to provide Owner a written installation warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of one year after job completion.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.

B. Store in a dry location, between 60 degrees F and 80 degrees F and relative humidity below 65%. Protect from damage and soiling. Stack carpet rolls horizontally on a flat surface, stacked no higher than two rolls.

C. Make stored materials available for inspection by the Owner's representative.

D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.5 PROJECT CONDITIONS

A. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this document and Manufacturer's installation instructions.

B. The maximum amount of moisture evacuation from the floor is 3.0 pounds per 1,000 square feet in 24 hours. The acceptable pH level of the substrate is between 7.0 and 9.0. Flooring contractor is responsible for floor testing.

C. All material used in sub-floor preparation and repair shall be recommended by the carpet manufacturer and shall be chemically and physically compatible with the carpet system being bid.

D. Maintain minimum 65 degrees F ambient temperature and 65% Relative Humidity for 72 hours prior to, during, and 48 hours after installation.

E. Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceiling is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.6 EXTRA MATERIALS

A. Deliver all unused carpet and large scraps to Owner for "attic stock." Dispose of scraps less than 2 square foot in area or less than 8" width.

1.7 CARPET WARRANTY

A. Warranty to be sole responsibility of the Manufacturer. Second source warranties and warranties that involve parties other than the carpet manufacturer are unacceptable.

B. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced.

C. The Lifetime warranty shall cover against and specifically define the following:
   1. Excessive Surface Wear: More than 15% loss of pile fiber weight.
   2. Excessive Static Electricity: More than 3.0 kV per AATCC 134.
   3. Resiliency Loss of the Backing: More than 10% loss of backing resiliency.
   4. Delamination.
   5. Edge Ravel
   6. Zippering

D. Tuft Bid warranty in lieu of edge ravel and zippering is not acceptable.

E. Provide certification and warranty the product is fully or partially recyclable through manufacturer's or aligned partner's currently operational recycling program. Include information regarding the following:
   1. The recycling process(es) itself (i.e. separation of components, chopping, melting, pelletizing, etc.)
   2. Portions of the product that will be recycled back into itself.
      a. name/type of resulting product
      b. end-use of resulting product
      c. total product recycled content based on total product weight
      d. whether resulting product is recyclable (fully or partially) or non-recyclable
   3. Portions of the product that will be down-cycled
      a. name/type of resulting product
      b. end-use of resulting product
      c. total product recycled content based on total product weight
      d. whether resulting product is recyclable (fully or partially) or non-recyclable
   4. Portions of the product that will be landfilled and/or incinerated. (Note: "Incineration" includes waste-to-energy conversion, extraction of embodied energy; using heat from incineration as a fuel source.)

PART 2 - PRODUCT

2.1 FIBER

A. Nylon Fiber: Dynex Sd® Nylon/Dynex ® Nylon

B. Blends of Solutia fibers are not allowed. Solutia LXI fibers alone are not allowed.

C. Durable stain inhibitor should be applied to the fiber during product manufacturing to resist fiber staining and soiling. (Minimum average of three fluorine analyses of a single composite sample per CRI TM-102: 500ppm.)

D. Fiber to contain carbon-core filament for permanent static control. Topical treatments not allowed.

2.2 BACKING CHARACTERISTICS

A. Thermoplastic vinyl composite.

B. Primary Backing: Synthetic Woven or Non-Woven.

C. Pre-Coat (Fusion Coat): Sealant Vinyl

D. Secondary Backing: Closed-Cell, Vinyl Cushion backing system.
   1. Density (ASTM C-1667): 18.5 lbs/cu ft +/- 5%
   2. Compression Set (ASTM D-1667): Max 10%
   3. Compression Deflection (ASTM D-1667): Min. 7 psi @ 25%; Max. 25 psi @ 25%.
   4. Impermeable to moisture *and airflow*
   5. Provide for a chemically welded seam that is also impermeable to moisture *and airflow*
   6. 6' Width Roll Goods

E. Product to be installed with a mill-applied releasable "dry" adhesive system (when/if available from Manufacturer) to securely attach product to sub-floor in compliance with ADA guidelines, Section 4.5.3. Free-lay and stretch-in installations not allowed.

2.3 PERFORMANCE CHARACTERISTICS

A. Test reports for the following performance assurance testing to be submitted upon request. Submitted results shall represent average results for production goods of the referenced style.

B. Requirements listed below must be met by all products.
   1. Flooring Radiant Panel
      ASTM E-648/ NFPA 253: Class 1 (CRF: 0.45 watts/sq cm or greater)
   2. Federal Flammability
      CPSC FF 1-70: Passes
   3. Smoke Density
      ASTM E-662/ NFPA 258: ≤ 450 Flaming Mode
   4. Electrostatic Propensity
      AATCC 134 (Step & Scuff): 3.0 kV or less
   5. Static Coefficient of Friction
      ASTM C-1028: Passes ADA Guidelines for Accessible Routes (Minimum 0.60)
   6. Delamination of Secondary Backing of Pile Floor Coverings
      ASTM D-3936: Minimum 5 lbs.
   7. Lightfasteness
      AATCC 16E: ≥ 4 @ 100 hours
   8. Vetterman Drum
      ASTM D-5417: Minimum 3 @ 22,000 cycles
   9. Moisture Barrier
      Moisture Penetration by Impact @ 10 psi: No Penetration of backing and seam after 10,000 impacts.
   10. Air Flow Barrier
      Air Permeability of Textile Fabrics: No Air Flow (0.0 ft^3/min) through backing and seam.

11. Seam Integrity
Seam to remain intact after 50,000 cycles per Phillips Chair Test
12. VOC Chamber Testing
ASTM D-5116: Product inclusive of "dry" adhesive system meets criteria established by the State of Washington Indoor Air Quality Specification for Carpet and/or Carpet & Rug Institute's (CRI) Indoor Air Quality Carpet Testing Program. If "dry" adhesive (2.02E) not available from manufacturer and "wet" adhesive is used to install the product, carpet and adhesive to meet CRI's Green Label requirements.

2.4 MANUFACTURING SPECIFICATIONS

A. Carpet over Powerbond® Cushion Pad:
1. Carpet:
   a. Manufacturer: TARKETT, www.commercial.tarkett.com (Or pre-approved equal)
   30000 Aurora Rd. Solon, Ohio 44139 (800)899-8916, (925)785-1530
   b. Pattern: Applause III (*Note: Extended lead-time 18-24 weeks)
   c. Color: By Architect
   d. Type: Broadloom, 6" roll good
   e. Construction: Stratatec® Patterned Loop
   f. Face Weight: 18 oz/sq yd
   g. Gauge: 1/13
   h. Stitched per Inch: 8.2
   i. Tuft Density: 104.96 tufts/sq in
   j. Pile Height Average: 0.177 inch
   k. Pile Thickness: 0.087 inch
   l. Density Factor: 7,448 oz/cu yd
   m. Fiber System: Dynex SD® Nylon/Dynex ® Nylon
   n. Dye Method: 50% Solution Dyed/ 50% Yarn Dyed
   o. Fluorine-Free Soil Protection: Eco-Ensure
   p. Primary Tufting Substrate: Synthetic Non-Woven
   q. Pattern Match: Not Required
2. Carpet Pad:
   a. Manufacturer: TARKETT, www.commercial.tarketet.com (or pre-approved equal)
   30000 Aurora Rd. Solon, Ohio 44139 (800)899-8916, (925)785-1530
   b. Type: Powerbond® Cushion Pad
   c. Total Minimum Recycled Content: 8.6%
   d. Pre-Consumer: 0.0%
   e. Postconsumer: 8.6%
   f. Third Party Certification NSF-140: Gold
   g. Product Size: 6ft
   h. Cushion: Closed Cell Cushion

i. Heterogenous Construction: No Delamination per ASTM D-3936
j. Intermediate Layer: Fiberglass Reinforced Sealant
k. Product Construction: No Delamination per ASTM D-3936
l. Secondary Backing Density: 65.0 lbs/cu ft
m. Secondary Backing Thickness: 0.050 inch
n. Total Weight: 101.9 oz/sq yd +/- 5%
o. CRI Green Label Plus Certification: GLP8320

B. Carpet Walk-Off Mat:
1. Carpet Tile:
a. Manufacturer: TARKETT, www.commercial.tarkett.com (Or pre-approved equal)
30000 Aurora Rd. Solon, Ohio 44139 (800)899-8916, (925)785-1530
b. Pattern: ABRASIVE ACTION II/ #19101 MIDNIGHT BLUE
c. Type: Carpet Tile.
d. Size: 24"x24" (install: quarter turn).
e. Construction: Accuweave® Patterned Loop.
f. Face Weight: 24 oz/sq yd.
g. Gauge: 1/12
h. Stitches per Inch: 8.0
i. Tuff Density: 96.0 tufts/sq in
j. Pile Height Average: 0.187 inch
k. Pile Thickness: 0.115 inch
l. Density Factor: 7,513 oz/cu yd
m. Fiber System: TDX Nylon
n. Dye Method: 100% Solution Dyed
o. Fluorine-Free Soil Protection: Eco-Ensure
p. Primary Tufting Substrate: Synthetic Non-Woven
2. Carpet Tile Backing:
a. Manufacturer: TARKETT, www.commercial.tarkett.com (or pre-approved equal)
30000 Aurora Rd. Solon, Ohio 44139 (800)899-8916, (925)785-1530
b. Type: Ethos® Modular with Omnicoat Technology®
c. Total Minimum Recycled Content: 54.7%
d. Pre-Consumer: 22.2%
e. Post-Consumer: 32.4%
f. Third Party Certification NSF-140: Platinum
g. Cradle to Cradle Certification: Silver (Certification #1904)
h. Product Size: 24"x24" Tile (18"x36" also available)
i. Secondary Backing: 50% Recycled Content
j. Intermediate Layer: Fiberglass Reinforced Sealant
k. Product Construction: No Delamination per ASTM D-3936
l. Secondary Backing Density: 65.0 lbs/cu ft
m. Secondary Backing Thickness: 0.050 inch

n. Total Weight: 101.9 oz/sq yd +/-5%
o. CRI Green Label Plus Certification: GLP8320

C. Exterior Recessed Walk Off Matts
1. Manufacturer: Peditred G4 by construction specialties.
2. Carpet: Heavy Duty inserts-see plans.

D. Substitutions are allowed.

2.5 ACCESSORIES

A. Materials recommended by Manufacturer for patching, priming, chemically welding the seams, etc.

B. Adhesives: Product to be supplied with pre-cured, mill-applied or other "dry" adhesive system (2.02E) when available. Otherwise, adhesive should be full spread, extremely low VOC in compliance with CRI Indoor Air Quality Adhesive Testing Program requirements, compatible with materials being adhered, as recommended by the Manufacturer.

C. Base, Carpet Edge, and Transition Strips: As specified in applicable sections.

2.6 CARPET AND PILE

A. Carpet shall comply with CBC section 11B-302.2.

PART 3 - EXECUTION

3.1 EXAMINATION / PREPARATION

A. Prepare sub-floor to comply with criteria established in Manufacturer's installation instructions. Use only preparation materials that are acceptable to the Manufacturer.
1. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation. (*i.e. floor wax)*
2. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects.

B. Verify that sub-floor is smooth and flat within specified tolerances and ready to receive carpet.

C. Verify that substrate surface is dust-free and free of substances that would impair bonding of product to the floor.

D. Verify that concrete surfaces are ready for installation by conducting moisture and pH testing. Results must be within limits recommended by Manufacturer.

E. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2 INSTALLATION - GENERAL

A. Install product in accordance with Manufacturer's installation instructions.

B. Verify carpet match before cutting to ensure minimal variation between dye lots.

C. Layout carpet and locate seams in accordance with shop drawings.
   1. Locate seams in area of least traffic, out of areas of pivoting traffic. *Minimize cross seams.*
   2. Do not locate seams perpendicular through door openings.
   3. Align run of pile in same direction on adjacent pieces.
   4. Locate change of color of pattern between rooms under door centerline.
   5. Provide monolithic color, pattern, and texture match within ay one area.

D. Install carpet tight and flat on sub-floor, well-fastened at edges, with a uniform appearance.

E. Double-cut carpet seams with accurate pattern match. Make cuts serpentine, true, and unfrayed.

F. Chemically weld all seams with manufacturer's recommended seam sealer as stated in installation instructions. Make sure the seam is fully sealed.

G. Roll with appropriate roller for complete contact of carpet with mill-applied adhesive to sub-floor.

H. Trim carpet neatly at walls and around interruptions.

I. Completed carpet is to be smooth and free of bubbles, puckers, and other defects.

3.3 PROTECTION & CLEANING

A. Remove excess adhesive and/or seam sealer from floor and wall surfaces without damage.

B. All rubbish, wrappings, debris, trimmings, etc. to be removed from site and disposed of properly.

C. Clean and vacuum carpet surfaces using a beater brush/bar commercial vacuum.

D. After each area of carpet is installed, protect from soiling and damage by other trades.

END OF SECTION

VINYL COVERED TACKBOARD
SECTION 09 7200

PART 1 - GENERAL

1.1 SUMMARY:

A. The work includes the furnishing and installing of vinyl covered tackboard wall finish with accessories as shown and noted on the drawings and specified herein. The Conditions of the Contract and Division 1 apply to this section as fully as if repeated herein.

1.2 REFERENCE STANDARDS:

A. The editions of American Society for Testing and Materials (ASTM) specifications and standards referenced herein, apply to the work only to the extent specified by the reference.

B. Product must be CHPS 'low emitting material' certified.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Store vinyl tackboard inside the building or in other dry weathertight enclosure. Stack flat and off the floor. Do not stack long lengths over shorter lengths.

B. Store flammable adhesives away from fire, sparks, or smoking areas.

1.4 PROJECT CONDITIONS:

A. Maintain temperature range between 55 degrees F. and 70 degrees F. for a period extending from 24 hours before installation until the permanent heating system is in operation. Provide ventilation during and following adhesive and joint treatment application. Use temporary air circulators in enclosed areas lacking natural ventilation.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Vinyl Tackboard (fiberboard)
   1. The base board is a cellulose fiber insulating board which meets or exceeds the physical requirements of ASTM Standard C 208 and Federal Specification LLL-I-535B, Class A. The cloth-backed vinyl used on the face of the board meets or exceeds Federal Specification CCC-W-408A, Type 1/ Group 2. Manufacturer, Chatfield Clarke.

2. Size shall be ½" thick x 4' wide, provide lengths 8', 10' and 12' - provide full height panels with no horizontal joints allowed, except were indicated on the drawings (Edges shall be wrapped and beveled).

3. FIRE HAZARD CLASSIFICATION The finished vinyl surface has a Class III Flame Spread Index (76-200) when tested in accordance with ASTM Standard E 4 (Tunnel Test), maximum smoke density 450.

4. Trim: Provide vinyl covered plastic trim pieces (vinyl to match the wall panels) for outside corner and end cap, and inside corners where necessary. Make every effort to use factory edge on inside corner.

PART 3 - EXECUTION

3.1 VINYL TACKBOARD INSTALLATION:

A. Note: Where tackboard is installed over gypsum board. Stagger joints between gypsum and tackboard.

B. Project Conditions - Temperature and humidity conditions closely approximating the interior conditions which will exist when the building is occupied, shall be maintained before, during and after the application of the Vinyl Tackboard. Installations shall not be made when the building is excessively cold and damp, or hot and damp.

C. Conditioning Vinyl Tackboard - All packages or stacks shall be opened and the Vinyl Tackboard placed singly around the room for at least 24 hours before application.

D. Vinyl Tackboard shall only be installed over a solid gypsum board backing. All holes and notches in the backing shall be filled prior to installation of Vinyl Tackboard. Backing shall be clean and dry prior to installation of Vinyl Tackboard. Vinyl Tackboard shall not be applied over open framing members.

E. Adhesive Application - To the back side of each piece of Vinyl Tackboard, apply adhesive by either of following methods:
   1. Notched Trowel: Apply adhesive in 4" wide ribbons along the edges and down the middle using a notched trowel with 1/4" deep notches spaced ½" o.c.

   2. Cartridge: Apply adhesive in continuous 1/4" to 3/8" beads starting at one edge of the board and spaced 16" o.c.

      Note: Use adhesives that are recommended by the Vinyl Tackboard Manufacturer only. All adhesives must comply with SCAQMD Rule 1168 with less than 50 grams/liter V.O.C. content.

F. Vinyl Tackboard Application - Place Tackboard vertically against the base wall and hold a minimum of ½" off the floor. Fasten each board with 6d nails spaced 8" o.c. along the top and bottom of each sheet. Clean off any adhesive from vinyl surface immediately with mild soap and water. Wrapped Beveled edge Tackboard shall be temporarily braced at third points to assure proper contact between the solid backing and the Vinyl Tackboard. Temporary bracing shall be done per manufacturers written recommendations. Panels shall not be installed with nails through the face in exposed locations. No horizontal joints will be allowed unless noted on plans. Fiberboard is to be cut straight and true - no more than 1/8" variation in 10 feet. Vertical joints shall be plumb with joints located as indicated on the drawings.

G. Contractor shall follow manufacturer's written guidelines to assure color texture and pattern match. All vinyl shall be from one continuous production run.

3.2 REPAIR, CLEAN-UP AND PROTECTION:

A. Vinyl tackboard shall be cleaned with mild soap and water to leave in a clean orderly manner.

END OF SECTION

ACOUSTICAL INSULATION AND SEALANTS
SECTION 09 8100

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Acoustical insulation in all interior partitions.
   2. Acoustical sealants and related materials.
   3. Acoustical pads at all boxes at interior classroom and office walls.
   4. Supplementary parts and components, such as clips, fasteners, supplementary framing, and other miscellaneous accessories required for a complete installation.

B. Related work:
   1. Division 7 for building insulation (thermal).
   2. Division 7 for weather-sealing sealants.
   3. Division 23 for pipe and duct insulation.

1.2 SUBMITTALS

A. Submit manufacturer's product data for materials specified below.

B. Samples: Submit 12-inch square samples of each type of insulation; 12-inch long samples of tape and sealants; full size samples of acoustical pad.

1.3 HANDLING

A. Store materials under cover, protected from moisture and off the ground or floor. Remove insulation that becomes wet or damp immediately from the job site.

PART 2- PRODUCTS

2.1 BATT INSULATION

A. Formaldehyde-free, unfaced blankets "Sound-Shield" by Johns Manville, "Greenguard" by Knauf, or equal.

B. Unless other indicated, provide insulation of same thickness as the stud depth.

2.2 ACOUSTICAL SEALANTS

A. Pecora Corp.: AC-20.

B. US Gypsum Co.: Sheetrock Acoustical Sealant.

C. Fire-resistive acoustical foam tape: Compressible, closed cell polyvinyl chloride foam with pressure sensitive adhesive, in rolls with protective release liner on non-adhesive face, 6 pcf density, 1 inch wide by not less than 1/4 inch thick, self-extinguishing, UL 94 recognized, Norseal V740FR by Norton Performance Plastics Corp., or equal.

2.3 ACOUSTICAL PADS

A. Fire-rated walls: Putty Pads by International Protective Coatings (800.334.8796) or Putty Pads by Specified Technologies, Inc. (800.992.1180).

B. Elsewhere: Lowry Box Pads by Henry A. Lowry Co. (818.768.4661), Sound Pad #68 by LH Dottie Co. (213. 269.3161), or Type FSP Firestop Putty Pads by Nelson Electric (800.331.SEAL).

2.4 ACCESSORIES

A. Staples, zinc-coated wires and other devices for fastening insulation: As recommended by the insulation manufacturer.

B. Supplementary metal and wood framing where required for insulation support: As specified in Section 061000.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Before installing insulation in stud walls, thoroughly clean space of debris.

C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 ACOUSTICAL PADS

A. Cover the back and sides of all electrical, telephone, and Data boxes in sound-insulated walls with the acoustical pad specified.

B. Verify that all unused knockouts are plugged before installing the pads.

C. Mold pads tightly to the boxes and to the adjacent surfaces.

3.3 INSULATION

A. Cut to fit irregular spaces, butt edges into firm contact with each other and adjoining surfaces.
   1. Hand pack around pipes, ducts, conduits, electrical boxes, etc., as required to thoroughly fill all voids and spaces between framing members and to form a continuous acoustical barrier.

   2. Comply with the California Electrical Code (CEC) for installation in proximity to light fixtures. Do not install insulation closer than recommended by CEC.

B. In stud walls more than 8 feet high, and where the insulation is not self-supporting, attach to gypsum board using staples with divergent points placed at each corner and at 24 inches o.c. thereafter.

3.4 ACOUSTICAL SEALANT

A. Comply with ASTM C 919 and the following.

B. Clean space to be calked of debris, dust and powdered materials which would prevent the sealant from adhering properly.

C. Seal openings between gypsum board and the perimeter of items penetrating gypsum board, such as electrical boxes, continuously using sealant specified.

D. Seal openings between the gypsum board and floors and ceilings along sound-insulated walls continuously, and along those intersecting walls for a minimum distance of 3-foot from insulated walls. When multiple layers occur, seal the perimeter of each layer continuously.

E. Seal gypsum board edges in contact with door frames continuously.

3.5 FIELD QUALITY CONTROL

A. Prior to closing-in of insulated assemblies, or prior to Substantial Completion for insulation that will remain exposed in the building, refit, reinstall and/or replace wet, damaged and displaced insulation.

B. Prior to closing-in of insulated assemblies, Architect shall be notified to review the installation.

END OF SECTION

PAINTING
SECTION 099000

PART 1 - GENERAL

1.1 SUMMARY:

A. The work includes the furnishing of all materials and equipment and the completion of all painting and painter's finish on all interior and exterior surfaces, as required to complete the finishing of the building as specified. The Conditions of the Contract and Division 1 apply to this section as fully as if repeated herein.
   1. Additional material and equipment to be painted: Frame and paint all piping, unwrapped ductwork and electrical conduits where exposed.

B. Related Sections:
   1. Section 076000 - Metal Flashing and Sheet Metal Work.
   2. Section 092000 - Gypsum Board.
   3. Section 092400 - Lath and Portland Cement Plaster.

1.2 SUBSTITUTIONS:

A. Materials will be considered for substitution subject to requirements.

1.3 SUBMITTALS:

A. Submittals to conform to Section 013300.

B. The Architect will select the finish colors and determine the basic hues of all surfaces to be painted or finished.

C. Prepare samples of colors and textures based upon the Architect's selections and submit them for review.

1.4 GENERAL REQUIREMENTS:

A. Examine the drawings and the specifications of other trades and consult with the other trades to determine the full extent of work and items which are specified to include shop priming and shop finish painting.

B. Conditions affecting the work of this section shall be verified at the job site.

C. No materials other than those specified, or approved, shall be delivered to the job or used on the work. Materials shall be delivered in manufacturer's sealed containers with labels defining the contents therein.

D. Paint materials and equipment, when not in actual use, shall be stored in places specifically assigned for that purpose. Such storage space shall be well ventilated and adequately fire protected. Paint mixing and handling shall be performed in these assigned areas and containers used for mixing and handling shall be metal and suitably designed for safety. Paint materials, including rags, tarpaulins, mixers, empty containers and filled or partially filled containers shall be removed from the building areas at the close of each working day.

1.5 WORK INCLUDED:

A. The intent and requirements of this section, is that all work, items and surfaces which are normally painted and finished in a building of this type and quality, shall be so included in this contract, whether or not said work, item or surface is specifically called out and included in the schedules and notes on the drawings, or is, or is not, specifically mentioned in these specifications.

1.6 PRODUCT HANDLING:

A. Deliver paint to site in manufacturer's labeled and sealed containers. Labels shall give manufacturer's name, brand, type, batch number, color of paint and instruction for reducing. Thin only in accordance with printed directions and manufacturer.

1.7 ENVIRONMENTAL CONDITIONS:

A. Do not apply exterior paint in damp, rainy weather or until the surface has dried thoroughly from the effects of such weather. Do not apply varnish or paint when temperature is below 50 degrees F. Avoid painting surfaces when exposed to hot sunlight.

1.8 PROTECTION AND CLEAN UP:

A. Before painting, remove hardware, accessories, plates, lighting fixtures and similar items or provide ample protection of such items. On completion of each space, replace above items. Use only skilled mechanics for removing and connecting above items. Protect adjacent surfaces as required or directed.

B. Wherever painting and finishing work is being performed, floors, surfaces and items shall be carefully protected from damage by the painting work. Clean drop cloths shall be provided and used wherever necessary. Supplies, materials, paints, containers, shall be orderly and carefully arranged and protected. Accidental spatter, spillage, shall be immediately cleaned and the damaged surfaces stored to perfect condition. Paint spots and spatter on glass, other surfaces shall be completely removed and the surface cleaned.

C. At the completion of work in each space or room, materials, supplies, debris and rubbish shall be removed and areas left in a clean, orderly condition.

1.9 GUARANTEE:

A. Guarantee the painting work, in writing, against peeling, fading, cracking, blistering, or crazing for a period of two (2) years from the time of Notice of Completion is filed.

1.10 EXTRA STOCK:

A. Provide binder with 8" x 10" brush outs of each color utilized. Label each brushout with product name, number, sheen, etc.

B. Provide on gallon of each type and color of finish coat used.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Paint materials shall be as manufactured by Dunn Edwards (DE) ("Basis of Design") or Sherwin Williams (SW), or Benjamin Moore (BM) in accordance with Section 013300.

B. Primer and sealer coats may be thinned no more than 10% with paint manufacturer's thinner. Check with Manufacturer for Premium Primer, before thinning. Other coats shall be used as they come from the can, except as otherwise approved.

C. Secure the Color Schedule before undercoating. Unless otherwise specified, all undercoats shall be tinted slightly to approximate the color of the finish coat. Approval of color shal be obtained before proceeding with the work.

D. Where a specific name is not given for a product or ingredient, such item shall be of the best quality of the approved manufacturer, which is normally used for the intended purpose.

2.2 PAINT SCHEDULE:

A. EXTERIOR

	Dunn Edwards	Sherwin Williams	Benjamin Moore
1. Group One: Ferrous Metal			
1st Coat - Primer (2.0 mils)	(ENPR00)	(B66W00011)	(HP04)
(If shop primed, only touch-up is required)			
2nd Coat - Exterior Acrylic Semi-Gloss (2.0mils)	(SSHL50)	(A82W00151)	(N448)
3rd Coat - Exterior Acrylic Semi-Gloss (2.0 mils)	(SSHL50)	(A82W00151)	(N448)
2. Group Two: Galvanized Metal			
Etch Etching Solution	Krud Kutter Metal Clean & Etch		
1st Coat - Primer (2.0 mils)	(ELGM00)	(B71Y00001)	(HP04)
2nd Coat - Exterior Acrylic Semi-Gloss (2.0 mils)	(SSHL50)	(A12W00151)	(N448)
3rd Coat - Exterior Acrylic Semi-Gloss (2.0 mils)	(SSHL50)	(A12W00151)	(N488)
3. Group Three: Concrete			
1st Coat - Primer (2.0 mils)	(ESSL00)	(B25W00025)	(571)
2nd Coat - Exterior Flat Low Sheen (1.5 mils)	(SSHL20)	(A12W00151)	(N455)
3rd Coat - Exterior Flat Low Sheen (1.5 mils)	(SSHL20)	(A12W00151)	(N455)
4. Group Four: Stucco			
1st Coat - Primer (2.0 mils)	(VNSL00)	(B28W08030)	(067)
2nd Coat - Exterior Flat Low Sheen (1.5 mils)	(SSHL20)	(A12W00151)	(N455)
3rd Coat - Exterior Flat Low Sheen (1.5 mils)	(SSHL20)	(A12W00151)	(N455)

B. INTERIOR:

	Dunn Edwards	Sherwin Williams	Benjamin Moore
1. Group One: Gypsum Board			
1st Coat - Primer (1.5 mils)	(VNSL00)	(B28W08030)	(067)
2nd Coat - Acrylic Eggshell (1.5 mils)	(SWLL30)	(B20W12651)	(T538)
3rd Coat - Acrylic Eggshell (1.5 mils)	(SWLL30)	(B20W12651)	(T538)
2. Group Two: Vinyl Wallcovering, Hard-to-Stick Surfaces			
1st Coat - Premium Primer (1.5 mils)	(UGP00-1)	or equal	or equal
2nd Coat - Acrylic Eggshell (1.5 mils)	(SWLL30)	(B20W12651)	(T538)
3rd Coat - Acrylic Eggshell (1.5 mils)	(SWLL30)	(B20W12651)	(T538)
3. Group Three: Interior Metal - Ferrous			
1st Coat - Primer (2.0 mils) (If shop primed, only touch-up is required)	(ENPR00)	(B66W00011)	(HP04)
2nd Coat - Acrylic Semi-Gloss (2.0 mils)	(SWLL50)	(B31W02651)	(HP29)
3rd Coat - Acrylic Semi-Gloss (2.0 mils)	(SWLL50)	(B31W02651)	(HP29)
4. Group Four: Interior Metal - Galvanized			
Etch Etching Solution	Krud Kutter Metal Clean & Etch		
1st Coat - Primer (2.0 mils)	(ULGM00)	(B71Y00001)	(HP04)
2nd Coat - Acrylic Semi-Gloss (2.0 mils)	(SWLL50)	(B31W02651)	(HP29)
3rd Coat - Acrylic Semi-Gloss (2.0 mils)	(SWLL50)	(B31W02651)	(HP29)

PART 3 - EXECUTION

3.1 PREPARATION:

A. Examine surfaces to be painted before beginning painting work. Work of other trades that has been left or installed in a condition not suitable to receive paint shall be repaired or corrected by the applicable trade prior to painting. Painting of defective or unsuitable surface implies acceptance of the surface.

B. Surfaces shall be clean and dry prior to painting and finishing. Dirt and dust shall be removed by washing with a stiff bristle brush and TSP compound and wiping dry with cloths. Oil and grease shall be removed by solvent cleaning, using a solvent such as mineral spirits and wiping with clean cloths. Surfaces shall be given a final rinse of clean solvent. Surfaces which have been contaminated with chemicals shall be thoroughly rinsed with water. The first coat of paint shall be applied as soon as possible after cleaning and drying surfaces.

C. Shop Primed Ferrous Metal Surfaces: Wash free of grease, dirt, oil, and dust, using solvents as required. Galvanized surfaces shall be cleaned with solvents and given a vinyl was coat. Shop primed surfaces shall be repaired and touched up wherever shop priming is damaged and at all welds.

D. Gypsum Board Substrates: Coordinate with Specification Section **092000 Gypsum Board,** and apply primer-sealer coat for drywall finishes from this Specification prior to application Specification Section **092000 Gypsum Board** texture finish coats.

E. Gypsum Board and Plaster: Fill minor cracks, scratches, holes and nail heads.

F. Vinyl and Hard-to-Stick Surfaces: Use specific premium primer-sealer coat designed for excellent adhesion on hard-to-stick surfaces. See manufacturer's guidelines for prep and application of product.

G. Prior to application of any finish coats, the preparation work is to be reviewed and accepted by the Project Inspector.

3.2 APPLICATION:

A. Application: Apply paints by brush or roller except as otherwise specified. Use paint of proper consistency for each coat, well brushed-out or flowed-on to obtain a uniform finish free from holidays, brush marks, sags, crawls, or other defects.

B. Materials shall be applied in accordance with the approved manufacturer's directions and specifications. Thinning required, shall be done in the manner and the type of reducer recommended by manufacturer.

C. The proper number of coats of paints and other finishes specified, properly applied, will result in the desired effect. Should this effect not be attained, additional applications of the specified materials and methods shall be made.

D. Each coat of painted work shall vary in shade from the proceeding coat in a manner that will make each coat readily distinguishable without affecting the finish color.

E. In enclosed spaces, the application and drying of paint shall be performed only when the temperature is 65 degrees F., or above and maintained constantly to prevent condensation.

F. Enamel coats shall be sanded smooth prior to re-coating. All defects and unevenness in previously applied coatings shall be repaired before applying the next coat.

G. Where questions occur as to the indicated surfaces inform the Architect and receive clarification therefrom.

3.3 CLEANING, TOUCH-UP AND REFINISHING:

A. Touch-up and Refinishing: 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 repaired as necessary to produce a first-class workmanlike job.

B. Cleaning:
   1. Carefully remove all spattering, spots and blemishes caused by work under this section from surfaces throughout the project.
   2. Upon completion of painting work remove all rubbish, paint cans, and accumulated materials resulting from work.

END OF SECTION

INTERIOR CONCRETE FLOOR SEALER
SECTION 099723

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Clear concrete sealer on exposed surfaces of concrete floors that are not polished.

   2. See specification section 03 3543 for Polished Concrete Floors.

1.2 PERFORMANCE REQUIREMENTS

A. Provide sealer with the following properties based on testing manufacturer standard products, according to test methods indicated, applied to substrates simulating Project conditions using same materials and application methods to be used for Project.
   1. Absorption: Minimum 90 percent reduction of absorption after 24 hours in comparison of treated and untreated specimens for hardened concrete: ASTM C 642.

   2. Water-vapor transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, ASTM E 96.

   3. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, ASTM G 53.

   4. Permeability: Minimum 80 percent breathable in comparison of treated and untreated specimens, ASTM D 1653.

B. Appearance: When compared visually to an untreated sample under same lighting conditions, the sealer shall not change the color and sheen of the coated substrate, and shall be invisible after application and over the life of the building.

1.3 SUBMITTALS

A. Data: Submit manufacturer's data of the proposed sealer, including recommended coverage rates, include material test reports indicating and interpreting test results for compliance of water-repellent sealer with criteria specified.

B. Manufacturer's certification: Submit the following.
   1. Letter from the sealer manufacturer to verify its acceptance of the applicator, acceptance of substrates as satisfactory to receive the specified sealer, and affidavit that sealer is compatible with concrete curing agent used.

2. Duplicate copies of manufacturer affidavit with each shipment of materials delivered to the jobsite certifying that material furnished complies with specified requirements.

1.4 QUALITY ASSURANCE

A. Installer's qualifications: Firm with a minimum of 3 consecutive years of experience in application of the sealer proposed for use, or similar sealers, on projects of similar size and scope, and licensed or approved in writing by the sealer manufacturer.

B. Samples: When requested by the sealer manufacturer, or necessary to adjust sealer formulation, provide sealer manufacturer with sufficient samples of substrate to be coated to determine exact formulation and coverage rates.

C. Pre-installation meeting:
   1. Prior to start of installation, arrange a pre-installation meeting between the sealer manufacturer, the applicator, and related trades whose work will be in contact with the treated surface, including but not limited to those for colored concrete and joint sealers.

   2. Record minutes of the meeting, file in the Project file, and send a copy to the Architect.

D. Manufacturer's inspections:
   1. Obtain materials only from manufacturer who will send a qualified technical representative to the Project site before start of this work to verify substrate acceptability. Schedule subsequent visits as required thereafter to review installation procedures and completed work, and to issue warranty specified.

   2. Unsatisfactory conditions disclosed by the manufacturer visits to the site shall be promptly and satisfactorily repaired and the areas re-inspected by the manufacturer before work starts or resumes in affected areas.

E. Pre-installation testing:
   1. Test sample panel in accordance with ASTM E 514, modified for field use.

   2. Report results of tests and apply additional sealer, when appearance is unchanged, or re-formulate and re-apply sealer, when test results are not satisfactory.

1.5 HANDLING

A. Materials shall be delivered to Project site in manufacturer's unopened containers bearing manufacturer's labels with batch number and date of manufacture.

1.6 JOB CONDITIONS

A. Comply with manufacturer's recommendations regarding environmental requirements, and temperature and conditions of surfaces to receive sealer.

1.7 WARRANTY

A. Warrant sealer against water penetration through treated surfaces, peeling, cracking, discoloration and other defects of the sealer, caused by faulty materials and workmanship, for 5 years after Substantial Completion.

B. The warranty shall include repair of any defects and failures in the sealer during the warranty period, at no additional cost to the District.

PART 2 - PRODUCTS

2.1 SEALER/MANUFACTURER

A. Basis of design is Ashford Formula by Curecrete Distribution, Inc. Equivalent products by the following manufacturers will be accepted with the Architect's approval in each case:
   1. Monopole.
   2. Prosoco.
   3. Harris Specialty Chemicals, Inc. (Hydrozo).
   4. L&M Construction Chemicals, Inc.
   5. Pecora Corp.
   6. Sivento.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Provide services of a factory-authorized technical service representative, from the sealer manufacturer, to inspect and approve the substrates before application and to instruct the applicator on the product and application method to be used.

B. Verify that slabs to be sealed are clean, dry and free of dust, dirt, oil, grease and other foreign material that would affect the application and performance of the sealer.

C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PROTECTION

A. Protect adjacent work, including sealant bond surfaces, from spillage or blow-over of sealer.

3.3 PHASING

A. Where feasible delay sealer application until installation of sealants has been completed in joints adjoining surfaces to be coated.

B. Sealer work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, sealer, and sealant materials identical to those used in the work.

3.4 APPLICATION

A. Test application:
   1. Before performing this work, including bulk purchase and delivery of products, prepare a small application in an unobtrusive location and in a manner approved by Architect to demonstrate the final effect (visual, physical, and chemical) of planned application.

   2. Proceed with work only after Architect review of test application.

B. Apply by manufacturer-approved applicators using recommended methods and equipment.

C. Do not exceed the application rate recommended by the manufacturer.

3.5 FIELD QUALITY CONTROL

A. The District may employ a testing agency to test the in-place sealer in compliance with standards specified.

B. The District will pay cost of test, except when test discloses that the sealer tested does not comply with these Specifications; the Contractor shall pay subsequent retests until application meets Specifications requirements.

C. In the event test shows that the sealer is deficient, apply additional sealer.

D. Repetition of the above procedure on all previously treated surfaces will be at Contractor's expense.

3.6 CLEANING

A. Clean sealer from adjacent surfaces immediately after spillage.

B. Comply with manufacturer's recommendations for cleaning.

END OF SECTION

FIBERGLASS REINFORCED PLASTIC (F.R.P.) WALL FINISH
SECTION 099850

PART 1 - GENERAL

1.1 SUMMARY:

A. The work includes the furnishing and installing of fiberglass reinforced plastic wall panels and, all other accessories as shown and noted on the drawings and specified herein. The Conditions of the Contract and Division 1 apply to this section as fully as if repeated herein.

1.2 REFERENCE STANDARDS:

A. The editions of American Society for Testing and Materials (ASTM) specifications and standards referenced herein, apply to the work only to the extent specified by the reference.

B. FRP Panels are to conform to ASTM-D 5319.

1.3 SUBMITTALS:

A. Comply with provisions noted in General Conditions.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Deliver FRP panels board and accessories to the site in the manufacturer's original unopened containers.

1.5 PROJECT CONDITIONS:

A. Maintain temperature range between 55 degrees F. and 70 degrees F. for a period extending from 24 hours before installation until the permanent heating system is in operation. Provide ventilation during and following adhesive and joint treatment application. Use temporary air circulators in enclosed areas lacking natural ventilation.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Fiberglass Reinforced Plastic (FRP): Fiberglass Reinforced Plastic paneling shall be 4'x8' x .090" thick, color to be chosen by Architect from standard colors, with matching vinyl trim shapes as manufactured by MARLITE, pebbled texture, Class A, ASTM E-84 with color integral trim moldings. FRP wall panels to have flamespread rating less than 25 and smoke developed less than 450 in accordance with UBC Standard 8-1.

B. See drawings for surface finish locations

PART 3 - EXECUTION

3.1 INSTALLATION OF GYPSUM BOARD:

A. Applications: Use mold resistant wallboard as indicated on the drawings.

3.2 INSTALLATION OF FRP PANELING

A. FRP paneling shall be installed with joints located as indicated on the drawings. Apply to gypsum board with adhesives recommended by manufacturer in accordance with manufacturer's written instructions.

3.3 REPAIR, CLEAN-UP AND PROTECTION:

A. Any breaks, chips or splits in material shall be replaced.

B. All FRP Panels are to be cleaned per Section 017423 prior to occupancy.

END OF SECTION

MARKER BOARDS
SECTION 10 1116

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installing of all marker boards and accessories as shown and noted on the drawings and specified herein. The conditions of the contract and Division 1 apply to this section as fully as if repeated herein.

B. Related Sections:
   1. Section 09 2000 - Gypsum Board.

1.2 SUBMITTALS

A. Before fabrication, furnish six (6) copies of submittals, including two standard color charts, to the architect for approval. Submittal is to show a cross section indicating materials and backing as well as attachment clip details for each type of installation.

B. Colors shall be selected by the architect from the manufacturer's standard colors.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in original unopened containers bearing the name of the manufacturer and product identification.

B. Boards are to be stored in such a manner as to prevent warping, bending and dents. Storage shall be protected from the weather and kept dry at all times.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dry marker board:

   1. 110 Series horizontal marker boards as manufactured by steelcase. Board sizes as indicated on Drawings. P3 ceramic steel surface over ½" particle board with 0.015" aluminum backer. Aluminum 3/4" trim and 2-3/4" CRC-2B Aluminum tray with radiused corners, with full map rail and cork insert. Provide one flag holder and four map hook/clips per 8' section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Marker boards shall be installed as indicated on the drawings. All panels shall be installed true to line.

3.2 GUARANTEE

A. Manufacturer shall provide a written guarantee for a period of 5 years from the Notice of Completion that the Marker Boards will not exhibit excessive color fading, crazing, cracking, flaking or ghosting under normal classroom usage. If the product does fail, the manufacturer must repair or replace the unit within 30 days of written notification by the Owner or Architect for the duration of the guarantee.

END OF SECTION

IDENTIFYING DEVICES
SECTION 101400

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installing of all identifying devices as specified herein.
   1. Code required Toilet and Room identification signs.
   2. Exterior aluminum and enameled steel panel signs.
   3. Acrylic wall mounted letter/logo signage.

B. Related Work:
   1. Documents affecting work of this Section include, but are not limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

C. Related Sections:
   1. Sections 087100 - Finish Hardware.

1.2 REFERENCES

A. ADAAG - Americans with Disabilities Act Accessibility Guidelines; U.S. Architectrual and Transportation Barriers Compliance Board.

B. 2022 CBC.

1.3 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Manufacturer's descriptive literature for sign types specified, including components and accessories.

C. Shop Drawings: Indicate location of each individual sign in the project.

D. Signage Schedule: Each door that is to receive signage, by door number referenced to drawings with indicated pictogram and/or text signage is to receive.

E. Verification Samples: One full size sample sign of type style and color specified, including method of attachment.

F. Manufacturer's Instructions: Printed installation/mounting instructions for each product.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Sign types to comply with 2022 CBC, ADAAG requirements, the Americans with Disabilities Act - 1990 (ADA).

B. Field inspections required per CBC 11B703.1.1.2.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store products of this section in Manufacturer's unopened packaging until installation.

B. Maintain dry, climate controlled storage area for products.

1.6 RELATED SECTIONS

A. Finish Hardware - Section 087100.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURER'S

A. Room Signage:
   1. ASI Sign Systems (916) 924-1939, Sacramento, CA.
   2. American Graphics Inc. (800) 653-7982, Montgomery AL.
   3. Grimco Architectural Signs and Graphics, (800) 542-9941, St. Louis, MO.
   4. Or approved equal.

B. Manufacturers
   1. For exterior post and panel signs:
      a. APCO Graphics, Inc.
      b. Best Manufacturing Co.
      c. Mills Manufacturing, Inc.
      d. Or equal.

2.2 ROOM SIGNAGE, TOILET ROOM SIGNAGE, ACCESSIBLE ENTRY SIGNAGE

A. All signs are to be one piece phenolic photopolymer 1/4" thick (min), radius edges, rated for exterior use only.

B. Tactile text signs are to have California grade 2 Braille. Contracted Grade 2 Braille shall be used whenever Braille symbols are specifically required. All signage shall conform to CBC section 11B-216.2 and 11B-703.

C. Mounting: Provide mechanical mount with pre-drilled holes and spanner head counter sunk screws for specified sign thickness and mounting surface, minimum three (3) per round sign and four (4) per square or rectangular sign.

2.3 MATERIALS

A. Exterior post and panels:
   1. Sheet steel: Minimum 18 gage. One of the following zinc-coated sheet steel treated for paint adhesion.
      a. Paintbond by US Steel Corp.
      b. Zincgrip Paintgrip by Armco Steel Corp.
      c. Bethzin Gripcote by Bethlehem Steel.
      d. Paint-tile by Inland Steel Corp.
      e. Or equal.

   2. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of 6063-T5.

   3. Colored coatings: Non-fading coating, including inks and paints for copy and background colors, recommended by background manufacturers for optimum adherence to substrate. Use refiective coatings where indicated.

B. Fasteners: Metals which are non-corrosive to sign materials and mounting surface, and of types suitable for mounting conditions indicated. Factory-paint brackets in color to match exterior window frames.

C. Interior signs:
   1. Cast acrylic sheet: Cast (not extruded or continuous cast) methacrylate plastic sheet with a minimum flexural strength of 16,000 psi, complying with ASTM D 790, as follows.
      a. Transparent sheet: Colorless sheet with light transmittance of 92 percent, ASTM D 1003, in matte finish, unless otherwise indicated.

      b. Translucent sheet: White or colored translucent sheet of density required to produce uniform brightness and minimum halation effects.

      c. Opaque sheet: Colored opaque acrylic sheet in colors and finishes indicated.

D. Colored coatings for acrylic sheet: Non-fading coatings, including inks and paints for copy and background colors, recommended by acrylic manufacturers for optimum adherence to acrylic surface where applicable.

E. Vinyl die-cut and pattern cutout graphics: 3M Scotchcal Opaque, Translucent, or Scotchlite Reflective sheeting, as indicated. Use pressure-sensitive, non-yellowing, non-peeling and weather-resistant vinyl as indicated.

F. Tactile Copy and Braille (Per most current ANSI standards at time of fabrication): Tactile characters are chemically welded to sign face and computer routed in place on sign panel. Router blade to penetrate sign surface minimum as needed to ensure vandal resistance of tactile characters. Tactile characters shall be raised 1/32 in. minimum from the background. Contracted Grade 2 Braille shall be used whenever Braille symbols are specifically required. All Braille shall be fabricated with a rounded or domed dot shape, and shall meet all current applicable standards. Braille dots shall have a domed or rounded shape and shall comply with Table 11B-703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials and acronyms. Refer to CBC Section 11B703.3.

G. Adhesive: Transparent silicone glue by Dow Corning or GE. Use in conjunction with 2-sided Polyfoam tape or lsotac contact adhesive by 3M, in minimum thickness available.

H. Decal or transfer: Special printed paper or vinyl suitable for reproducing the design on substrate to which sign will be applied or painted.

I. Fasteners: Concealed fasteners unless otherwise indicated. Fabricate from metals that are non-corrosive to sign materials and mounting surface.

J. Aluminum:
   1. Sheet: ASTM B 209.

   2. Extrusions: ASTM B 221.

2.4 FABRICATION- GENERAL

A. General:
   1. Metals shall be specially selected for straightness and flatness. and be free of fabrication marks, dents, scratches, oil canning, or other imperfections, as approved by the Architect.

   2. Produce smooth, even, level sign panel surfaces, constructed to remain flat when installed within a tolerance of +1/16 in. measured diagonally from corner to corner.

3. Letter style: "Radiant Bold". Size of letters shall be as indicated on Drawings.
   a. Note that artwork for elevator lobby emergency evacuation plaques will be provided by District.

B. Laminated sign panels: Permanently laminate face panels to backing sheets, of material and thickness indicated, using manufacturer's standard process.

C. Copy application:
   1. Use Project alphabet for all copy application, unless otherwise noted on the Drawings.

   2. Space letters to conform to standards shown.

   3. Make edges of letters, numbers or symbols smooth with corners sharp and true.

   4. Forms shall be free of ticks, line waver, discontinuous curves and other imperfections.

D. Fasteners: Concealed stainless steel unless otherwise accepted by the Architect. Where exposed fasteners are indicated, finish them to match that of adjacent surfaces.

E. Linear polyurethane coatings: Provide the following, or equal:
   1. Acrylic linear polyurethane enamel: 2-part components primer: One-coat Matthews 74-793 Spray Bond at .15 to .25 mils dry film thickness or Wyandotte/AKZO Grip-Guard Wash Primer (2Afy-31284) with Grip-Guard Wash Primer Hardener ((10AFK-31284)) combined and applied in accordance with manufacturer's specifications, or equal (primer) for the application of the pre-approved and preformulated paint system.

   2. Clear sealer: Crystal-clear matte polyurethane sealers by Matthews Paint Co. or equal. Sealers are to resist rust and corrosion associated with exposure to salt air as required, and of highest quality available, applied per manufacturer's specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify that installation conditions are acceptable for product installation in accordance with manufacturers instructions.

3.2 INSTALLATION

A. Install product in accordance with suppliers instructions.

B. Install product in locations indicated using double sided mounting tape and spanner head screws as indicated. Install product level, plumb and at heights indicated and free from distortion, warp or defect adversely affecting appearance..

C. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and CBC Section 11B-703.4.1 and applicable local amendments and regulations.

D. Mounting Conditions: On metal stud framed walls, provide sold metal backing attached to studs, adequate for fastening at all corners of sign.

3.3 CLEANING, PROTECTION AND REPAIR

A. Repair scratches and other damage which might have occurred during installation.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

END OF SECTION

TOILET ACCESSORIES
SECTION 102800

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installing of all toilet accessories as shown on the drawings and as herein specified. The Conditions of the Contract and Division 1 apply to this Section as fully as if repeated herein.

1.2 RELATED SECTIONS

A. See the following Sections for related work:
   1. Section 06 1000 - Rough Carpentry.
   2. Section 09 2000 - Gypsum Board.
   3. Section 26 0000 - Basic Materials and Methods Electrical.

1.3 SUBMITTALS

A. Provide catalog cut sheets of every item furnished for this project. Submittals shall conform to Section 013300.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide and install the following at restrooms and locations shown, as listed below:
   1. Grab Bars: - Bobrick, B-5806, 36" and 48" (as indicated on plans), 1-1/2 ” diameter stainless steel grab bar. Mount at +33" with 252-30 for walls and 2583 mounting kit for partitions - one for each flange.

   2. Mirrors: Bobrick, B-290 Series, stainless steel with angle frame 24" x 36", or as indicated on the Drawings.

   3. Toilet Paper Dispensers: Bobrick, B-3888, recessed mounted multi-roll toilet tissue dispenser serving accessible toilet stalls and Staff Restrooms. Bobrick B-2888, surface mounted multi-roll toilet tissue dispenser serving non-accessible toilet stalls.

   4. Sanitary Napkin Disposal: Bobrick, B254, surface mount stainless steel at non-accessible stalls and B-353 recessed mount stainless steel at accessible toilet stalls and rooms. Provide at locations shown on Drawings.

5. Paper Towel Dispenser - Bobrick, B262 (surface mount).

6. Electric Hand Dryers, World Dryer, Stainless Steel, Polished, #L-972

7. Seat Cover Dispenser - Bobrick B-221 (2" depth), surface mount.

8. Soap Dispenser - Provided by Owner, installed by Contractor.

B. Undersink insulation system at sinks:
   1. Provide and install “Trap Gear” Kit for insulating P-trap and hot and cold angle valve assemblies at accessible sinks and lavatories. Class A insulating material with 25 flame spread and 450 smoke index complying with ASTM E84-07, by Plumberex Specialty Products Inc.

PART 3 - EXECUTION

3.1 TEMPLATES

A. Provide templates and/or Dimensional Data to the General Contractor for coordination of blocking locations. See details for additional blocking requirements.

B. Coordinate locations of electric operated hand dryers with electrician.

3.2 INSTALLATION

A. Work is to be performed by skilled craftsmen. All installations shall be theft proof. All items shall be installed per manufacturers written installation standards.

B. All dispensers shall be mounted at heights indicated on the drawings.

END OF SECTION

FIRE EXTINGUISHERS AND CABINETS
SECTION 102813

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installation of all fire extinguishers and cabinets as shown on the drawings or as specified herein.

B. Related Work:
   1. Section 061000 - Rough Carpentry.
   2. Section 092000 - Gypsum Board Systems.

C. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 SUBMITTALS

A. Refer to Section 013300.

B. Manufacturer's data: Submit complete data on extinguishers and cabinets.

C. Shop Drawings: Submit shop drawings showing dimensions for all necessary openings, backing, and manufacturer's details for anchorage.

1.3 CODES AND STANDARDS

A. Comply with all pertinent codes and regulations. All firefighting devices shall be approved by Underwriter's Laboratories, Inc., bear UL label, and be approved by Fire Marshal.

PART 2 - PRODUCTS

2.1 EXTINGUISHERS

A. Cabinet Extinguishers: J.L. Industries;
   1. Cosmic 5E, #3A-40B:C (Class A, B, C fires; multi-purpose chemical) see Plan for cabinet spec.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fire extinguishers and cabinets where indicated on Drawings and in accordance with all pertinent regulations and manufacturer's recommendations, setting handle extinguisher at no more than 48" above finish floor, and anchoring all components firmly in place.

3.2 SERVICE

A. Determine approximate completion, date of Work and then inspect, charge, and tag fire extinguishers not more than 10 days before nor less than one day before actual completion date of Work.

END OF SECTION

KEY STORAGE VAULT
SECTION 104116

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Exterior key storage vault - Knox box.
   2. Interior key storage cabinets.
   3. Supplementary parts and components, such as inserts, clips, anchors, fasteners, and other miscellaneous supports required for a complete installation.

1.2 SUBMITTALS

A. Data: Manufacturer's data for items specified herein.

PART 2 - PRODUCTS

2.1 KEY STORAGE VAULT

A. 3261 Series 4-inch by 5-inch by 3-1/4-inch deep by Knox Co. (800-552-5669) at locations shown on the Drawings.

B. 1803 Key cabinet 19 ½ " tall x 13 ½" wide x 4 3/4" deep enamel 16 GA. steel lockable cabinet with 120 key capacity by KIDDE in custodial room.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 COORDINATION

A. Coordinate installation of building specialties with the work of related trades for necessary rough-in work, backing, and anchorage. Deliver backing and embedments, including templates and instructions for their installation, to affected trades before related construction begins.

3.3 INSTALLATION

A. Install building specialties in compliance with their manufacturer's instructions and recommendations with flush, hairline joints, plumb, level and secured to their supports.

3.4 FIELD QUALITY CONTROL

A. Remove protective coverings, where applicable, and clean building specialties.

B. Lubricate, test and adjust moving parts to operate easily, free from warp, twist or distortion.

C. Touchup damaged finishes, where the results are acceptable to the Architect, otherwise replace with new components.

END OF SECTION

PROJECTION SCREENS
SECTION 115213

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Projection screens.

B. Related Sections:
1. Section 09 2000 - Supports for Plaster and Gypsum Board: Backing in wall or for mounting projection screens.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate projection screen work as required with installation of related work.
2. Coordinate projection screen work with wall or partition section for installation of concealed blocking or anchor devices.

1.03 SUBMITTALS

A. Product Data.

B. Shop Drawings: Show locations and methods of attachment of screens[and wiring diagrams and locations of control switches for electrically controlled screens].

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged products in original containers with seals unbroken and labels intact until time of use.

B. Store delivered products in clean, safe, dry area.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

A. Projection Screens, Manually Operated:
1. Description:
a. Screen:
1) High contrast white surface on flame retardant and mildew resistant fiberglass fabric. Screen shall have 2 inch black masking borders and 6" of black extra drop.

2) Size:69" H x 92" W (min)

b. Roller: Camlok roller system standard with manufacturer. Bottom of fabric shall be mounted into a metal strip in a tubular steel slat. Ends of slats shall be protected by spring steel inner caps and plastic outer caps.

c. Case: Two piece design made of extruded aluminum with white, lightly texture powder finish. Case to have end caps made of high strength plastic.

d. Screen to be equipped controlled screen return (CSR) to control return speed of screen into case.

e. Extension Wall Brackets: Provide as required to clear chalkboard.

2. Product: Da-Lite Screen Co., Inc. Designer Contour CSR Model 92722 or equal, with 38" pull rod.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine construction to support, adjoin, or otherwise contact and verify that:
1. Dimensions are correct.
2. Adequate support will be available at time of installation.
3. Supports are available where required by weight of items
4. Setting conditions are dry, clean, and otherwise proper for installation.

B. Do not install items until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install projection screens in accordance with manufacturer's written instructions and reviewed Shop Drawings.

B. Mount case so screen when lowered is centered in room as shown on the Drawings.

C. Securely anchor to supporting substrate.

D. Install to produce smoothly operating screen with plumb and straight vertical edges and plumb and flat viewing surfaces when lowered.

3.03 ADJUSTING

A. Adjust installed unit for smooth and balanced operation.

3.04 CLEANING

A. Remove protective coverings from finished surfaces. Clean surfaces and components ready for inspection.

3.05 PROTECTION

A. Protect projection screens from damage before, during and after installation.

END OF SECTION

ROLLER SHADES
SECTION 12 2413

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Manually operated sunscreen and room darkening roller shades.

1.2 RELATED SECTIONS

A. Section 06 1000 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.

B. Section 09 2000 - Gypsum Board Assemblies: Coordinate with gypsum board assemblies for installation of shade pockets, closure and related accessories.

1.3 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 70 - National Electrical Code.

C. NFPA 701-99 - Fire Tests for Flame-Resistant Textile and Films.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 3300.

B. Submit Environmental Certification and Third Party Evaluation per Section 1.52 Qualifications.

C. Product Data: Manufacturer’s data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
   3. Storage and handling requirements and recommendations.
   4. Mounting details and installation methods.

D. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
   1. Prepare shop drawings on Autocad or Microstation format using base sheets provided electronically by the Architect.

E. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

F. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

H. Maintain Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified below. Initial submittals, which do not include the Environmental Certification, below will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.

E. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.

F. Recycled Characteristics: Provide documentation that the sahde cloth can and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material, without down cycling. Certifying that this process is currently underway and will be utilized for this project.

G. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.

H. Mock-Up: Provide a mock-up (manual shades only) of one roller shade assembly for evaluation of mounting, appearance and accessories.
   1. Locate mock-up in window designated by Architect.
   2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

A. Roller Shade Hardware and Chain: Manufacturer's standard non-depreciating twenty-five year limited warranty.
   1. EcoVeil standard non-depreciating 10-year limited warranty.

B. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: MechoShade Systems, Inc.: 42-03 35th Street, Long Island City, NY 11101, www.mechoshade.com

2.2 APPLICATIONS/SCOPE

A. Roller Shade Schedule:
   1. Shade Type 1: Manual operating, chain drive, sunscreen roller shades all windows. Roller Shade Model: Mecho 5 Slimline.

2.3 SHADE CLOTH

A. Environmentally Certified Shadecloth: MechoShade Systems, Inc., EcoVeil group, 0950, fabricated from TPO for both core yarn and jacket, single thickness, non-raveling 0.030 inch (0.762 mm) thick fabric.
   1. Type 1:
      a. Weave: 5 percent open basket weave sunscreen.
      b. Color: Ecoveil 1354 Black/Brown or approved equal.

2.4 SHADE BAND

A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
   1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
   2. Shade band and Shade Roller Attachment:
      a. Use extruded aluminum shade roller tube of diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
      b. Provide for positive mechanical engagement with drive/brake mechanism.
      c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable/replaceable with a “snap-on” “snap-off” spline mounting, without having to remove shade roller from shade brackets. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.5 SHADE FABRICATION

A Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
   1. Bottom hem weights.
   2. Concealed hemtube.
   3. Exposed hemtube.
   4. Exposed blackout hembar with light seal.
   5. Exposed blackout hembar with polybond seal.

C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

D. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located and aligned with vertical window mullions. Furnish battens in place of plain seams when the width, height, or weight of shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands. No railroading of fabric will be permitted without the permission of the Architect.

E. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.

2.6 COMPONENTS

A. Shade devices required to be accessible shall comply with CBC 11B308 & 309.

B. Access and Material Requirements:
   1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
   2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
   3. Use only Delrin engineered plastic by DuPont for all plastic components of shade hardware. Styrene based plastics, and/or polyester, or reinforced polyester will not be acceptable.

C. Manual Operated Chain Drive Hardware and Brackets:

1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive and brackets. Universal offset shall be adjustable for future change.
2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment form the first to the last shade band.
5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degree total offset.
6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.
7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade. Utilize ceiling bracket at room #117 and wall mount bracket at all other locations.
8. Drive Bracket/ Brake Assembly:
    a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room darkening side/ sill channels, center supports and connectors for multi-banded shades.
    b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
    c. The brake shall be an over-unning clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
    d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
    e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.

D. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.7 ACCESSORIES

A. Fascia:
   1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
   2. Fascia shall be able to be installed across two or more shade bands in one piece.
   3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
   4. Provide bracket/fascia end caps where mounting conditions expose outside of roller shade brackets.
   5. Notching of Fascia for manual chain shall not be acceptable.
   6. Color: Clear Anodized.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.3 INSTALLATION

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearance for window operation hardware.

B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

FIRE-SUPPRESSION SPRINKLER SYSTEMS
SECTION 21 1300

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Pipes, fittings, and joining methods.
2. Fire-protection valves.
3. Trim and drain valves.
4. Specialty valves.
5. Fire-department connections.
6. Specialty fittings.
7. Sprinklers.
8. Alarm devices.

1.2 SYSTEM DESCRIPTIONS

A. NFPA 13 System: System designed and installed in accordance with NFPA 13 as amended by the California Building Code and the California Fire Code as listed on the cover sheet of the project documents.

B. Wet-Pipe Sprinkler System: Automatic sprinkler are attached to piping containing water and that is connected to water supply. Water discharges immediately from spinklers when they are opened.

1.3 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

B. Sprinkler system(s) design shall be approved by Division of the State Architect (DSA).
1. Margin of safety for available water flow and pressure shall be 10 percent, including losses through water-serving piping, fittings, valves, and backflow preventers.
2. Sprinkler Occupancy Hazard Classifications:
   a. Office and Public Areas: Light Hazard.
   b. Utility Areas: Ordinary Hazard, Group 1.
   c. Storage Areas: Ordinary Hazard, Group 2.
3. Minimum Density for Automatic-Sprinkler Piping Design:
   a. Light Hazard Occupancy: 0.10 GPM per sq. ft.
   b. Ordinary Hazard, Group 1 Occupancy: 0.15 GPM per sq. ft.
   c. Ordinary Hazard, Group 2 Occupancy: 0.20 GPM per sq. ft.

4. Maximum Protection Area per Sprinkler: Per UL listing.
5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13.

C. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13.

1.4 SUBMITTALS

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

B. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details.
1. Wiring Diagrams: For power, signal, and control wiring.

C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations.

D. Welding Certificates.

E. "Contractor's Material and Test Certificate for Aboveground Piping."

F. "Contractor's Material and Test Certificate for Underground Piping."

G. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:
1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test conducted within twelve months.
a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports.

B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
   1. NFPA 13 2022 with 2022 CFC amendments, “Installation of Sprinkler Systems.”
   2. NFPA 24 2022 with 2022 CFC amendments, “Installation of Private Fire Service Mains and Their Appurtenances.”

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in “Piping Schedule” Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.2 PIPE AND FITTINGS

A. Standard Weight (schedule 40) and Light Weight (schedule 10), Black-Steel Pipe: ANSI/ASTM A135, A795, A53 or B36, Type E, Grade A or B; or ASTM A135; or ASTM A795. Pipe ends may be factory or field-formed to match joining method.

B. Black-Steel Pipe Nipples: ASTM A733, made of ASTM A53/A53M, standard-weight, seamless steel pipe with threaded ends per ANSI 1.20.1 (B2.1).

C. Malleable-Iron Threaded Fittings: ANSI B16.3, made of ASTM A536 malleable iron, with threaded ends per ANSI 1.20.1 (BS.1).

D. Cast-Iron Threaded Fittings: ANSI B16.4, made of ASTM A126 cast iron, with threaded ends per ANSI 1.20.1. (B2.1).

E. Cast-Iron Flanges: ANSI B16.4, made of ASTM A125 cast iron, Class 125.

F. Steel Welding Fittings: ASTM A53, Type E, Grade A or B; or ASTM A135; or ASTM A795.

G. Grooved-Joint, Steel-Pipe Appurtenances:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, **the following:**
      a. Victaulic Company.
      b. Tyco Fire Suppression and Building Products.
      c. Anvil International.
   2. Pressure Rating: 175 psig minimum.
   3. Grooved-End Fittings for Steel Piping: ASTM A 536, ductile-iron casing; with dimensions matching steel pipe.

2.3 PIPING JOINING MATERIALS

A. Groove-End-Pipe Coupling for Steel Piping: Rigid pattern, unless otherwise indicated, for steel-pipe dimensions. ASTM A 536, ductile-iron housing, EPDM-rubber gasket, and bolts and nuts.

B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic and asbestos free.
   1. Class 125, Cast-Iron Flat-Face Flanges: Full-face gaskets.

C. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

D. Welding Filler Metals: Comply with AWS D10.12M/D10.12 welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 LISTED FIRE-PROTECTION VALVES

A. General Requirements:
   1. Valves shall be UL listed.
   2. Minimum Pressure Rating: 175 psig.

B. Backflow preventer: Double check type, Ames or equal.

C. Indicating Valves:
   1. Body material: Cast or ductile iron.
   2. End connections: Flanged or grooved.

D. Check Valves: Victaulic, or equal.
   1. Type: Swing check.
   2. Body material: Cast or ductile iron.
   3. End connections: Flanged or grooved.

2.5 TRIM AND DRAIN VALVES

A. Angle, check and globe trim valves for fire sprinkler service: NIBCO, United Brass, or equal.

2.6 SPECIALTY VALVES

A. See Drawings.

2.7 FIRE DEPARTMENT CONNECTIONS

A. See Drawings.

2.8 SPECIALTY FITTINGS

A. See Drawings.

2.9 SPRINKLERS

PRODUCT DATA SHEET 1-2

A. Sprinkler heads shall glass bulb.

B. Sprinkler heads shall be color coded.

C. Sprinkler heads in areas with exposed piping shall be standard upright or pendant type. Sprinklers in finished ceilings to be chrome with white escutcheons. T-bar ceilings to receive semi-recessed sprinklers. Ceiling with surface mounted lights allowed to be pendent with 401 style 2 piece escutcheons.

D. Sprinkler heads in corrosive environments (i.e., all chemical rooms) shall have a white coating applied at the factory. Sprinkler heads in all other areas allowed to have standard finishes.

2.10 ALARM DEVICES

A. Water flow indicator for local alarm: UL approved suitable for variable pressure, complete with instantaneous recycling retard and electrical contacts for alarm system (number as required). Potter Electric Signal, or equal.

PART 3 - EXECUTION

3.1 WATER-SUPPLY CONNECTORS

3.2 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
   1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
   2. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
   3. Retain first paragraph below if piping is required to withstand seismic design loads.
   4. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.

5. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
6. Install unions adjacent to each valve in pipes NPS 2 and smaller.
7. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
8. Install “Inspector’s Test Connections” in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
9. Install sprinkler piping with drains for complete system drainage.
10. Install sprinkler control valves, test assemblies, and drains.
11. Install alarm devices in piping systems.
12. See Editing Instruction No. 3 in the Evaluations for cautions about pipe hangers.
13. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
14. Install pressure gages on riser.
15. Install sleeves for exposed piping penetrations of walls, ceilings, and floors.
16. Retain first paragraph below for piping that penetrates an exterior concrete wall or concrete slab.
17. Install sleeve seals for piping penetrations of concrete walls and slabs.
18. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 VALVE AND SPECIALTIES INSTALLATION

A. Installed listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

3.4 SPRINKLER INSTALLATION

A. Coordinate this article with Drawings.

B. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Test and Inspections:
   1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
   2. Flush, test, and inspect sprinkler systems according to NFPA 13, “Systems Acceptance” Chapter.
   3. Coordinate with fire-alarm tests. Operate as required.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.6 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

END OF SECTION

BASIC MECHANICAL MATERIALS AND METHODS
SECTION 22 0500

PART 1 - GENERAL

1.1 INCLUSIONS

A. This section applies for al Division 222 and 23 sections. All conditions and materials are pertinent to the other sections as if repeated in those sections.

B. Furnish and install any incidental work not shown or specified which is necessary to provide a complete and workable system.

1.2 DRAWINGS

A. Examine all Drawings prior to bidding of work and report any discrepancies in writing to the Architect.

B. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions will not always permit their installation in the location shown. The Mechanical Drawings show the general arrangement of all piping, ductwork, equipment, etc., and shall be followed as closely as existing conditions, actual building construction and the work of other trades will permit. The Architectural and Structural Drawings shall be considered a part of the work insofar as these Drawings furnish the Contractor with information relating to design and construction of the building. Architectural Drawings shall take precedence over Mechanical Drawings. Because of the small scale of the Mechanical Drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly providing such fittings, valves and accessories as may be required to meet conditions. When job conditions do not permit installation of equipment, piping, ductwork, etc., in the locations shown, it shall be brought to the Architect’s attention immediately and the relocation determined in a joint conference. Contractor will be held responsible for the relocation determined in a joint conference. Contractor will be held responsible for the relocation of any item without first obtaining the Architect’s approval. Contractor shall remove and relocate such items at his own expense if so directed by the Architect.

C. Execute work mentioned in the Specifications and not shown on the Drawings, or vice versa, the same as if specifically mentioned in both.

1.3 CODES

A. Provide all work and materials in full accordance with the latest rules and regulations of the California Code of Regulations (CCR), Title 21, Title 22, and Title 24, as applicable, Safety Orders of the Division of Industrial Safety, (Cal OSHA); the California Electric Code; The California Plumbing Code; the California Building Code; California Mechanical Code; State Fire Marshal; and other applicable laws or regulations. Nothing in these plans or specifications is to be construed to permit work not conforming to these codes. Furnish without extra charge, any additional material and labor required to comply with these rules and regulations.

B. Where material or equipment is specified to conform to standards such as American Society of Testing and Materials (ASTM), Underwriters' Laboratories, Inc., (UL), American National Standards Institute (ANSI) and the like, it shall be assumed that the most recent edition of the standard in effect at the time of bid shall be used.

1.4 FEES AND PERMITS

A. Procure and pay for all permits and licenses required.

1.5 FRAMING, CUTTING AND PATCHING

A. Special framing, recesses, chases and backing for work of this section, unless specified otherwise, is covered under other sections. Be responsible for proper placement of all pipe sleeves, hangers and supports and location and sizing of openings for work of this section.

1.6 SUBSTITUTIONS AND MATERIAL LIST

A. Product names are used as standards of quality, items furnished as standards on specified equipment shall be furnished on all substituted equipment at no extra cost to the contract regardless of disposition of submittal data; other materials or methods shall not be used unless approved in writing by the Architect. The burden of proof as to the equality of any proposed material shall be upon the Contractor; Architect's decision is final. Only one request for substitution shall be considered for each item. Equipment capacities specified are minimum acceptable. Submittals will not be accepted until compliance with the requirements of Contract Documents has been confirmed by the Contractor.

B. Unless stipulated otherwise in General Conditions and Division 1, submit a list of 7 copies of materials for approval within 35 days after the award of the Contract. It shall be accompanied by shop drawings, pump performance curves, fan curves, and other pertinent data, showing the size and capacity of the proposed materials. All materials to be used, whether substitutions or not, shall be listed in the order in which they appear in the specifications.

C. Any mechanical, electrical, structural or other changes required for the installation of any approved substituted equipment shall be made to the satisfaction of the Architect and without additional cost to the Owner. Approval by the Architect of the substituted equipment and/or dimensional drawings does not waive these requirements. Upon request, submit drawings of mechanical equipment spaces showing substituted equpment before installation.

D. Review of material shall not be construed as authorized any deviations from the specifications unless the attention of the Architect has been directed to the specific deviations.

E. Furnish to the Project Representative, upon request, complete installation instructions on all materials and equipment before starting installation of same.

F. Submittals shall bear the specification reference or drawing location where they are specified. Submittals shall not be accepted in incomplete form. Submittals shall be organized into booklets for each specification section and submitted in indexed loose leaf binders with notation when it is a deviation from the specifications.

G. Have fire damper installation instructions available at the sire during construction for use by the inspector.

1.7 SITE CONDITIONS

A. Information on the drawings relative to existing conditions is approximate only, Deviations found necessary during progress of construction to conform to actual conditions, as approved by the Architect, shall be made without additional cost to the Owner. The Contractor shall be held responsible for any damage caused by existing services. Promptly notify the Architect if services are found which are not shown on drawings.

1.8 GUARANTEE

A. Repair or replace any defective work, materials or part which may appear within 1 year of the date of acceptance. This shall include damage by leaks.

B. On failure to comply with the above guarantee within a reasonable length of time after notification is given, the Architect shall have the repairs made at the Contractor's expense.

1.9 MAINTENANCE AND OPERATING INSTRUCTIONS

A. Instruct the Owner's authorized representatives in operation, adjustment and maintenance of all mechanical equipment and systems. Provide three copies of certificate signed by Owner's representatives attesting to their having been instructed.

B. Furnished three complete sets of operating and maintenance instructions bound in a hardback binder and indexed. Start compiling the data upon approved of list of materials. Final observation will not be made until booklets are approved by Architect.

C. These sets shall incorporate the following:
   1. Complete operating instructions for each item of heating, ventilating, air conditioning and plumbing equipment.
   2. Test data and air and water balancing reports as specified.
   3. Typewritten maintenance instructions for each item of equipment listing in detail the lubricant to be used, frequency of lubrication, inspections required, adjustment, etc.
   4. Manufacturer's bulletins with parts numbers, instructions, etc., for each item of equipment, properly stripped and assembled.
   5. Temperature control diagrams and literature.
   6. A complete list or schedule of all major valves giving the number of the valve, location and the room or area controlled by the valve. Identify each valve with a permanently attached metal tag stamped with number to match schedule. Post list in frame under plastic on wall in mechanical room or where directed.

1.10 SCHEDULE OF WORK

A. All temporary connections required to maintain services, including adequate heat and cooling, during the course of this Contract shall be made without additional cost to the Owner. The normal function of the building must not be interrupted; notify the Owner seven (7) days in advance before disturbing any service.

1.11 RECORD DRAWINGS

A. Upon completion of the work and as precedent to final payment, deliver to the Architect originals of all Drawings showing the work exactly as installed. Also deliver to the Architect on complete set of reproducibles of all Drawings showing the work exactly as installed. All Record Drawings shall be signed by the Contractor verifying their accuracy.

1.12 DELIVERY AND STORAGE

A. All equipment, ducting and piping delivered to site shall be protected from the weather, humidity and temperature variations, dirt and dust and other contaminants.

PART 2 - PRODUCTS (OR MATERIALS)

2.1 GENERAL

A. Materials or equipment of the same type shall be of the same brand wherever possible. All materials shall be new and in good condition.

2.2 ELECTRIC MOTORS

A. Shall be Allis-Chalmers, General Electric, Gould, Lincoln, or equal, selected for quiet operation. Furnish motors with splashproof or weatherproof housings, where required or recommended by the manufacturer. Match the nameplate voltage rating with the electrical service supplied. Check electrical drawings. Provide a transformer for each motor not wound specifically for system voltage. The minimum efficiencies shall be as defined by IEEE 112 Test Method B and NEMA Standard MGI-112-53B.

2.3 MOTOR STARTERS

A. Furnish starters with the proper size thermal overload units, ambient compensated. Provide 3-phase motor starters with 3-phase overloads. Magnetic starters shall have Hand-Off-Automatic switches and control transformers furnished integral with the starter when starter is serving an automatically controlled motor. Starers shall be Square D, Allen Bradley, or equal, in NEMA Type I enclosure inside and NEMA Type IIIR outside as required. Minimum starter size shall be 1.

2.4 VALVES AND FITTINGS

A. Valves: Shall be DeZurik, Crane, Nibco, Kennedy, or equal.
   1. Gate Valves thru 2-1/2" -- Crane #428, Kennedy #427, Nibco #T-595.
   2. Gate Valves 3" thru 4" -- Crane #460 or #461, Nibco #F-617.
   3. Gate Valves 5" and Larger – Demco NE, DeZurik #660 or Norris R3310 with throttling handle.
   4. Check Valves 2-1/2" and smaller – Muessco #203BP, Crane #36, Nibco #T-413.
   5. Check Valves 3" and larger – Muessco # AP, Crane #373.
   6. Gas Valves – DeZurik #425SIRS-49.
   7. Gas Cocks at Appliances – ConBra Co. 50 Series.
   8. Gas Pressure Regulators – Reliance #1803 or #2003, Rockwell or equal with internal relief for LPG.
   9. Valves in the ground shall be Crane #2487-1/2-0, Mueller #A-2380-21 or equal, and shall be installed in Christy Concrete Products #F1 valve box with C210 C.I. lid, Books #1-RT box with #1-RT C.I. lid or equal. Nut operated valves in Alhambra Foundry Co. #A-3004 or equal access boxes marked for service. Provide a tee handle wrench for each size. Set access boxes in 4" thick concrete pad, trowel smooth and edge, set flush with grade. Water service valve in ground

shall be AWWA, 200 psi, nut operated.

10. Valves in copper lines shall be furnished with adapters, or may be solder joint type of equal quality to screw type valves.
11. OS&Y Gate – Crane #459 thru 2", #467 for 2-1/2" and larger; Demco NE-H for 4" and larger.
12. Ball Valves – Worcester #411TS, Nibco #T-560, 2" maximum (use for air, vacuum, steam and high pressure gases).
13. Vacuum Breakers, Makeup – Cla Val Co. Type RP, Watt 909, reduced pressure type backflow preventer.
14. Vacuum Breakers, General – SMR #P-701 (½" to 1"); #P-711 (1-1/4" to 2"); #P-714 (2" and larger) with check valves, pressure type. SMR #H-400 (½"); #H-403 (3/4") atmospheric type.
15. Flow Control Valves – Bell & Gossett Circuit Setter Plus, Armstrong CBV, or equal thru 3", Circuit Sensor with hand valve above 3". Illinois Series 5000 will be acceptable thru 2".
16. Balance Valves – Rockwell 142 thru 2", 143 above 2"; Walworth 1796 thru 2", 1797F-1718F above 2".
17. Provide gate or globe valves on inlet of each water heater and inlet and outlet of each pump whether shown or not.
18. Butterfly Valves: Keystone 100, Crane Monarch 2200 or equal.

B. Unions and Flanges:

1. Steel 2" and smaller – 150# screwed black or galvanized malleable iron, match pipe, ground joint, brass-to-iron seat.
2. Steel 2-1/2" and larger – 150# black flange union, flat faced, full gasket.
3. Copper or brass pipe or tubing 2" or smaller – 150# cast bronze ground joint, bronze-to-bronze seat with copper-to-copper end connections.
4. Copper or brass pipe or tubing 2-1/2" and larger – 150# brass flange union, flat faced, full gasket.
5. Gaskets - Hot and cold water – Garlock Style 320D.
6. Flange Bolts – Open-hearth bolt steel, square heads with cold pressed hexagonal nuts, cadmium plated in ground. Provide copper plated steel bolts and nuts or brass bolts and nuts for brass flanges.

2.5 HANGERS AND SUPPORTS

All hanger components shall be Grinnell, Elcen, Super-Strut or equal.

A. Vertical Piping: Grinnell #261, Elcen #39, or equal, clamps attached to the pipe above each floor, to rest on the floor: Provide with two wraps of 10 mil PVC tape on copper tubing. Provide additional support at base of cast iron risers.

B. Individually Suspended Piping: Super-Strut C-711, Elcen #90, or equal complete with threaded rod. Provide insulation shield and hangers outside on all insulated water and steam piping.

Pipe Size	Rod Size
2" and smaller	3/8"
2-1/2 to 3-1/2"	½"
4" to 5"	5/8"
6"	3/4"
8 to 12"	7/8"

C. Trapeze Suspension: Super-Strut, Elcen, or equal, 1-5/8" width channel in accordance with manufacturer's published load ratings. No deflection to exceed 1/180 of a span.

D. Trapeze Supporting Rods: Shall have a safety factor of 5, securely anchor to building structure.

E. Pipe Straps: Super-Strut C-702, Speed Strut #650, or equal through 8" for ferrous pipe; C-701, Speed Strut #751, or equal, through 6" for copper pipe.

F. Concrete Inserts: Uni-Strut P-3200 continuous inserts or M24 spot insert.

G. Pipe Rollers: Super-Strut C-728 up to 8"; C-721for 10" and 12".

H. Above Roof: H frame made from Uni-Strut hot-dipped galvanized 1-5/8" single or double channel with P-2072A or P-2073A foot secured to roof and surrounded with waterproof pitch pocket.

I. Steel Connectors: Beam clamps with retainers.

J. Wood Connectors: Angle clips with through bolts in shear; no lag screws in tension.

2.6 SERVICE MARKERS

A. 4" round by 30" long concrete marker, Haley Mfg., Co., Pinkerton, or equal with engraved brass identification plate.

2.7 PIPE PROTECTION

A. Polyethylene Coating: Extruded polyethylene coating, X-Tru-Coat, or field wrap as in B, Raychem "Thermofit" polyethylene sleeve joints, or field wrap as in B.

B. Tape Wrap: Pressure sensitive polyvinyl chloride tape, “Trantex #V-10 or V-20", “Scotchrap #50", Slipknot 100, or equal, with continuous identification. Tape shall be a minimum of 20 mils thick for fittings and irregular surfaces, 2 wraps, 50% overlap, 40 mils total thickness. Tape shall be laminated with a suitable adhesive. Widths as recommended by the manufacturer for the pipe size. Wrap 50'-0" or longer sections of piping with an approved wrapping machine.

C. Pabco Wrap: Pabco Specifications #D-40-240K double wrap, in accordance with manufacturer’s recommendations or PVC as in B. Lap pipe wrap a minimum of 1/4" and stagger the second layer. All Pabco pipe wrapping shall be done by the manufacturer’s agent and not by the Contractor, except the field joints.

D. Field Joints and Fittings: Pabco double wrap and Polyvinyl Chloride type as above. Provide at least 2 thicknesses of tape over the joint and extend a minimum of 4" over adjacent pipe covering. Build up with primer to match adjacent covering thickness. Width of tape on fittings shall not exceed 2". Tape shall adhere tightly to all surfaces of the fittings, without air pockets.

2.8 ACCESS DOORS

A. Milcor, Newman, or equal, with concealed hinges, screwdriver locks, prime coated with rust inhibitive paint, and style of door to suit ceiling or wall construction. Access doors in acoustical tile ceilings shall be “Sesame” with tile recess. Doors shall be 14 gage C.R. steel and shall be 22" x 30", 24" x 24" in tile ceiling, unless otherwise noted or required, fire rated to match rating of surface in which installed. Doors in walls of toilet rooms, shall be stainless steel.

2.9 FLASHING

A. All flashings shall be made of four pound sheet lead with 8" minimum skirt, Semco S1100-2 or S1100-4, Stoneman #1110-2 or 1110-4, or equal, and counter flashing.

PART 3 - EXECUTION

3.1 ELECTRICAL REQUIREMENTS

A. Provide adequate working space around electrical equipment in compliance with the California Electric Code. Coordinate Mechanical Work with Electrical Work to comply.

B. Furnish and set in place all motors. Furnish necessary control diagrams and instructions for controls. Before permitting operations of any equipment which is furnished, installed or modified under this section, review all associated electrical work including overload protection devices and assume complete responsibility for correctness of electrical connections and protective devices.

C. Motors and control equipment shall conform to Standards of National Electrical Manufacturer's Association. All equipment and connections exposed to the weather shall be NEMA IIIR with factory wired strip heaters in each starter enclosure, and temperature control panel to inhibit condensation.

D. All power wiring, conduit, fuses, thermal overloads, and disconnect switches, and connection of all motors are under electrical work, Division 26. All wiring and conduit associated with the temperature control and indicating system is included in this section. Run all wiring in conduit in accordance with Division 26.

E. Electric Motors: All motors shall be rated for continuous operation at 115% of nameplate amperage throughout the entire operating cycle. Motors found exceeding the nameplate amperage shall be promptly replaced at no cost to the Owner. Horsepowers shown are minimum and shall be increased as necessary to comply with above requirements.

F. Motor Starters: Furnish magnetic motor starts for all equipment furnished under this section except those shown in motor control centers.

G. Provide OSHA label indicating device starts automatically.

3.2 PRIMING AND PAINTING

A. Perform all priming and painting on the equipment and materials as specified herein.

B. 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 coast of Rust-Oleum #769 #769 primer and one coat of #960 primer. Items to be primed shall be properly cleaned by effective means, free of rust, dirt, scale, grease, wax and other deleterious matter. 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.

C. Finish Painting:

1. Equipment and machinery located in fan rooms, equipment rooms and similar purpose rooms and at other locations when specified, shall be furnished with a standard factory-applied beaked enamel finish in approved uniform colors. At the Contractor's option, equipment and machinery may be field-painted hereunder with two coats consisting of an air-dried synthetic industrial enamel undercoater and enamel as approved over the shop or factory-applied primer. All exposed ferrous metals, including piping located in fan rooms, equipment rooms, and boiler rooms shall be painted one coat of an approved paint, of color selected, over the primer. Canvas insulation jackets, including piping located in fan rooms, equipment rooms, and boiler rooms shall be painted two coats of paint of color selected. Mechanical Work, except as described herein, occurring in rooms or

spaces required to be painted on walls, and/or ceilings will be finish painted as described above for equipment and machinery in equipment rooms.

D. See Painting Section for detail requirements and finishes.

3.3 EXCAVATING

A. Perform all excavating required for work of this section.

B. Unless shown otherwise, provide a minimum of 3'-0" above top of pipe to finished grade outside so as to be below frost line and a minimum of 1'-0" under the building from bottom of slab. Trim trench bottom by hand or provide a 4" deep minimum bed of sand to provide a uniform grade and firm support throughout entire length of pipe. For cement asbestos pipe, insulated pipe, glass pipe, or plastic pipe, bed the pipe in sand.

C. Maintain all warning signs, barricades, flares and red lanterns as required.

D. For all trenches 5' or more in depth, shoring, bracing, slipping or other provisions shall be made for worker protection from the hazard of caving ground during the excavation of such trenches in accordance with Cal OSHA.

3.4 BACKFILLING

A. Backfill shall comply with applicable compaction provisions of Division 2 of these specifications.

B. Backfill plastic pipe and insulated pipe with sand for a minimum distance of 12" above the top of the pipe. Compact sand backfill by impact tamper and concrete vibrator.

C. Except under existing or proposed paved area, walks, roads, or similar surfaces, and in cases where rock is encountered, backfill more than 1'-0" above the top of the pipe shall be made using suitable excavated material or other approved material as necessary. Place the backfill in 8" layers, measured before compaction, and compact with impact hammer to at least 95% relative compaction per ASTM D1557.

D. Entire backfill for excavations under existing or proposed pavements, walks, roads, or similar surfaces, under new slabs on grade and where rock is encountered, shall be made with clean sand compacted withe mechanical tamping equipment to at least 95% relative compaction per ASTM D1557. Remove excess earth from site or deposit on site if so directed by the Architect.

E. Replace or repair to its original condition all sod, concrete, asphalt paving, or other materials, including landscape sprinklers, disturbed by the trenching operation. Repair within the guarantee period as required.

3.5 THRUST BLOCKS

A. Provide concrete anchors or thrust blocks on all cast iron and cement asbestos water and forced main sewer lines in the ground. Install thrust blocks at all changes indirection and at all connections to the mains 2" and larger. Form thrust blocks by pouring concrete between the pipes and trench wall. They shall be adequate in size and placed to take all thrusts created by the maximum internal water pressure.

3.6 INSTALLATION OF PIPING SYSTEMS

A. General:
   1. All piping shall be concealed unless shown or otherwise directed.
   2. Where piping or conduit is left exposed within a room, the same shall be run true to plumb, horizontal or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor or ceiling surfaces.
   3. Horizontal runs of pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance. The clearance shall not be less than 6'-8" without written approval from the Architect.
   4. Minor changes in locations of equipment, piping, ducts, etc., from locations shown shall be made when directed by the Architect at no additional cost to the Owner providing such change is ordered before such items of work, or work directly connected to same are installed and providing no additional material is required.
   5. Grade all water-circulating piping, flow and return, to provide for drainage of lines and elimination of air.
   6. Close ends of pipe immediately after installation. Leave closure in place until removal is necessary for completion of installation.
   7. Each piping system shall be thoroughly flushed and proved clean before connection to equipment.
   8. Pipe the discharge of each relief valve, air vent, backflow preventer and similar device to floor sink or drain.
   9. Install exposed polished or enameled connections with special care showing no tool marks or threads at fittings.
   10. Tracer Wires (for Non-Metallic Pipe):
      a. Install tracer wire where shown for non-metallic pipe in ground outside of buildings. Use AWG #12 tracer wire and lay continuously below vertical projection of pipe so that it is not broken or stressed by backfilling operations. Solder all joints.
      b. Locate terminals where shown. Terminals: Precast concrete box and cast iron locking traffic cover, Brooks 3TL, or equal; cover marked with name of service; 6" of loose gravel below box. Plastic terminal board with brass bolts; identify line direction with plastic tags. Test for continuity between terminals after backfilling in presence of Construction Supervisor.

c. Option: Use electronically detectable plastic tape with metallic core, Terra Tape D, manufactured by Griffolyn Co., or equal; tape 2" wide, continuously imprinted “CAUTION, WATER (GAS, etc.) LINE BELOW”. Install, with printed side up, directly over pipe, 8" below finish grade. Backfill material shall be as previously specified for the particular condition where pipe is installed, but avoid use of crushed rock or of earth with particles larger than ½" within the top 12" or backfill. Take precautions to insure that tape is not damaged or misplaced during backfill operations. Terminal boxes not required.

11. Use reducing fittings; bushings shall not be allowed. Use eccentric reducing fittings wherever necessary to provide free drainage of lines and passage of air.

B. Sleeves: Install AMI sleeves of sufficient size to allow for free motion of pipe, 24 gage galvanized steel. The space between pipe and sleeves through floor slabs on ground, through outside wall above and below grade, through roof, and other locations as directed shall be caulked with oakum and mastic and made water-tight. At Contractor’s option pipes through slabs on grade may be wrapped with 1" thick fiberglass insulation to completely isolate the pipe from the concrete in lieu of sleeves. Link seal casings may be used in lieu of caulking.

C. Floor, Wall and Ceiling Plates: Fit all pipe with or without insulation passing through walls, floors, or ceilings, and all hanger rods penetrating finished eilings with chrome plated or stainless steel plates. Openings through air plenums shall be sealed airtight.

D. Flashing: Furnish and install around each pipe, where it passes through a roof, a flashing and counterflashing.

E. Hanger and Supports:

1. General: Support all piping so that it is firmly held in place by approved iron hangers and supports and special hangers as required. Rigidly fasten hose faucets, fixture stops, and similar items to the building construction. All hanger material shall be approved by the Architect before installation. Support no piping or ductwork by any plumber tape, wire, rope, wood, or other makeshift devices.

2. Pipe Support and Hanger Spacing Schedule:

	½	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	4&up
Standard weight steel pipe; Sch. 40 (liquid filled)	5'	5'	6'	6'	7'	8'	9'	10'	10'	10'
Standard weight steel pipe; Sch. 40 (vapor filled)	6'	8'	8'	10'	10'	10'	10'	10'	10'	10'
Copper tubing Type K	4'	4'	5'	5'	6'	6'	7'	8'	9'	10'
Copper tubing Type L	3'6"	4'	4'6"	5'	5'6"	6'	7'	7'6"	8'6"	10'
IPS Brass Pipe	5'	6'	7'	8'	9'	10'	10'	10'	10'	10'
Cast Iron	Support at every joint and ten-foot o.c. maximum									

3. On insulated pipes, install the hangers on the outside of the pipe covering and not in contact with the pipe. Provide rigid insulation and a 12" long, 18 gage galvanized sheet iron shield between the hanger whenever hangers are installed on the outside of the pipe covering.
4. Burning or welding on any structural member may only be done if approved by the Architect.
5. Insulate copper tubing from ferrous materials and hangers with 2" thickness of 3" wide 10 mil polyvinyl tape wrapped around pipe.
6. No valve or piece of equipment shall be used to support the weight of any pipe.
7. Provide a support or hanger close to each change of direction of pipe either horizontal or vertical.

F. Anchors:
1. Piping subject to expansion or contraction shall be provided with anchors and expansion loops or joints as required. Provide adequate guides to prevent misalignment.

G. Fireproofing:
1. The annular space between the pipe sleeves and the pipe and between duct openings and ducts through all floors and walls shall be protected by a UL-listed Fire Stopping System, 3M, Fire Barrier, Dow Firestop or Nelson Firestop.

3.7 SERVICE MARKERS

A. Mark the location of each plugged or capped pipe, set marker in 6" x 6" concrete pag flush with finish grade.

3.8 PIPE JOINTS AND CONNECTIONS

A. Cutting: Cut piping and tubing square, ream cut ends to full bore, remove rough edges, burrs, loose materials.

B. Threaded Pipe: Make joints with Rectorseal #5 or Permatex #1 thread lubricant or joint tape. Use no caulking of any kind. Remake leaky joints with new materials.

C. Copper and Brass Pipe and Tubing (except Control Piping): Make all joints with silver brazing alloy, Sil-Fos or equal, 1100 degrees F. melting point or greater, ASTM B-260, except that water piping 1-1/4" and smaller not buried in the ground or concrete and Type DWV plumbing piping may be made up with 95-5 tin-antimony, ASTM B-32, Grade 5A solder. Boss or saddle type fittings or mechanically extracted tube joints will not be allowed. Use leadless solder for potable water piping.

D. Welded Pipe:
   1. Make up with oxyacetylene or electric are process.
   2. All welding shall conform to the American Standard Code for Pressure Piping ASA B-31, Section 6, Chapter 4, and Appendix A. When requested by the Architect, furnish certification from an approved testing agency or National Certified Pipe Welding Bureau that the welders performing the work are qualified.
   3. All line welds shall be of the single “V” butt type. Welds for flanges shall be of fillet type.
   4. Where the branch is 2 pipe sizes smaller than the main or smaller, Bonney Weldolets, Threadolets, Nibco, or equal, may be used in lieu of welding tees.

E. Cast Iron Soil Pipe:
   1. Make-No Hub joints with torque wrench. Wrought iron, steel, or copper pipe shall have a ring or part of a coupling screwed on to form a spigot end where connected to a No-Hub joint. Suspended No-Hub pipe shall have sway brace at 20'-0" maximum spacing.
   2. Ty-Seal, Dual-Title, or equal, pipe and fittings may be used at the Contractor’s option.
   3. Connection building drain piping to outside service pipe with reducers or increasers as required. Caulking of smaller pipe into the larger without a reducer or increaser will not be permitted. Provide for changes in material types.

3.9 UNIONS AND FLANGES

A. Install Epco, or equal, dielectric unions or flanges at points of connection between copper or brass piping material and steel or cast iron pipe or material except in drain, waste, vent, or rainwater piping. Bushings or coupling shall not be used. Dielectric unions shall not be installed below grade.

B. Install unions, whether shown or not, at each connection to all equipment and tanks, at one connection to each valve or cock, and at all connections to all automatic valves, such as temperature control valves.

C. Locate the unions for easy removal of the equipment, tank or valve.

3.10 PIPE PROTECTION

A. Wrap all underground bare galvanized and black steel pipe and copper pipe, buried in the ground and to 6" above grade, including pipe in conduit, with a corrosive protective wrap as specified under “Pipe Protection” in Part 2 of Section 22 4000.

B. Cleaning: Clean all piping thoroughly before wrapping.

C. Inspection: Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by the Architect.

D. Testing: Test completed pipe with Tinker and Rasor Co. Test machine (San Gabriel, Calif. 626/287-7942).

E. Covering: No rocks or sharp edges shall be backfilled against the wrap. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper. Leave in place during backfill.

3.11 ACCESS DOORS

A. Furnish and install access doors wherever required whether shown or not for easy maintenance of mechanical system; for example, at concealed valves, strainer, traps, cleanouts, dampers, motors, controls, operating equipment, etc. Access doors shall provide for complete removal and replacement of equipment.

3.12 CONCRETE WORK

A. Concrete work required for work of this section shall be included under another section of the specifications, unless otherwise noted. This shall include all poured in place concrete work for installing precast manholes, catch basins, etc., unless the work is specially indicated on the drawings to be furnished under this section. Thrust blocks, underground anchors, and pads for cleanouts, valve access boxes and washers boxes are included under this section of the specification. Concrete shall be 2500 psi test minimum.

3.13 INSULATION WORK

A. General:
   1. All insulation shall be done by a contractor specifically licensed for insulation work. Insulation applied by the mechanical and plumbing contractor is not acceptable.
   2. The term “piping” used herein shall include pipe, air separators, valves, strainers and fittings. Apply insulating cement to fittings, valves and strainers and trowel smooth to the thickness of adjacent covering. Cover with jacket to match piping. Extend covering on valves up to the bonnet. Leave strainers cleanout plugs accessible. Valve and fitting covers may be preformed PVC. Provide rigid insulation, 18" minimum length at each pipe hanger. Seal ends of insulation with jacket.
   3. Do not insulate flanges and unions on high temperature piping. Insulate unions and pump bodies on chilled water and combination hot and chilled water systems with three heavy layers of Mortell’s No-Drip Paint, 1/16" minimum total thickness or Armstrong Armaflex Tape per manufacturer’s recommendations.
   4. Clean thoroughly, test, and have approved, all piping and equipment before installing covering.
   5. All insulation, adhesive coverings and jackets including pre-insulated flexible duckwork shall have a flame spread of 25 or less and developed smoke rating of 50 or less testing in accordance with ASTM E84.

B. Insulation of Piping:
   1. Domestic hot and tempered water shall be insulated with 1" thick 3-1/2# density fiberglass with ASJ-SSL jacket.
   2. Urethane insulation will not be allowed above ground or on hot water or steam piping.
   3. On all insulated piping exposed to the weather apply .015 aluminum jacket secured with ½" aluminum bands on 12" centers. Cover fittings with six ounce canvas and two coats of Foster’s 30-36 or Zeston plastic fitting covers. Insulation shall be vaportight before applying metal jacket or plastic covers.
   4. All insulated piping exposed in occupied spaces or mechanical rooms shall have a Proto or equal, 25/50 rated PVC jacket. Color as selected, installed and sealed per manufacturer’s recommendations.

5. Refrigerant piping, including all fittings, shall be insulated with nominal 3/4" thick Armstrong Armaflex 22, Owens-Corning Flex Tubing, or equal. Seal all joints with Armstrong 520 adhesive, Owens-Corning 500 adhesive, or equal. Insulation exposed to the weather shall be finished with two coats of Armstrong white Armaflex finish, or equal. Apply insulation in strict accordance with manufacturer's recommendations.

C. Duct Insulation:

1. Wrap all unlined concealed supply and return ducts with O.C. Fiberglas All-Service duct wrap with a reinforced foil Kraft vapor barrier facing 2" thick and 3/4" per cubic foot density. Wrap insulation entirely around duct and wire securely in place with #16 wire 12" o.c. and each side of each standing seam and over each insulation joint. Lap all insulation joints 3" minimum. Insulate ducts installed tight against other work before hanging in place.
2. All ducts and plenums in Fan Room shall be insulated with 1-1/2" (2" outside building) thick Fiberglas 705 insulating board with factory-applied foil facing. Insulation shall be adhered to ducts with Type B STICKLIPS at 18" o.c. cemented in place. Wrap insulation with 8 ounce canvas sized with Foster's Seal-fas mastic. Apply one final undiluted coating of Foster's 30-76 white insulation coating.
3. Install acoustical lining in all supply, return and mixed air ducts and plenums exposed in the Equipment Room or outside the building and where marked; and additional length as necessary to provide, in all cases, a minimum of 10'-0" in each direction from the fan, fan casing, or unit casing. Line exhaust ducts for a minimum of 10'-0" form fan inlet and 10'-0" downstream from each register or grille. Line all transfer ducts. Lining shall be 1" thick vinyl face black matt Fiberglas Aeroflex Type 150, 1-1/2# per cubic foot, J-M, or equal, and coat all edges and joints. In addition, all lining shall be fastened with Sticklip or welded pins spaced at 18" maximum centers both ways. No bare fiberglass shall be left exposed to air stream.
4. Seal airtight all seams of all supply, return and exhaust ducts except those exposed in the conditioned space with Hardcast Inc. FTA-20 adhesive and Hardcast DT-Tape installed in accordance with manufacturer's direction.
5. Seal watertight all joints of all ductwork exposed to the weather with 6 ounce canvas dipped in Arabol; cover the canvas with a heavy coat of Foster's 30-76, or equal, no dilution.

3.14 EQUIPMENT IDENTIFICATION

A. Identify each piece of equipment with an engraved brass tag fastened with screws. For example - EXHAUST FAN 2.

3.15 PIPE IDENTIFICATIONS

A. Identify each piping system and indicate the direction of flow by means of Idento Bands (Idento Metal Products Co.) Or SETMARK pipe markers. Apply the markings after all painting and cleaning of the piping and insulation is completed.

B. Apply the legend and flow arrow at all valve locations; at all points where the piping enters or leaves a wall, partition, cluster or piping or similar obstruction; and at approximately 50'-0" intervals on pipe runs. Variations or changes in locations and spacing may be made with the approval of the Architect. There shall be at least one marking in each room. Markings shall be located for maximum visibility from expected personnel approach.

C. Wherever two or more pipes run parallel, the markings shall be supplied in the same relative location on each.

D. The legends and flow arrows shall conform to ANSI A13.1.

E. The sizes of the letter and flow arrows shall be as follows:

Outside Diameter of Pipe or covering (Inclusive)	Size of Letter	Minimum Length of Flow Arrow
5/8" to 2"	½"	2-1/2"
2-1/2" and larger	1"	4"

F. Each hand valve on non-potable water piping shall be labeled with a metal tag stamped "DANGER – NON-POTABLE WATER" in one-quarter inch (1/4") high letters.

3.16 GUARDS

A. General: Belt drive, gear drive shafts, couplings, fan inlets and outlets, and running equipment shall be properly protected by guards as required by the CCR, Title 8, Division of Industrial Safety, Sub Chapter 7, General Industry Safety Orders, Article 31 through 36, whether shown on the drawings or not.

B. Construction: Guards shall be factory furnished or made of expanded metal with angle iron framework. Guards for belt drives shall have an easily removable section for replacement of belts. Openings shall be provided at shaft ends for taking rpm readings.

3.17 ANTI-VIBRATION BASES AND HANGERS

A. All ventilating and air conditioning equipment shall operate under continuous demand without objectionable vibration. Contractor shall be sure that above result is achieved. Isolate all equipment connections, including conduit, piping, drains, etc.

B. Air conditioning units and all fans shall be supported on anti-vibration bases or hangers. Other equipment and pumps shall be supported on anti-vibration bases, pads or hangers, when shown on Drawings or specified with equipment. Isolators and supporting bases shall be supplied by single manufacturer, Kientics, Korfund, or equal. Type of mounting and supporting base for each piece of equipment shall be as tabulated on equipment scheudle or as hereinafter specified. Individual mounts shall be Kinetics Type FPS, or equal. Contractor shall provide calculations for isolators and mounting acceptable to reviewing authority.

C. All piping in Mechanical Equipment Rooms and piping three supports away from mechanical equipment mounted on vibration isolators shall be isolated from structure by means of vibration and noise isolators. Suspended piping shall be isolated with combination Spring and Fiberglass hangers in supporting rods. Hangers shall be Type H. Floor-mounted piping shall be supported directly on Spring Mounts, Type S. Vertical pipe risers shall be isolated from structure by means of vibration and noise isolating Expansion Hangers, Type XH.

D. Isolator manufacture's submittal shall include complete design for supplementary bases, tabulation of design data on isolators, including O.D. free operating, and solid heights of springs, free and operating heights of neoprene or fiberglass isolators, and isolation efficiency based on lowest operating speed of equipment supported.

3.18 SPECIAL SEISMIC REQUIREMENTS

A. Supports for all piping and ductwork shall be in accordance with SMACNA "Guideline for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems".

B. Expansion Anchors in Hardened Concrete:
   1. Maximum Values: The allowable shear and withdrawal shall not exceed values permitted for bolts cast into concrete, as defined in Section 2624 of Title 24, with the 100% increase provided in Footnote 1 to CCR Table 26-F.
   2. Qualification Tests: The allowable shear and withdrawal load shall be based on qualification tests of at least three (3) test specimens, using a factor of safety of five (5) on the average of the test values, or a factory of safety of four (4) on the lowest test value, whichever is lower. Until the test data for the various anchors can be evaluated, use not more than 80% of the allowable load listed in the ICBO Research Committee Recommendations for the specific anchor.
   3. Installation: The anchors must be installed in accordance with the requirements given in ICBO Research Committee Recommendations for the specific anchor.
   4. Limitations on Anchors in Withdrawl: Anchors acting in withdrawl shall not be used for major connections such as anchoring tilt-up walls, tie-downs, heavy continuously applied loads, frequent vibratory loads, etc.

5. Job Testing: Fifty percent of the anchors shall be load-tested on each job to twice the allowable capacity in tension, except that if the design load is less than 75 pounds; only one anchor in ten need be tested. If any anchor fails, all anchors must be tested. The load test shall be performed in the presence of the project inspector.

   The load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, a torque wrench calibrated using the specific anchor, calibrated spring-loading devices, etc. anchors in which the torque is used to expand the anchor without applying tension to the bolt may not be verified with a torque wrench.

3.19 TESTS AND ADJUSTMENTS

A. Test the installation in accordance with the following requirements and all applicable codes. Notify the Architect at least 7 days in advance of any test. All piping shall be tested at completion of rough-in, or at other times as directed by the Architect.

B. Furnish all necessary material, test pumps, gases, instruments and labor required for testing. Test shall be witnessed by the Architect.

C. Isolate from the system all equipment which may be damaged by test pressure.

D. Test Schedule: No loss in pressure or visible leaks shall show after four hours at the pressures indicated.

System Tested	Test Pressure PSI	Test With
Sanitary Sewer, Drain,Vent	10 Ft. Hd.	Water
Storm Drain, Condensate Drains	10 Ft. Hd.	Water
Domestic Hot and Cold Water	125	Water
Gases	100	Air & Soap

All piping, including underground, connected to the fire sprinkler system shall be tested and certified in accordance with ISO requirements.

E. Testing, Evacuating, Charging and Lubrication of Refrigeration Systems:
   1. Pressurizing with dry nitrogen and/or refrigerant to 300 psig and test all joints with an electronic detector or halide torch. Release the pressure and attach a high vacuum pump. Evacuate to 4mm (400 microns) and hold for 30 minutes. Break to 5 psig with dry nitrogen or R-22 and allow to remain in the system for ten minutes. Evacuate to 2 mm (2000 microns) and hold for 30 minutes. Use a mercury manometer or electronic vacuum gauge. Do not start timing until recommended vacuum range is reached.

2. At the end of the evacuation, if the system has been proved leakfree, charge with refrigerant and fill the crankcase to the oil level specified by the manufacturer. All refrigerant oil shall be delivered to the location in sealed containers.
3. Replenish for a period of one year without cost to the Owner all refrigerant and oil required to maintain the proper levels.

F. Perform operational tests under simulated or actual service conditions, including one test of complete plumbing installation with all fixtures and other appliances connected.

G. Should any material or work fail in any of these tests, it shall be immediately removed and replaced by new material, any portion of the work replaced shall again be tested by Contractor at his own expense.

H. Instruct Owner's operating personnel during test and operating adjustment period. Lubricate each item of equipment, including motors, before operation.

3.20 MISCELLANEOUS FRAMES AND COVERS

A. Furnish all steel channel frames and covers in connection with concrete work required by this Section of the Specification. All items shall be welded construction, and expect as noted, hot-dip galvanized after fabrication painted two coats of chromate before delivering to the jobsite.

END OF SECTION

PLUMBING
SECTION 224000

GENERAL

1.1 The General Conditions and Supplementary Conditions apply to this Section.

1.2 SCOPE:
Provide plumbing where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

A. Domestic hot and cold water piping systems

B. Drain, waste, and vent systems

C. Gas, water and sewer service connections per local requirements

D. Plumbing fixtures and trim as shown on the Drawings

E. Condensate lines

1.3 General Contractor shall provide temporary sanitary facilities for all trades.

1.4 DRAWINGS:

A. Examine all drawings prior to starting of work and report any discrepancies in writing to the Architect.

B. Verify all dimensions at the building site and check existing conditions before beginning work. Make changes which are necessary to install the work in harmony with other crafts; they shall be first approved by the Architect.

C. Execute work mentioned in the specifications and not shown on the drawings, or vice versa, the same as if specifically mentioned in both.

D. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.5 CODES AND REGULATIONS:

A. Provide all work and materials in full accordance with the latest rules and regulations of the:

1. 2022 California Building Code

2. 2022 California Plumbing Code

3. 2022 California Mechanical Code

4. 2022 California Electrical Code

5. 2022 California Fire Code

6. Title 24, California Code of Regulations.

Nothing in these plans or specifications is to be construed to permit work not conforming to these codes. Furnish without extra charge, any additional material and labor required to comply with these rules and regulations.

1.6 SUBSTITUTIONS AND MATERIALS LIST:

A. Product names are used as qualitative standards, however other materials or methods shall not be used unless approved in writing by the architect. The burden of proof as to the equality of any proposed material shall be upon the contractor, and the architect's decision is final. Only one request for substitution shall be considered for each item. Equipment capacities specified are minimum acceptable.

B. Submit in indexed folders, five (5) sets of submittals for approval within 35 days after the award of the contract. The submittals shall be accompanied by equipment shop drawings, pump performance curves, and other pertinent data, showing the size, capacity and the proposed materials to be used. Submittals shall be provided, whether substitutions are made or not, and shall be listed in the order in which they appear in the schedules. Submittals shall be provided and approved prior to start of construction.

C. Any mechanical, electrical, structural or other changes required for the installation of any substituted equipment shall be made to the satisfaction of the architect and without additional cost to the owner. Approval by the architect of the substituted equipment and/or dimensional drawings does not waive these requirements. With submittal, provide drawings showing substituted equipment.

D. Approval of material shall not be construed as authorizing any deviations from the specifications unless the attention of the architect has been directed to the specific deviations.

E. Furnish to the Inspector, upon request, complete installation shop drawings of the same approved substitutions and drawings.

1.7 STERILIZATION CERTIFICATE:
Upon completion of water line sterilization, deliver to the Architect two copies of an acceptable "Certificate of Performance" for that activity.

1.8 MANUALS:

A. Upon completion of the work of this Section, deliver to the Architect one copy of an operation and maintenance manual compiled in accordance with the provisions of the General Requirements.

B. Include within each manual a copy of the Project Record Documents showing all work of this Section.

1.9 FIELD MEASUREMENT:
Make necessary measurements in the field to assure precise fit of items included in plumbing. Verify dimensions with all framing and concrete work prior to installing any components. Notify architect immediately of any discrepancies.

1.10 Install fixtures for accessibility requirements at locations shown on plans.

MATERIALS

2.1 FIXTURE SCHEDULE (As shown on Plumbing Drawings – see PLUMBING FIXTURE SCHEDULE)

2.2 PIPE SCHEDULE (As shown on Plumbing Drawings – see PLUMBING MATERIAL SPECIFICATIONS)

2.3 MISCELLANEOUS MATERIALS:

A. Gate valves: Provide solid wedge disc, rising stem, WOG; rising stem: Provide Nibco T-126 bronze, screwed, or 5-126, solder.

B. Globe valves: Provide replaceable composition disc suitable for 200 degree F water: 2 1/2 and smaller; Provide Nibco F-718-B, bronze, screwed.

C. Gas cocks: 2" and smaller: Provide 250#, bronze, screwed, square head, 125# (Rockwell Fig 142).

D. Ball valves: two or three piece construction, forged bronze body, chrome plated brass ball, threaded ends, Teflon seats, PTFE or reinforced Teflon stem seals, lever handles. Milwaukee BA100/150, BA300/350.

E. Flashing: Where pipes of this Section pass through the roof, flash with 24 ga. galvanized sheet metal, counter flashing to be 24 ga. sheet metal.

F. Traps for lavatories and sinks, except service sinks, chrome plated 17-ga. brass with clean out.

G. Insulation:

1. Provide 1-1/2" thick, 3 ½ pound per cubic foot fiberglass with all-service jacket (aluminum jacket with stainless steel bands outdoors) for all hot water and hot water returns (service at 105-140℉ up to 4" diameter.

2. Pipe wrapping

a. Steel piping in concrete or underground:

(1) Wrap with 20 mil tape.

(2) Fittings and other joints: Wrap in the field with 20 mil tape and primer.

(3) Provide 50% overlap on tape weld rubber coating.

b. Sleeves: Where pipes pass through concrete, masonry, or stud walls, or pass through ceilings, provide a sleeve of the size required.

H. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

I. Fixtures and Equipment: Provide complete plumbing fixture, trim, and equipment where shown on the Drawings.

EXECUTION

3.1 SURFACE CONDITIONS:

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.

3.2 PLUMBING SYSTEM LAYOUT:

A. Lay out the plumbing system in careful coordination with the Drawings, determining proper elevations for all components of the system and using only a minimum number of bends to produce a satisfactorily functioning system.

B. Follow the general layout shown on the Drawings in all cases except where other work may interfere.

C. Lay out pipes to fall within partition, wall, or roof cavities, and to not require furring other than as shown on the Drawings.

3.3 Perform trenching and backfilling associated with the work of this Section in strict accordance with all provisions of these Specifications.

A. Cut bottom of trenches to grade. Make trenches 12" wider than the greatest dimension of the pipe.

B. Bedding and backfilling:

1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.

2. Under the building, install pipes on a 6" bed of damp sand. Backfill to bottom of slab with damp sand.

3. Outside the building, install underground piping on a 6" bed of damp sand. Backfill to within 12" of finish grade with damp sand. Backfill remainder with native soil.

4. Do not backfill until installation has been approved and until Project Record Documents have been properly annotated.

3.4 INSTALLATION OF PIPING AND EQUIPMENT

A. General:

1. Proceed as rapidly as the building construction will permit.

2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.

3. Cut pipe accurately, and work into place without springing or forcing, properly clearing windows, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.

4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.

5. Make changes in directions with fittings; make changes in main sizes with eccentric reducing fittings. Unless otherwise noted, install water supply piping with tap tees feeding up to fixtures.

6. Run horizontal sanitary and storm drainage piping at a uniform grade of 1/4" per ft, unless otherwise noted. Run horizontal water piping with an adequate pitch upwards indirection of flow to allow complete drainage.

7. Provide sufficient swing joint, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.

8. Support piping independently at pumps, coils, tanks, and similar locations, so that weight or pipe will not be supported by the equipment.

9. Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar locations, to spill over an open sight drain, floor drain, or other acceptable discharge point, and terminate with a plain end unthreaded pipe 2" above the drain.

10. Securely bolt all equipment, isolators, hangers, and similar items in place.

11. Support each item independently from other pipes. Do not use wire for hanging or strapping pipes.

12. Provide complete dielectric isolation between ferrous and non-ferrous metals.

13. Provide union and shut off valves suitably located to facilitate maintenance and removal of equipment and apparatus, whether shown or not.

14. Provide adequate drainage slope on condensate drains.

15. Equipment access:

    a. Install piping, equipment, and accessories to permit access for maintenance. Relocate items as necessary to provide such access, and without additional cost to the Owner.

    b. Provide access doors where valves, water hammer arrestors, motors, or equipment requiring access for maintenance are located in walls or chases or above ceilings. Coordinate location of access doors with other trades as required.

B. Pipe Joints

1. Copper tubing:
    a. Cut square, remove burrs, and clean inside of female filling to a bright finish.
        (1) Apply solder flux with brush to tubing.

        (2) Remove internal parts of solder-end valves prior to soldering.
    b. Provide dielectric unions at points of connection of copper tubing to ferrous piping and equipment.

c. For joining copper tubing, use:
(1) Water piping 3" and smaller: “Lead free” solder;
(2) Underground: “sil-fos” brazing.

2. Screwed piping:
a. Deburr cuts.
(1) Do not ream exceeding internal diameter of the pipe.
(2) Thread to requirements of ANSI B2.1.
b. Use Teflon tape on male thread prior to joining other services.

3. Leaky joints:
a. Remake with new material.
b. Remove leaking section and/or fitting as directed.
c. Do not use thread cement or sealant to tighten joint.

J. Pipe Supports:

1. Support suspended piping with clevis or trapeze hangers and rods.

2. Space hangers and support for horizontal steel pipes according to the following schedule:

Pipe size:	Maximum spacing on centers:
1-1/4" and smaller	8'-0"
1-1/2" to 3":	10'-0"
4" to 5":	14'-0"

3. Space hangers and supports for horizontal copper tubing according to the following schedule:

Tube size:	Maximum spacing on centers:
1" and smaller	6'-0"
1-1/2"	7'-0"
2":	8'-0"
2-1/2":	9'-0"
3" and larger:	10'-0"

4. Provide sway bracing on hangers longer than 18".

5. Support vertical piping with riser clamps secured to the piping and resting on the building structure. Provide at partition top plates.

6. Provide insulation continuous through hangers and rollers. Protect insulation by galvanized steel shields.

7. Arrange pipe supports to prevent excessive deflection, and to avoid excessive bending stress.

8. Support piping from inserts or anchors in concrete slabs.

9. Hubless piping:

   a. Provide hangers on the piping at each side of, and within 6" of, hubless pipe coupling so the coupling will bear no weight.

   b. Do not provide hangers on couplings.

   c. Provide hangers adequate to maintain alignment and to prevent sagging of the pipe.

   d. Make adequate provision to prevent shearing and twisting of the pipe and the joint.

K. Sleeves and Openings

1. Provide sleeves for each pipe passing through walls, partitions, floors, roofs, and ceilings.
   a. Set pipe sleeves in place before concrete is placed.
   b. For uninsulated pipe, provide sleeves two pipe sizes larger than the pipe passing through, or provide a minimum of 1/2" clearance between inside and outside of the pipe.
   c. For insulated pipe, provide sleeves of adequate size to accommodate the full thickness of pipe covering, with clearance for packing and caulking.

2. Caulk the space between sleeve and pipe or pipe covering, using a noncombustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack with noncombustible asbestos cotton, rope, or fiberglass to within 1/2" of both wall faces, and provide the waterproof compound described above.

3. Finish and escutcheons:
   a. Smooth up rough edges around sleeves with plaster or spackling compound.
   b. Provide 1" wide chrome or nickel plated escutcheons on all pipes passing through walls, floors, partitions, ceilings, and similar locations.
      (1) Size the escutcheons to fit pipe and covering.
      (2) Hold escutcheons in place with set screw.

L. Cleanouts:

1. Secure the Architect’s approval of locations for cleanouts in finished areas prior to installation.

2. Provide cleanouts of same nominal size as the pipes they serve.

3. Make cleanouts accessible. After pressure tests are made and approved, thoroughly graphite the cleanout threads.

M. Valves:

1. Provide valves in water and gas systems. Locate and arrange so as to give complete regulation of apparatus, equipment and fixtures.

2. Provide valves in at least the following locations:
   a. In branches and/or headers of water piping serving a group of fixtures.
   b. On both sides of apparatus and equipment.
   c. For shutoff of risers and branch mains.
   d. For flushing and sterilizing the system.
   e. Where shown on the Drawings.

3. Locate valves for easy accessibility and maintenance.

N. Backflow Prevention:

1. Protect plumbing fixtures, faucets with hose connections, and other equipment having plumbing connection, against possible back-siphonage.

2. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

O. Plumbing Fixture Installation

1. Installation:
   a. Set fixtures level and in proper alignment with respect to walls and floors, and with fixtures equally spaced.
   b. Provide supplies in proper alignment with fixtures and with each other.
   c. Provide flush valves in alignment with the fixture, without vertical or horizontal offsets.

2. Grout wall and floor mounted fixtures watertight where the fixtures are in contact with walls and floors.

3. Caulk deck-mounted trim at the time of assembly, including fixture and casework mounted. Caulk self-rimming sinks installed in casework.

P. Disinfection of Water Systems

1. Disinfect hot and cold water systems.
   a. Notify the Architect at least 48 hours prior to start of the disinfection process.

b. Upon completion of disinfecting, secure and submit the Certificate of Performance required under Article 2a of this Section, stating system capacity, disinfectant used, time and rate of disinfectant applied and resultant residuals in ppm at completion.
c. Use disinfectant method approved by the California Plumbing Code.

2. When disinfection operation is completed, and after final flushing, secure an analysis by a laboratory, based on water samples from the system, showing test negative for coli-aerogene organisms. Provide a total plate count of less than 100 bacteria per cc, or equal to the control sample.
a. Upon completion of disinfecting, secure and submit the Certificate of Performance required by the County Health Dept, stating system capacity, disinfectant used, time and rate of disinfectant applied and resultant residuals in ppm at completion.
b. Use disinfectant method approved by the Owner.

3. If analysis results are not satisfactory, repeat the disinfection procedures and retest until specified standards are achieved.

Q. Other Testing and Adjusting.

1. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction.

2. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

3. Adjust the system to optimum standards of operation.

END OF SECTION

HEATING, VENTILATING AND AIR CONDITIONING
SECTION 23 0800

PART 1 - GENERAL

1.1 The General Conditions apply to this section.

1.2 SCOPE

Furnish and install all heating, ventilating and air conditioning work indicated on the drawings and described herein. Also, any incidental work not shown or specified that is necessary to provide the complete system.

1.3 DRAWINGS

A. Examine all drawings prior to starting of work and report any discrepancies in writing to the Architect.

B. Verify all dimensions at the building site and check existing conditions before beginning work. Make changes which are necessary to install the work in harmony with other crafts; they shall be first approved by the Architect.

C. Execute work mentioned in the specifications and now shown on the drawings, or vice versa, the same as if specifically mentioned in both.

1.4 CODE RULES AND SAFETY ORDERS

A. Provide all work and materials in full accordance with the latest rules and regulations of the:

1. 2022 California Building Code.
2. 2022 California Plumbing Code.
3. 2022 California Mechanical Code.
4. 2022 California Electrical Code.
5. 2022 Californica Fire Code.
6. Title 24, California Code of Regulations.

Nothing in these plans or specifications is to be construed to permit work not conforming to these codes. Furnish without extra charge, any additional material and labor required to comply with these rules and regulations.

1.5 FEE AND PERMITS:

Procure and pay for all licenses, fees and permits required.

1.6 UTILITY COORDINATION:

It shall be the contractor's responsibility to arrange and coordinate with the utility companies all requests for service(s) ad the installation of meter(s) and services. The contractor shall furnish all documentation and information that the utility companies require prior to start of construction. Within 35 calendar days of the award of contract, the contractor shall submit to the architect a letter with copies of drawings that are sent to the utility companies for such services.

1.7 FRAMING, CUTTING AND PATCHING

Special framing, recesses, chases and backing for work of this section is covered under other sections. Be responsible for proper placement of all pipe sleeves, hangers and supports and location of openings for work of this section.

1.8 SUBSTITIONS AND MATERIALS LIST

A. Product names are used as qualitative standards, however other materials or methods shall not be used unless approved in writing by the architect. The burden of proof as to the equality of any proposed material shall be upon the contractor, and the architect's decision is final. Only one request for substitution shall be considered for each item. Equipment capacities specified are minimum acceptable.

B. Submit in indexed folders, five (5) sets of submittals for approval within 35 days after the award of the contract. The submittals shall be accompanied by equipment shop drawings, pump performance curves, and other pertinent data, showing the size, capacity and the proposed materials to be used. Submittals shall be provided, whether substitutions are made or not, and shall be listed in the order in which they appear in the schedules. Submittals shall be provided and approved prior to start of construction.

C. Any mechanical, electrical, structural or other changes required for the installation of any substituted equipment shall be made to the satisfaction of the architect and without additional cost to the owner. Approval by the architect of the substituted equipment and/or dimensional drawings does not waive these requirements. With submittal, provide drawings showing substituted equipment.

D. Approval of material shall not be construed as authorizing any deviations from the specifications unless the attention of the architect has been directed to the specific deviations.

E. Furnish to the Inspector, upon request, complete installation shop drawings of the same approved substitutions and drawings.

1.9 SITE CONDITIONS

Information on the drawings relative to existing conditions is approximate only. Deviations found necessary during progress of construction to conform to actual conditions, as approved by the architect, shall be made without additional cost to the owner. The contractor shall be held responsible for any damage caused to the existing property and services. Promptly notify the architect if services are found which are not shown on the drawings.

1.10 GUARANTEE

A. Repair or replace any defective work, material or part which may appear within one year of the date of acceptance. This shall include damage by leaks.

B. On failure to comply with the above guarantee within a reasonable length of time, after notification is given, the architect shall have the repairs made at the contractor's expense.

1.11 MAINTENANCE AND OPERATING INSTRUCTION

A. Furnish four complete sets of operating and maintenance instructions bound in a hardboard binder and indexed. Start compiling the data upon approval of list of materials, Final inspection will not be made until booklets are approved by the architect.

B. These sets shall incorporate the following:
   1. Complete operating instructions for each item of equipment listing in detail the lubricants to be used, frequency of lubrication, inspections required, adjustments, etc.
   2. Manufacturer's documentation with part numbers, instructions etc., for each item of equipment.

C. Post service telephone numbers and/or addresses in an appropriate place as designated by the architect.

1.12 RECORD DRAWINGS

A. Upon completion of the work, and as precedent to final payment, the contractor shall provide and deliver, to the architect, updated reproducible drawings showing the work exactly as installed.

PART 2 - PRODUCTS

2.1 Provide equipment as specified on the drawings.

PART 3 - EXECUTION

3.1 MATERIAL STORAGE

A. During storage at the construction site, all duct and related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable tot he local authority to reduce dust or debris collection in compliance with CalGreen section 5.504.3.

3.2 FILTERS

A. Air filters shall be of an approved type tested in accordance with test method SFM Std. 12-71-1 as shown in Part 12, Title 24, California Code of Regulations. Preformed filters having combustible framing shall be tested as a complete assembly. Air filters in all occupancies shall be Class 2 or better (as shown in the State Fire Marshall listing).

B. Provide temporary filters for all fans that are used during construction; after all construction dirt has been removed from the building, install new filters at no additional cost to the Owner.

C. Air filters shall be accessible for cleaning or replacement.

D. Filters shall be 1" thick Farr (MERV-8) or approved equal.

3.3 SHEET METAL WORK

A. Construct and install all sheet metal in accordance with the latest SMACNA recommendations. Provide variations in duct size, and additional duct fittings as required to clear obstructions and maintain clearances, as approved by the Architect, at no extra cost to the Owner. Pressure class shall be 2" w.c. or better.

B. Exterior ductwork shall be sealed water-tight with hardcast RTA 50 adhesive and DT-tape or Glenkote.

C. Interior ductwork shall be sealed water-tight with hardcast RTA 20 adhesive and DT-tape or Glenkote.

D. Duct sealer system must be installed in strict conformance with the manufacturer’s application instructions.

E. Provide drive slip or equivalent flat seams for ducts where necessary due to spacer limitations. On ducts with flat seams, provide standard reinforcing inside of duct.

F. Provide Duro-Dyne Ventlon flexible connection on inlet and outlet of each fan.

G. Duct size shown on lined duct is the inside dimension.

H. All round ductwork shall be metal, except fiberglass flexible duct shall be used on the final 5'-0" connection to the diffuser in concealed areas. Transitions and bends to ductwork, to avoid obstructions, must be approved by the Architect. Protect ductwork from damage and after erection until final inspection.

I. Flexible ducts shall conform the following requirements:
   1. Factory-made air ducts shall be approved for the use intended or shall conform to the requirements of U.M.C. Standard No. 6-1. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with U.M.C. Standard No. 6-1 and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing.
   2. Flexible ducts shall consist of an exterior reinforced laminated vapor barrier, 1-1/2" thick fiber glass insulation (K=.25 @ 75°F), encapsulated spring steel wire Helix and impervious, smooth, non-perforated interior vinyl liner. Individual lengths of flexible ducts shall contain factory fabricated steel connection collars.
   3. Flexible ducts shall be supported at or near mid-length with 2" wide 28 GA. Steel hanger collar attached to the structure with an approved duct hanger. Installation shall minimize sharp radius turns or offsets. The maximum length connecting to terminal outlets shall be seven feet.
   4. Flexible ducts may be used to cross seismic joints without offsets.
   5. Flexible air ducts shall anchored and supported per the latest SMACNA air duct annual.

3.4 GRILLES

A. Provide all outlets with gaskets and install so that there will be no streaking of the walls or ceilings due to leakage.

B. Furnish all diffusers, registers, and grilles with baked enamel finish - color to be coordinated with architect - and white gaskets on ceiling - mounted outlets.

C. All visible surfaces behind air outlet faces to be flat black.

3.5 VIBRATION ISOLATION

A. Isolate all ventilating and air conditioning equipment, including conduit, piping duct, drains, etc., so that equipment will operate under continuous demand without objectionable vibrations.

3.6 TESTING AND BALANCING

A. Coordinate testing and balancing agency work with work of other trades.

B. Contractor shall provide for adjustments and/or additions or modifications to fan and motor sheaves, belts, damper linkages and the like to achieve proper air balance at no additional cost.

C. Testing and balancing shall be performed in complete accordance with AABC National Standards for Field Measurements and Instrumentation. Testing and balancing shall be performed on air distribution systems.

D. Balance air quantities of supply, return, outside air, and exhaust to achieve those given on Drawings with accuracy within minus 5 percent and plus 10 percent. Measure the total air quantity at each fan.

E. The air balance technician shall be responsible to modify all supply, return, and exhaust fan sheaves & VFD output frequency limits as applicable such that the design air flows are met. All supply fans controlled for filter loading shall similarly be modified to ensure the full range of motor power is available to the control system. Rated fan speed and motor speed shall not be exceeded.

END OF SECTION

ELECTRICAL GENERAL REQUIREMENTS
SECTION 260000

The General Conditions, Supplementary Conditions, and Division 1 - General Requirements are hereby made a part of this Section as fully as if repeated herein.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. The requirements of this Section apply to all the Work of Division 26.

B. The entire Project Specifications and all Drawings shall be checked in connection with the requirements of this Section.

C. Failure on the part of the Contractor to make such an investigation of the Drawings and Specifications governing the work of other trades shall not relieve him of the responsibility to meet all the requirements of the Contract to provide all materials and labor necessary for complete and operable systems.

1.2 SCOPE OF WORK:

A. Furnish all labor, materials, and tools, and perform all operations necessary for the removal and replacement of the rooftop package HVAC units as shown on the Drawings and as specified herein, including that which is reasonably inferred.

B. Documents do not undertake to show or list every item to be provided. When an item not shown is clearly required for proper operation to the system or is required by code, such item shall be provided at no increase in contract price.

C. Items identified by manufacturer's type or catalog reference shall be understood to include all fittings, accessories, and optional features necessary to meet the intended design requirements.

D. The Work shall include, but not be limited to, the following general headings:
   1. Work includes:
      a. HVAC system line voltage wiring.
      b. Power wiring including disconnect switches and final connection to all equipment furnished under this Section and other Sections of the Specifications, including new 120v GFI outlet at each roof area (duplex units maybe furnished with one (11)).
      c. Cutting and patching for electrical work.
      d. Hookups with fire sprinkler system, HVAC systems.
   2. Related Work Specified Elsewhere or Not in Contract:

a. General: Refer to other Sections to determine the extent of electrical work to be performed in connection therewith.
b. Control wiring and interlocks, both line voltage and low voltage.
c. Control wiring for mechanical equipment.

1.3 TITLE 24 COMPLIANCE:

A. The entire electrical installation shall comply with all the requirements of Title 24 of the California Administrative Code.

B. During the inspection period, the Work shall be subject to periodic inspection to verify compliance with Title 24.

1.4 QUALITY ASSURANCE:

A. Requirements of Regulatory Agencies:
1. Provide work in accordance with appropriate standards, codes and recommendations, all applicable local codes and ordinances, industry standards, and utility company regulations and standard, including the following:
   a. County.
   b. City.
   c. Rules and regulations of the State Fire Marshal and the Local Fire Marshal.
   d. California Administrative Code.
2. Nothing in the Contract Documents shall be construed as permitting work not conforming to the applicable laws, ordinances, rules, and regulations.
3. When requirements of the Contract Documents exceed the requirements of applicable laws, ordinances, rules or regulations, the Contract Documents shall take precedence.
4. It is not the intent of the Contract Documents to repeat requirements of codes except where necessary for completeness or clarity.
5. Reference Standards: All materials and equipment shall comply with applicable standards and requirements of the following:
   a. American National Standards Institute - ANSI.
   b. Institute of Electrical & Electronic Engineers -IEEE.
   c. Institute of Power Cable Engineers Association -IPCEA.
   d. National Bureau of Standards - NBS.
   e. National Electric Manufacturers Association - NEMA.
   f. National Fire Protection Association - NFPA.
   g. Underwriters' Laboratories - UL.
6. If any of the requirements of the above are in apparent conflict with one another, or with the requirements of these Specifications, the more stringent requirement shall govern.

1.5 PERMITS AND FEES:

A. The Contractor shall obtain and pay for all permits required for the completion of the Work of this Section.

B. The Owner shall pay for all utility company fees required for this Project.

1.6 SUBMITTAL:

A. Submit shop drawings and supplemental data for all materials and equipment intended for use on the Project, including specified materials.

B. Prior to submittal of any shop drawings or manufacturer's data, the Contractor shall thoroughly check it out to verify that it complies fully with the requirements of the Contract with regard to quality, function, electrical characteristics, dimensions, and suitability for the intended application, and, furthermore, that it complies with all applicable codes.

C. All submittals shall be forwarded for approval under the name of the Contractor, who shall take full responsibility for their content, even if the original submittal material has been prepared and assembled by a manufacturer or agent. The intention of this requirement is to ensure that the Contractor will not assume the role of merely transferring information but will accept full responsibility for the material submitted.

D. Submit dimensioned shop drawings, plans and elevations of electrical equipment rooms showing layout of all submitted equipment dimensions, clearances, and access.

E. Submittals shall be specific for this project. General catalog data or typical wiring diagrams are not acceptable. Submittals shall define accurately which product and, where applicable, which options are proposed for use on the job.

F. Forward all submittals to the Architect, at one time. Organize submittals by systems, e.g. lighting, switchgear, basic materials. Each system shall be bound separately and independently. Individual or incomplete submittals will not be acceptable.

G. Identify each item by manufacturer, brand, trade name, number, size, rating or whatever other data are necessary to identify properly and to check materials and equipment. Words "as specified" are not sufficient identification.

H. Identify each substitute item by reference to the Specification Section paragraph in which the item is specified or the applicable Drawing and detail reference.

I. Organize the submittals in the same sequence in which they are specified.

J. Any mechanical, electrical, structural, or other changes required for the installation of any approved substitute equipment provided all or in part under the Work of this Division shall be made at the expense of the Contractor. Approval of the substituted equipment and/or dimensional drawings or other data does not waive these requirements. Submit drawings of electrical equipment spaces showing clearance and required access prior to installation.

K. Approval of equipment shall not be construed as authorizing any deviations form the Contract Documents unless the attention of the Architect has been directed to the specific deviations and approval has been granted in writing.

L. Upon request, furnish complete installation data and instructions on all material and equipment to be provided as part of the Work of this Division before commencing installation.

1.7 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Subsequent to completion of the installation, part of the Work of this Division shall be the responsibility of the Contractor to instruct the Owner's Representative in the operation, adjustment, and maintenance of the electrical equipment.

B. Before Owner's personnel assume control of the electrical systems, submit three (3) sets of operating and maintenance instructions, manuals, and parts lists on all equipment.

C. Submit three (3) copies of certificate, signed by the Owner's Representative, confirming that the instruction has been received.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Identify materials and equipment delivered to the site to provide a check against materials list and shop drawings.

B. Protect materials from loss or damage. Replace lost or damaged materials with new materials at no increase in Contract Price.

1.9 AS-BUILT DRAWINGS AND OPERATION MANUALS:

A. As-built drawings of record shall be maintained at all times and corrected daily to show the exact locations of all equipment installed under this Contract. Within fifteen (15) days after completion, and before Work will be considered for acceptance, Contractor shall deliver to the Architect reproducible drawings for each contract "E" drawings (obtained from the Architect at cost), accurately revised to show the as-built installation. Underground lines shall be fully dimensioned as to location and depth of burial. As-built drawings shall be prepared by a competent draftsman equal to the Contract Drawings.

B. On completion of the Work, the Contractor shall furnish three (3) sets of operations manuals to the Owner.
   1. Manuals shall be bound in hardcover ring binders, properly indexed and titled.
   2. Service manuals shall include complete operating, repair servicing data, wiring diagrams, and complete lists of replacement parts for all power distribution, including panelboards and motor control equipment.
   3. Technical data, wiring diagrams, etc., furnished with the manual shall be specific for this Project. Copies of general catalog data and typical wiring diagrams will not be sufficient to meet this requirement.

1.10 GROUNDING:

A. Provide a complete system of electrical and equipment grounding in accordance with code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Identify all material and equipment by manufacturer's name and nameplate data. Remove unidentified materials and equipment from the site.

B. Equipment specified by manufacturer's number shall include all accessories, fittings, controls, and other components, listed in the catalog as standard with equipment. Furnish optional or additional accessories as specified or shown on the Drawings.

C. Equipment and materials damaged during transportation, installation, or operation shall be considered as totally damaged and shall be replaced with new. Variance form this requirement will be permitted only with written approval by the Architect.

D. Provide an authorized representative to constantly supervise the Work of this Division.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Follow manufacturer's directions for installation of equipment where such directions cover points not covered by the Contract Documents.

B. Install all equipment neatly placed and properly anchored. Comply with all applicable codes for the correct method of mounting all equipment for earthquake conditions. No allowance will be made for failure to foresee actual jobsite conditions.

C. During the course of installation, protect the Work of other Divisions, as well as the Work of this Division, from damage.

3.2 PERFORMANCE:

A. Sleeves, Chases, and Inserts: Provide as part of the Work of this Division, and in such a manner as to cause no delay to the progress of the work of other Divisions, all required sleeves, chases, inserts, anchor bolts, and similar items.

B. Cutting and Patching:
   1. Perform all cutting and patching necessary for the Work of this Division.
   2. Cutting, drilling, boring, or notching of structural members shall not be done except where approved in writing by the Architect. Where approved, such cutting shall be done in strict accordance with the California Administrative Code.
   3. Repair damage done by cutting and patching to the approval of the Architect.

3.3 TESTING AND ADJUSTING:

A. Furnish all labor and test equipment required for the Work of this Division.

B. Should any equipment or material fail or show defects during testing, it shall be removed immediately and replaced with new, and the system shall be retested.

C. Perform all tests in accordance with standard practices and with code requirements and under the supervision of authorities having jurisdiction.

D. After completion of testing and adjustment, operate the system to demonstrate proper functioning of all components. If in the opinion of the Architect the performance of the system is not in accordance with the specified requirements, the deficiency shall be corrected at no increase in Contract Price and the system operated again to demonstrate that the correction has been properly made.

E. At completion of Work, provide written certification that all systems have been installed according to the Contract requirements and are functioning satisfactorily without any defects.

3.4 CLEANING AND PAINTING:

A. Prepare for painting all Work of this Division that will be finish painted.

B. All equipment furnished finish painted as part of the Work of this Division shall be refinished to the satisfaction of the Architect if damaged.

C. Thoroughly clean all equipment, panelboards, switches, and other materials provided as part of the Work of this Division free from all rust, scale, dirt, and other foreign material, before such equipment is covered up, painted, or put in service.

3.5 EQUIPMENT IDENTIFICATION:

A. Properly identify each piece of equipment and all switches which control remote equipment.

B. Panelboards shall be identified by engraved 3/32" laminated plastic nameplates secured with round head machine screws or contact cement.

C. Identify remote-control switches for equipment such as exhaust fans, HVAC equipment, etc., with nameplates as specified for panel boards.

D. Install typewritten circuit directory in framed glass or plastic holder mounted behind panelboard door.

E. Label all service disconnects, etc. for all the services.

F. Provide additional labels as may be required by the Authority having jurisdiction.

END OF SECTION

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
SECTION 260526

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Wire.
   2. Mechanical connectors.

1.02 REFERENCES

A. International Electrical Testing Association:
   1. ANSI/NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems.

B. Part 3, Title 24, - California Electrical Code (CEC).

1.03 SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes:
   1. Existing Metal underground water pipe.
   2. Concrete-encased electrode.
   3. Existing Metal underground gas piping system.

1.04 QUALITY ASSURANCE

A. Provide grounding materials conforming to requirements of CEC, IEEE 142, and UL labeled.

PART 2 - PRODUCTS

2.01 WIRE

A. Material: Stranded copper.

B. Bonding Conductor: Copper conductor insulated.

2.02 MECHANICAL CONNECTORS

A. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

PART 3 - EXECUTION

3.01 PREPARATION

A. Remove paint, rust, mill oils and surface contaminants at connection points.

3.02 EXISTING WORK

A. Modify existing grounding system to maintain continuity to accommodate renovations.

B. Extend existing grounding system using materials and methods as specified.

3.03 INSTALLATION

A. Install grounding and bonding conductors concealed from view.

B. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

C. Permanently ground entire light and power system in accordance with CEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

D. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with CEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment.

E. Ground conduits as necessary by means of grounding bushings on terminations at panelboards and switchboards to grounding bus.

F. Permanently attach equipment and grounding conductors prior to energizing equipment.

END OF SECTION

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
SECTION 260533

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes conduit, surface raceways, outlet boxes, pull and junction boxes, and handholes.

1.02 REFERENCES

A. American National Standards Institute:
   1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
   2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.

B. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
   3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
   4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
   5. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
   6. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

C. Part 3, Title 24, - California Electrical Code (CEC).

1.03 SYSTEM DESCRIPTION

A. Underground outside Foundation Wall: Use nonmetallic conduit. Terminate with rigid steel conduit out of concrete of soil. Use cast metal boxes or nonmetallic handhole.

B. Outdoor Locations, Above Grade: Provide rigid steel conduit, intermediate metal conduit and electrical metallic tubing with compression type fittings. Provide cast metal or nonmetallic outlet, pull, and junction boxes.

C. Below Slab on Grade: Use Schedule 40 nonmetallic conduit. Terminate with rigid steel elbows and short length of rigid steel conduit out of concrete.

D. Wet and Damp Locations: Provide rigid steel conduit, electrical metallic tubing with compression type fittings, Schedule 40 nonmetallic conduit. Provide cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

E. Concealed Dry Locations: Provide rigid steel conduit intermediate metal conduit or electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas.

F. Exposed Interior Dry Locations: Use rigid steel conduit or intermediate metal conduit below eight feet or where subject to damage. Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing above eight feet or in electrical, mechanical, elevator or telecommunication rooms. Use sheet-metal or cast metal boxes. Use flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.04 DESIGN REQUIREMENTS

A. Minimum Raceway Size:
   1. 1/2 inch.
   2. 3/4 inch. for homeruns.
   3. 1 inch outside foundation line.

PART 2 - PRODUCTS

2.01 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Intermediate Metal Conduit (IMC): Rigid steel.

C. Fittings and Conduit Bodies: NEMA FB 1. Fittings shall be steel or malleable iron with threaded fittings. Use insulated metallic bushings with lug where ground connections are required. Use plastic bushing for non-bonding applications.

2.02 FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked steel construction.

B. Fittings: NEMA FB 1; steel or malleable iron squeeze type with insulated throat.

2.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked steel construction with PVC jacket.

B. Fittings: NEMA FB 1; steel or malleable iron fitting with insulated throat.

2.04 ELECTRICAL METALLIC TUBING (EMT)

A. Product Description: ANSI C80.3; galvanized tubing.

B. Fittings: NEMA FB 1; steel or malleable iron couplings and connectors. Box connectors shall have with insulated throat.

2.05 NONMETALLIC CONDUIT (MAY NOT BE USED)

2.06 SURFACE METAL RACEWAY (NOT USED)

2.07 OUTLET BOXES

A. Sheet Metal Outlet Boxes:
   1. NEMA OS 1, galvanized steel.
   2. Boxes for shall be 1-1/2 inch deep by 4 inch square minimum.

B. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

C. Wall Plates for Finished Areas: As specified in Section 26 27 26.

D. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.08 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Concrete composite Handholes: Die-molded, concrete composite hand holes:
   1. Cable Entrance: Pre-cut cable entrance at center bottom of each side.
   2. Extension: 12” reinforced concrete below box.
   3. Cover:Concrete composite cover with nonskid finish. Covers shall bem marked “ELECTRIC”, “SIGNAL”, “GROUND’ or as indicated on drawings.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces.

B. Remove concealed abandoned raceway to its source.

C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.

D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.

E. Extend existing raceway and box installations using materials and methods as specified.

F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.02 INSTALLATION

A. Ground and bond raceway and boxes in accordance with Section 26 05 26.

B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.

C. Identify raceway and boxes in accordance with Section 26 05 53.

3.03 INSTALLATION CONCRETE COMPOSITE HANDHOLES

A. Install boxes flush with finished grade or surface material.

B. Provide hold down bolts for all covers.

C. Provide minimum 12” depth of crushed rock or pea gravel below boxes for drainage. Ground bond steel cover plate with insulated green grounding conductor.

3.04 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

LIGHTING CONTROLS
SECTION 260943

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Networked lighting control system and components.

1.02 REFERENCES

A. Federal Communications Commission:
   1. Standard for Radio Frequency Equipment.

B. Government Electronics and Information Technology Association:
   1. EIA 709.1 - Control Network Protocol Specification.

C. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. California Title 24:
   1. Part 3, California Electrical Code.

E. Title 24 Part 6:
   California Energy Commission – California Energy Code 2010.

F. Underwriters Laboratories Inc.:
   1. UL 50 - Enclosures for Electrical Equipment.
   2. UL 67 - Panelboards.
   3. UL 508 - Industrial Control Equipment.
   4. UL 916 - Energy Management Equipment.

1.03 SYSTEM DESCRIPTION

A. Provide lighting control system consisting of components manufactured by single source.

B. Provide lighting control system consisting of:
   1. Relay panels and programmable switches connected together by networked wiring system extending from panel locations with single communications bus to allow switches to communicate with panels.
   2. System connected to single time clock mounted in interior of relay panel.

C. Perform Work in accordance with the State of California Title 24 Part 6 2010 Energy Code.

D. Completion and issuance of all Title 24 mandatory testing forms for manual daylight switching, occupancy sensing devices and automatic shut-off controls

E. Completion and issuance of all Title 24 mandatory installation certificates for occupancy sensing devices and automatic shut-off controls.

F. Comply with NFPA 70 as applicable to electrical wiring work.

G. Comply with NEMA 250 for type of electrical equipment enclosures.

H. Provide panelboards with UL listing in accordance with UL 50, UL 67, and UL 916.

I. Provide equipment complying with FCC emissions' standards in part 15 subpart J for Class A application.

PART 2 - PRODUCTS

2.01 LIGHTING CONTROL SYSTEM

A. Lighting control system consisting of the following components: relay panels, programmable wired switches, programmable clock, software, and capability of integration into building automation system, as manufactured by Blue Ridge Technologies.

B. Each control panel shall provide a Warn-Off (flash the lights) to inform the occupants of and impending Off command. The Warn-Off command will allow 10 extra minutes for the occupants to override their lights.

C. Control panels shall permit lighting to be overridden On for after hours use or cleaning. These overrides shall be hard wired inputs or voice guided touch tone telephone control.

2.02 RELAY PANELS

A. UL listed, NEMA 250 Type 1 enclosure.

B. Cover: Hinged, locking configuration with wiring schedule directory card.

C. Furnish with individual on-off switches for both panel and network wiring power.

2.03 PROGRAMMABLE NETWORK WIRED SWITCHES

A. Function: Allow individual overrides. Switches terminated to network wiring of each panel.

2.04 PHOTOCELL CONTROL

A. The controller shall accept user adjustable ambient light sensors. Sensors shall provide for both indoor and outdoor applications. The sensor shall be powered from the controller.

2.05 TELEPHONE OVERRIDES

A. The control system shall provide intelligent software for a telephone interface module. The interface module shall allow modem communications and touch tone overrides from any touch tone phone.

2.06 PROGRAMMABLE CLOCK

A. From each plug-in point on network wiring, time clock can be used to:
   1. Schedule each 8 channel groups in relay panel network.
   2. Program network wired switches.

B. Includes user selectable functions to handle standard lighting control functions for each channel independently. Selectable functions include:
   1. Scheduled on and scheduled off.
   2. Manual on and scheduled off.
   3. Astronomical on and astronomical off with optional offset.
   4. Astronomical on and scheduled off with optional offset.

C. Each channel capable of being assigned the following:
   1. Time delay from 1 to 256 minutes.
   2. Automatic blinking of lights before turning off to allow occupants opportunity to enter override. Time interval configurable.

D. Features:
   1. Furnish clock with display and user interface.
   2. Capable of being adjusted for leap year, daylight savings dates, and holidays.

2.07 SOFTWARE

A. Furnish plug-in capability for use in system commissioning, programming, monitoring, and control. Software capable of functioning with EIA 709.1 compliant network tool.

B. After programming of system parameters is completed, system allows each userdefinable feature such as schedules, relay groups, switch assignments to be field modified without need for configuration software or system integration expertise.

2.08 BAS INTEGRATION

A. In addition to hardwired channel inputs, furnish system with capability for integration into building automation and control system without use of dry contact, gateways or protocol converters. Integration accomplished via network connections of EIA 709.1 compliant devices.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Mount switches occupancy sensors and photocells as indicated on Drawings.

B. Label each low voltage wire clearly indicating connecting relay panel.

C. Use only properly color coded, stranded wire.

D. Identify power wiring with circuit breaker number controlling load. When multiple circuit breaker panels are feeding into relay panel, label wires to clearly indicate originating panel's designation.

E. Terminate communication conductors and associated conduits external to factory supplied equipment.

F. Test relays and switches after installation to confirm proper operation.

G. Label each low voltage wire with relay number at each switch or sensor.

H. Install wiring schedule directory card affixed to rear of panel cover to identify circuits, relays, and loads controlled.

3.02 FIELD QUALITY CONTROL

A. Test relays and switches after installation to confirm proper operation and confirm correct loads are recorded on directory card in each panel.

B. Test light fixtures and control devices per the test procedures described in the California Energy Commissions Building Energy Efficiency Standards.

END OF SECTION

WIRING DEVICES
SECTION 262726

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes wall switches; wall dimmers; receptacles; and device plates and decorative box covers.

1.02 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA WD 1 - General Requirements for Wiring Devices.
   2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

PART 2 - PRODUCTS

2.01 WALL SWITCHES

A. Manufacturers:
   1. Pass & Seymour
   2. Hubbell
   3. Leviton
   4. Cooper
   5. Approved equal

B. Product Description: Specification Grade, NEMA WD 1, Heavy-Duty, AC only general-use snap switch.

C. Body and Handle: White thermoplastic with rectangular rocker switch. Red color for devices connected to emergency power system.

D. Ratings:
   1. Voltage: 120-277 volts, AC.
   2. Current: 20 amperes.

2.02 RECEPTACLES

A. Manufacturers:
   1. Pass & Seymour
   2. Hubbell
   3. Leviton
   4. Cooper

5. Approved equal

B. Product Description: Specification Grade, NEMA WD 1, Heavy-duty general use receptacle. Combination head brass grounding screw. Brass alloy triple wipe contacts shall grip both sides of plug prongs.

C. Device Body: White thermoplastic rectangular design with smooth face. Red for devices connected to Emergency circuits.

D. Convenience Receptacle: Type 5-15.

E. Dedicated Receptacle: Duplex,type 5-20

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

G. Special Purpose Receptacles: Type and rating and number of poles indicated or required for the anticipated purpose.

2.03 WALL PLATES

A. Decorative Cover Plate: Brushed Stainless Steel.

B. Mounting Screws: Stainless steel, painted head to match plate finish.

C. Surface cover plate in dry locations: Galvanized steel. Four inch square, raised 1/2” for surface mounted switches and receptacles.

D. Weatherproof Damp Location Cover Plate: Gasketed cast metal cover plate with hinged and gasketed device cover.

E. Weatherproof Wet Location Cover Plate: Extended metal hinged cover for use when attachment plug is inserted.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and completely covered by wall plates.

C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION

A. Clean debris from outlet boxes.

3.03 EXISTING WORK

A. Disconnect and remove abandoned wiring devices.

B. Modify installation to maintain access to existing wiring devices to remain active.

C. Clean and repair existing wiring devices to remain or to be reinstalled.

3.04 INSTALLATION

A. Install devices plumb and level.

B. Mounting heights shown shall be measured from the center of the device. U.O.N.

C. Mounting heights of electrical switches, receptacles and telecommunication devices in accessible spaces as defined by the CBC shall comply with the mounting height requirements. Switches and receptacle outlets shall be located no more than 48 inches measured from the top of the outlet box nor less than 16 inches measured from the bottom of the box to the level of the finished floor or working platform.

D. Install switches with OFF position down.

E. Install wall dimmers to achieve full rating specified and indicated after de-rating for ganging as instructed by manufacturer.

F. Do not share neutral conductor on load side of dimmers.

G. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.05 LABELS AND INSCRIPTIONS:

A. Identify receptacle cover plate with panel and branch circuit number (for example L2A-3). Provide label as described in Section 26 05 53].

END OF SECTION

INTERIOR LIGHTING
SECTION 265100

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes interior luminaires, lamps, ballasts, and accessories.

1.02 REFERENCES

A. American National Standards Institute:
   1. ANSI C82.1 - American National Standard for Lamp Ballast-Line Frequency Fluorescent Lamp Ballast.
   2. ANSI C82.4 - American National Standard for Ballasts-for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

PART 2 - PRODUCTS

2.01 INTERIOR LUMINAIRES

A. Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Disconnect and remove abandoned luminaires, lamps, and accessories.

B. Clean and repair existing interior luminaires to remain or to be reinstalled.

END OF SECTION

EXTERIOR LIGHTING
SECTION 265600

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Lighting outdoors.

1.02 RELATED SECTION

A. Section 26 27 26: Wiring Devices

1.03 REFERENCES

A. California Electrical Code 2022 Edition.

B. California Energy Code 2022 Edition.

C. California Building Code 2022 Edition.

D. I. E. S. Lighting Standards, 10th Edition.

PART 2 PRODUCTS

2.01 LIGHTING FIXTURES

A. Units shall be as designated in the Lighting fixture schedule on the drawings. All fixtures shall bear the Underwriters' Laboratories label. All LED fixtures shall be equipped with LED lamp modules, LED drivers.

B. All pole-mount fixtures shall be LED type with LED drivers, all in compliance with California Energy Code.

C. Fixtures shall be complete with lamps, all fitting, accessories, and supports necessary for a complete and operable installation.

D. Verify finish color of all fixtures with Architect prior to ordering.

2.02 LIGHTING CONTROLS

A. Photo cell and motion sensors shall comply with California Energy Code Section 130.2 (c).

B. Time Clock shall be Intermatic, 7 day programmable, Astronomic, multi-channel, with field replaceable industrial grade batteries as ET 8000 series or equal.

C. Lighting contactors shall be as manufactured by Square D Co. Type “SMG”, electrically held, with number of poles per plans. Provide housing as noted on plans.

PART 3 EXECUTION

3.01 GENERAL

A. See Section 26 05 00 for Basic Execution methods.

3.02 INSTALLATION OF LIGHTING FIXTURES

A. For polemount fixtures, provide concrete base with steel reinforcement as shown on the plans. Determine exact location of pole in coordination with Architecture and Civil plans.

B. Install lighting fixtures in accordance with code requirements.

C. Provide all supports for lighting fixtures in accordance with code requirements for installation in seismic zone in which the Facility is located.

D. Set all controls as noted on plans and directed by owner in field.

3.03 CLEANING:

A. On completion of the work, all fixtures and lenses shall be left clean. Any minor damage or scratches shall be touched up to the satisfaction of the Architect.

END OF SECTION

IT SYSTEMS COMPONENTS AND CABLING
SECTION 27 0120

PART 1 - GENERAL

1. PURPOSE:

A. The purpose of this document is to provide a list of network electronics, fiber cabling, copper cabling, and cabinet specifications for a complete installation.

B. This document will list make, model, and part number as it applies to our current network infrastructure. The make, models, and part numbers are subject to change. Please contact IT for the latest documentation.

2. NETWORK ELECTRONICS:

A. Main Distribution Frame (MDF) Network routers, switches, transceivers, and UPS: - Are existing.

B. Intermediate Distribution Frame (IDF) Network switches and UPS:

Table 1 Network Electronics - IDF

Purpose	Make	Model	Quantity
User Switch Access	Ruckus	ICX8200	Per Plans
Uninterruptable Power Supply	APC	APC Smart-UPS X 3000 with Network Management Card	Per Plans
Battery Pack	APC	SM X 48RMBP2U	Per Plans

C. Wireless Access Points (WAP):

Table 2 Wireless Access Points Interior

Purpose	Make	Model	Quantity
Classrooms	Ruckus	R670 with smart zone controller AP management license	9

1. Internal WAPs should be mounted at locations indicated on the drawings.
2. All WAPs shall have activated licenses for virtual zone director control.

Table 3 Wireless Access Points Exterior

Purpose	Make	Model	Quantity
Outdoor locations	Ruckus	Not Use	0

3. External WAPs should be mounted as indicated on drawings.

D. Voice over IP:

Table 4 Voice over IP for Building 'E'

Purpose	Make	Model	Quantity
All other locations	Mitel	1P420g	6

1. Building 'F' phones to have mitel wall mount .

3. IDF SPECIFICATIONS

A. For new building IDF to be placed as indicated on the Drawings.

B. Ground bus bar kit should be installed and ground to the bus bar at every network rack and enclosures.

C. Power should be installed inside the cabinet/enclosure with a dedicated circuit, attached to right side of open rack.

4. GENERAL FIBER CABLING SPECIFICATIONS

A. See **Table 6** for make, model, and part numbers for fiber parts.

B. Install 12 strands of indoor-outdoor rate single mode fiber optic cable from the MDF to respective IDF. No patch through or splice in between MDF and IDFs, should be a point to point fiber run.

C. Fiber run should have a 15' service loop on both ends and dressed in a fashion to fit inside the MDF and IDF location.

D. Fiber at MDF should be terminated inside a Panduit 19" rack mount fiber enclosure on Panduit LC bulkheads.

E. Fiber at IDF locations should be terminated inside a Panduit 19" rack mount fiber enclosure on Panduit LC bulkheads.

F. Fiber patch cables used to interconnect MDF and IDF shall be LC/LC single mode

G. All fibers shall be tested and certified and results submitted to IT.

H. All warranties for fiber should be submitted to IT.

Table 6. Fiber Specification

Purpose	Make	Model	Part Number
IDF Fiber Panel	IDF Fiber Panel	Panduit 19" Rack Mount Fiber Encl.	FRME4
Backbone Fiber Cable	Berk-Tek	Plenum Indoor/Outdoor S/M Fiber Optic Cable	LTP012-AB0504
LC Bulkhead	Panduit	Panduit LC Bulkhead Single Mode Duplex Ports	FAP12WBUDLCZ
Fiber Optic connectors	Berk-Tek	Single mode Fiber optic connector	10062630
Fiber Patch Cables		LC/LC Single mode Duplex Fiber Patch Cable	

5. GENERAL CATEGORY 6 AND 6A SPECIFICATION

A. See **Table 7** for make, model, and part numbers for cabling, panels, faceplates, and jacks.

B. Category 6 cabling shall be used for all data, VoIP phones, and IP clocks/speaker locations.

C. Category 6A cabling shall be used for all ceiling locations for wireless access points.

D. Standard classroom cable count is a total minimum of seven (7) jacks.

1. Category 6 cables shall be a total of five (5) jacks. Two (2) jacks on one wall and two (2) jacks on an opposite wall, and one (1) cable for IP clock/speaker location.

2. Category 6A cables shall be a total of two (2) jacks located at the center of each classroom/room.

E. Classroom workrooms has two (2) wall jacks per workstation locations.

F. Caddy "J" hooks shall be installed every 5 feet above suspended ceiling to support all cabling. All cabling should be properly secured and not attached to the support wire of the T-bar ceiling and not laying across ceiling boards/tiles.

G. All copper cabling shall be installed away from electrical interference.

H. Horizontal cabling at station location should have a service loop of 6' above ceiling.

I. Horizontal cabling at the MDF location should have a server loop of 10’ above ceiling.

J. All Category 6 cabling should terminate to a Panduit Mini-Com Category 6 data jack color blue.

K. All Category 6A cabling should terminate to a Panduit Mini-Com Category 6A data jack color orange.

L. All cabling terminations at the station locations shall be mounted on the appropriate faceplate as specified by Table 7.

M. All cabling terminations at the MDF and IDF shall be mounted onto Panduit 24 or 48 port 19” modular patch panel.

N. MDFs/IDFs cabling patch work from panels to network equipment shall be neat and properly dressed using wire managers.

O. MDF/IDFs horizontal cabling shall be neat and properly dressed into the back of the cabinet using wire managers.

P. All inside horizontal cabling shall be blue in color.

Q. All outside horizontal cabling shall be black in color.

R. All patch cables for Category 6 connection shall be blue in color.

S. All patch cables for Category 6A connections shall be orange in color.

T. All cabling shall be tested and certified and result submitted to District IT.

U. All warranties for Category 6 and 6A should be submitted to District IT.

Table 7. Category 6 and 6A Specifications

Purpose	Make	Model	Part Number
Horizontal Cable	General Cable	Category 6 Standard Cable	7133900
Wireless Access Point Horizontal Cable	General Cable	Category 6A 10G	7133819
Category 6 jack	Panduit	Category 6 Jack Blue	CJ688TGBU
Category 6A jack	Panduit	Category 6A Jack Orange	CJ6X88TGOR
Patch Panel	Panduit	48 Port 19" Snap-In Modular Patch Panel	CPP48WBLY
Patch Panel	Panduit	24 Port 19" Snap-In Modular Patch Panel	CPP24WBLY
Face Plate – 2 Port	Panduit	Classic Series Mini-Comm Face Plate	CFP2EI
Surface mount box for WAPs	Panduit	2 Port surface mount box	CBX2EI-AY
Patch Cables 6	Panduit	Cat-6 patch cable BLUE	
Patch Cables 6A	Panduit	Cat-6A patch cable ORANGE	

6. PROCEDURE:

A. For network equipment rack elevations, see Electrical Drawings.

B. For labeling scheme and naming convention contractor shall have a pre-installation meeting with District IT.

C. A second post-installation meeting shall occur with District IT at the IT punchwalk.

END OF SECTION

DATA / TELEPHONE STRUCTURED CABLING SYSTEM
Section 271000

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 and Section 26 specification sections, apply to work specified in this Section.

B. Furnish and install Telephone and Data Communications Structured Cabling System including all wiring and connections and other materials as shown on Plans and specified herein.

C. Coordinate power requirements for all components with General Electrical Contractor. All powered units shall connect to UPS (Uninterruptible Power Supply) protected circuits. See UPS requirements in Electrical Specifications.

1.02 RELATED DOCUMENTS

A. Code Requirements: Components and installation to meet latest rules and regulations for telecommunications cable systems of the California Building Code, California Code of Regulations, Title 24, Part 3, and California Electrical Code.

B. Applicable Standards:
1. ANSI/EIA/TIA - 568-A, Commercial Building Telecommunication Cabling.
2. TSB-67, Field Testing of UTP Cabling Systems, October 1995.
3. TSB-72, Centralized Cabling Guidelines, October 1995.
4. TSB-75, Additional Horizontal Cabling Practices for Open Offices, August 1996.
5. TSB-95, Additional Field Testing Requirements for Category 5, October 1999.
6. ANSI/EIA/TIA - 568-A, Addendum 1, Propagation Delay and Delay Skew Specifications for 100 ohm 4-Pair Cable, September 1997.
7. ANSI/EIA/TIA - 568-A, Addendum 2, Miscellaneous changes and corrections.
8. ANSI/EIA/TIA - 568-A, Addendum 3, Hybrid and Bundled Cables.
9. ANSI/EIA/TIA - 568-A, Addendum 4, Modular Patch Cord Production Testing, December 1999.
10. ANSI/EIA/TIA - 568-A, Addendum 5, Category 5e Performance.
11. ANSI/EIA/TIA - 568-B.2-1, Transmission Performance Specification for 4-pair 100 Ohm Category 6 Cabling.
12. ANSI/EIA/TIA-TSB-36, Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted-Pair Cables.
13. EIA/TIA-455-61, FOTP-61, Measurement of Fiber or Cable Attenuation using an OTDR.
14. IEEE 802.3, Carrier Sense Multiple Access with Collision Detection.

15. ANSI/EIA/TIA - 569-A, Commercial Building Standard for Telecommunications Pathways and Spaces, February 1998.
16. ANSI/EIA/TIA - 570-A, Residential Telecommunications Cabling Standard, October 1999.
17. ANSI/EIA/TIA - 606, Administration Standard for Telecommunications Infrastructure of Commercial Buildings, February 1993.
18. ANSI/EIA/TIA - 607, Commercial Building Grounding and Bonding Requirements for Telecommunications, August 1994.
19. ANSI/EIA/TIA - 729, Screened, 100 Ohm Twisted Pair Cabling.
20. ANSI/EIA/TIA - 758, Customer-Owned Outside Plant Telecommunications Cabling Standard, April 1999.
21. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) - 9th Edition, 2000.
22. National Fire Protection Agency (NFPA-70), National Electrical Code (NEC) - 1999.

C. Install and test all cabling in accordance with the most recent edition BICSI publications:
1. BICSI - "Telecommunications Distribution Methods Manual."
2. BICSI - "Cabling Installation Manual."

1.03 GENERAL REQUIREMENTS

In order to qualify for installation of the data communications system, the Contractor must possess the required license classification, trade certifications, a performance history, experience in the installation and termination of fiber optics cable systems, and proof of time in business.

A. License Classification: Contractor must possess a valid C-7 California State Contractor's License. This license must have been issued two years prior to the date of this bid. No other license classification in acceptable.

B. BICSI Certifications: Contractor will use personnel certified by the trade organization BICSI. The vendor must have a Registered Communications Distribution Designer (RCDD®) on staff who will be ultimately responsible for this project. The RCDD must have sufficient experience in this type project as to be able to lend adequate technical support to the field forces during installation, during the warranty period, and during any extended warranty periods or maintenance contracts. The vendor must attach a resume of the responsible RCDD to the vendor's submittal for evaluation. Should the RCDD assigned to this project change during the installation, the new RCDD assigned must also submit a resume for review by the District. The vendor must also have BICSI registered installed and technicians on staff and assign them to this project. The project shall be staffed at all times by installers and technicians, who, in the role of lead craftsperson, will be able to provide leadership and technical resources for the remaining crafts persons on the project. A minimum of 30 percent of personnel shall be BICSI registered

telecommunications installers.

C. A factory registered Panduit ® PCI Contractor Agreement or equivalent. The contractor shall have completed standards based product and installation training. A copy of the Contractor Registration shall be included in contractors submittal.

D. Performance History: Contractor must have successfully performed at least three projects of similar scope, within two years of the date of this bid. Proof of performance shall be in the form of reference sheets which shall include a brief description of the project, the beginning and ending contract price, the project foreman or superintendent's name, and the name, address, and telephone number of a project contact.

E. Fiber Optics Experience: Contractor must be able to prove to the satisfaction of Owner that they have had significant experience in the installation of fiber optics cable systems. Installation must include installation of fiber optics cable in innerduct, fiber breakout systems, fiber termination, a knowledge of interconnect equipment, and a thorough knowledge of testing procedures. Contractor must provide a minimum of three (3) references supports its claim of experience for similar projects within the two years prior to this bid. Documentation must be included with the submittal documents.

F. Time in Business: Contractor must have been in business, and in the business of installing telecommunications/data communications systems, continuously, for a period of at least three years, prior to the date of this bid. Contractor must submit at least one project reference for each of the three years prior to the date of this bid. The contractor must also maintain a full time staff at an established business location having appropriate parts and service facilities and the ability to provide a one-hour response time to Elk Grove Unified School District. Any contractor not able to meet these requirements will not be considered as an acceptable contractor for this project.

1.04 DEFINITIONS

A. Main Distribution Facility (MDF): The MDF is the location, within a building or complex of buildings, where the entire telecommunications system originates. It may include 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 backbone or vertical riser system and the horizontal distribution system occurs. It may include the physical location, enclosure, wire and cable management hardware, termination hardware, distribution hardware, and equipment racks. In this case, the IDFs are collocated with the CTBs (Computer Terminal Backboards) and provide the interface location between fiber distribution cable (backbone) and station cable (horizontal distribution).

C. Backbone Pathway: The backbone pathway consists of a series of conduits of chases, which connect the MDF to IDFs or IDFs to IDFs. It generally houses the vertical or backbone system.

D. Backboard: Backboard generally refers to the plywood sheeting lining the walls of telecommunications facilities. Backboard may also refer to the entire wall-mounted assembly, including wire management, wiring blocks, and equipment racks. In this case, the term Backboard is fully interchangeable with CTB and the equipment required to fulfill the scope of work below.

1.05 SYSTEM DESCRIPTION

A. The data and telephone structured cabling communications system shall consist of three components: termination equipment, a fiber optics backbone, and copper twisted-pair Category 6 workstation cabling (voice and data). The central location shall house an MDF and each of the other locations shall house an IDF. Each fiber optics cable shall originate in the MDF and shall be terminated in its respective IDF. All fiber optics cables shall be enclosed in innerduct. The combination of innerduct with fiber optic cable shall be routed through a system of conduits and raceway installed by the responsible contractor for that discipline, in accordance with the drawings. The drawings depict a typical conduit layout and fiber cable routing. All copper backbone cables shall be routed along with the fiber cable, shall originate at the MDF, and terminate in each of the IDFs. From each IDF, one (1) or more twisted-pair copper cables shall be routed to each data and telephone outlet location, either via routing established by the installing contractor or provided by Owner, within its respective building or buildings. These cables shall originate in an IDF and terminate in its respective data outlet location. Should the installation not require copper exchange cable for the telephone system the conduit shall be installed as a spare and labeled as such.

1.06 SCOPE OF WORK

A. Contractor shall provide materials for and install a complete wiring/cabling and conduit system in accordance with this specification and the drawings. Contractor shall be responsible for providing a complete wiring/cabling and conduit system including all necessary components, whether included in this specification or not.

B. The installation shall include cable (fiber optic and twisted-pair copper), innerduct, fiber interconnect equipment, connectors (fiber and copper), jumpers (twisted-pair copper), wiring blocks, and data communications outlets. The necessary material and equipment are depicted throughout the specifications and applicable drawings. Contractor is responsible to supply Owner with all necessary components, whether included in the specifications and drawings or not.

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. The Owner reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

1.07 MANUFACTURER

A. Contractor shall furnish and install all equipment, accessories, and materials necessary for a complete, functional fiber optics data distribution system in accordance with these Specifications and Drawings.

B. Materials: The preference of the District, unless otherwise noted in these specifications, shall be Panduit ® and conform to the Panduit ® Certification Plus System Warranty standard and have one point of contact for all cabling system issues. The system shall be warranted for a period of at least 25 years. Any substitutions shall meet all requirements set forth in the Panduit references, including rack space usage, VIP testing, and single contact for all warranty work. Any submittal MUST include a rack space usage drawing or it will be rejected as non-conforming to our specifications.

C. Unless specified otherwise in the following, the equipment furnished shall fall into five classes, and with exception of Class 5, all of the material within a single class shall be the standard product of Panduit ®. Exceptions are annotated CLASS EXEMPT. The five classes are as follows:

1. Class One: Fiber optics cable, copper cable (both station and backbone), copper jumpers, blocking kits, interconnection devices, wiring blocks, connectors (fiber and copper), and telecommunications outlets. All material covered in Class One shall conform to the Panduit ® Certification Plus System Warranty. and be tested to specification standards. The materials and installation of these products must have a warranty program of twenty-five (25) years, or better.
2. Class Two: Fiber innerduct. All material covered in Class Two shall be equal in quality and performance to that manufactured by Carlon or Arnco, no substitutions.
3. Class Three: Equipment racks and cabinets. All material covered in Class Three shall be equal in quality and performance to that manufactured by Saunders or CPI Dracon, no substitutions.
4. Class Four: Wire management panels. All material covered in Class Four shall be Panduit ® and conform to the Panduit ® Certification Plus System Warranty standard.
5. Class Five: Wire ties, printed labels, "D" rings, nuts, bolts, screws, and other miscellaneous hardware [CLASS EXEMPT].

1.08 SUBMITTALS AND SUBSTITUTIONS

A. Within 30 calendar days after the date of the award of the contract, the Contractor shall submit to the Owner for review two (2) copies of a complete submission. The submission shall consist of five (5) major sections with each section separated with insertable index tabs. 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. Each page in the submission shall be numbered chronologically and shall be summarized in the index. The second section shall include a copy of the Contractor's valid C-7 California State Contractor's License, BICSI certifications, the information required in Section 1.03 above, and a list of instrumentation to be used for system testing. The third section shall contain the comparative specification listing of any substitutions and a complete listing of the characteristics of the equipment in the specifications. The fourth section shall contain samples of proposed cable markers and labeling. The fifth section shall contain a complete, detailed satellite closet count, proposed floor plan and backboard plan, workstation count, and bill-of-materials. Refer also to Section 16010 for other submittal requirements. Any contractor failing to include all of the required information shall be deemed non-responsive and may be disqualified, at the discretion of the Owner.

B. For purposes of determining conformity, technical and general information set forth on the respective data sheets by manufacturers named in Section 1.07 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 equal 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 of proposed equal items will be final.

C. Shop Drawings: Furnish shop drawings showing front and side elevations of backboard and rack mounted equipment and interconnections. Drawings shall be computer drafted and shall be part of submittals. Drawings shall show layout of all equipment at each location. Drawings attached to this specification are schematic, do not show all panels, hubs, etc. required, and are only offered to show general layout.

D. Two submittal reviews will be made by the Architect. Subsequent reviews will be charged to the Contractor. A rejection of a submittal or review of a partially presented submittal constitutes one submittal review. All submittals for this section to be approved by NCLUSD Technology Services Department.

E. Record Drawings: Refer to General Conditions. Final Inspection will not be made until drawings are received and approved. Record Drawings shall include "As-Built" one-line and wiring diagrams, with terminations identified, wire color coding schedule, pull box locations, and conduit routing plans.

1.09 GUARANTEE

A. One firm to assume full responsibility for performance on all work of this section. Guarantee all equipment not covered by the Panduit ® Certification Plus System Warranty against defects in material and workmanship for one (1) year, and provide on-the-premises service during normal working hours for one year, at no cost to purchaser if trouble is not caused by misuse, abuse, or accident, or at current labor rates if so caused. Provide manufacturer's written one-year guarantee for equipment and parts to Owner. Refer also to 1.07C.1. Class one products require a warranty program of twenty-five (25) years.

B. Service shall normally be available within 24 hours from service department of authorized distributor of manufacturer by factory trained servicemen.

C. On-the-premises service at other than normal working hours to also be available, but labor charges for such calls to be paid by purchaser at current labor rates.

1.10 FUNCTION AND OPERATION

A. The intended function of the data communications cable system is to transmit data signals from a central location to several individual data outlet locations. Upon completion of the work outline in this specification, the system shall be capable of transmitting data signals at 1000 Base-T or Category 6 levels.

B. The multi-mode fiber optics cable system shall be capable of transmitting signals with a bandwidth of up to 500 MHz at either 850 or 1300 nm. The cumulative signal loss, through connectors, jumpers, couplers, and fiber cable, shall be less than 10 dB. The single-mode fiber optics cable system shall be capable of transmitting signals with a bandwidth of up to 500 MHz at both 1310 and 1550 nm. The cumulative signal loss, through connectors, jumpers, couplers, and fiber cable shall be less than 10 dB.

C. Work station cable, commencing at the wiring blocks, shall be installed in accordance with ANSI/EIA/TIA TSB standards and shall be capable of transmitting a signal at Category 6 level with acceptable attenuation losses and cross-talk attenuation. The entire workstation cable system, including wiring blocks, cable, and telecommunications outlets shall be tested for Category 6 compliance, so an extended warranty can be provided to NCLUSD. The cabling system shall be channel tested to the standard for Cat 6

D. Voice cables shall be Category 6 compliant.

PART 2 - PRODUCT AND INSTALLATION SPECIFICATIONS

2.01 GENERAL

A. Throughout this Part 2, material quantities and minimum installation practices are given. These quantities and instructions are given for reference purposes only. It is the responsibility of the Contractor to provide appropriate quantities of materials and install them to Manufacturer Specifications as to provide a complete, functional system that will have an extended warranty applied.

B. Equipment shall be installed in accordance with drawings. General installation provisions are as follows:

1. Equipment Racks: Equipment racks shall be assembled and mounted in locations as shown in the Drawings and as described in the following. Each rack 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 have vertical wire management installed on each side and horizontal wire management installed. Each rack shall be installed in accordance with the approved plans submitted to Technology Services.
2. Wiring Blocks and Wire Management Components: Should copper exchange cable be required it shall be terminated on rack mounted patch panels located on a dedicated equipment rack in such a manner that allows for neat and orderly cross connections. Standard 568B will be used for all terminations.
3. Fiber and Copper Cable: Where fiber or copper cable enters an MDF or IDF, it shall be affixed to the backboard via “D” rings and cable ties in accordance with the attached drawings. All cable shall be neatly bundled, combed, and tied. All cable runs, within the MDF and IDF, shall be horizontal or vertical within the constraints of minimum cable bending radius and will not be mounted in manner that segments the backboard.
4. Fiber Optics Interconnect Equipment: Interconnect equipment shall be mounted in the equipment racks.
5. Labeling:
    a. 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 typewritten onto adhesive labels. The font shall be at least 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. Patch panels shall exhibit workstation numbers, for all workstations served by the MDF or IDF.
    b. Workstation outlets shall be labeled by building identifier of the IDF / MDF location and numeric identifier. If an IDF supplies cabling to another building, the outlets in that building will retain the identifier of the IDF building location. Patch panels will be labeled sequentially.

6. 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 less 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.
7. T-Bar Suspended Ceilings: Where allowed by code, copper station cabling may be run outside of conduits and above t-bar suspended ceilings when available, at the option of the installer. Cables installed in this fashion are to be run horizontally in bundles and tied down neatly, well clear of any light fixtures or other electrical appliances that may affect data transmission. Cables shall be supported from roof structure by means of Cable Hanger system such as the Erico CAT425, or equivalent, and shall not lay on ceiling system.

2.02 FIBER INNERDUCT

A. Description: If required, from the MDF to each IDF, segments of fiber optics innerduct shall be installed in the conduit system.
1. Product: Carlon AW4X1A, 1-1/4" Outside Plant Fiber Optics Innerduct with all necessary accessories.
2. Quantities Required: Innerduct runs do not have to be continuous throughout, breaks are expected at the pullboxes. Contractor is responsible for determination of actual lengths of innerduct required. Enough innerduct shall be provided and installed to extend from the fiber service loop in the MDF to the fiber service loop in each IDF. If the route passes through a pullbox, the segments of innerduct shall extend twelve inches into the pullbox. If the route passes through an en route IDF, each segment of innerduct shall extend at least twelve inches beyond the end of the service conduit. Seal all ends of the innerduct after the installation of the fiber is complete.

B. Installation: Fiber innerduct shall be installed in conduit in accordance with manufacturer's instructions and industry standards. Within the equipment rooms, the innerduct shall extend from the end of conduit to four (4) feet above the floor and shall be affixed to the backboard by means of clamps designed for that purpose. Care shall be taken to avoid kinking the innerduct or applying excessive tension during the installation process.

2.03 FIBER DISTRIBUTION

A. Description: From the MDF to each IDF, a continuous segment of fiber cable shall be installed. Routing shall be via conduit in accordance with electrical drawings. The cable shall be a twenty four (24) fiber multi-mode cable and a twelve (12) fiber single-mode

cable, suitable for subsurface installation. The cable shall not be extended more than 50 feet into the building interior unless enclosed in conduit. The NCLUSD fiber optic cable system includes the historic use of 62.5 / 125 µm cable and 51.0 / 125 µm cable. It is the responsibility of the contractor to insure any modernizations, additions, or upgrades match the existing cable type.

1. Products: General Cable BG0244M1A (24 strands) multi-mode 50.0 / 125 µm cable General Cable AP0124M1A (12 strands) single-mode cable. Although the type of multi mode fiber may vary from this specification, the fiber quantities apply to any and all new construction.
2. Quantities Required: The contractor is responsible for determination of actual segment lengths. Actual quantities will be determined by the routing established by the drawings.
3. Required Accessories and Quantities:
    a. Connectors: Panduit FSCMM50BL opticrimp SC (multi mode) Panduit FSCCBU SC fiber optic connector (single mode) One SC connector for each end of each fiber.
    b. Furcation Kits: Panduit FK2BJ in sufficient quantities for all fibers
    c. Miscellaneous supplies to terminate fiber cables to industry standards.

B. Installation: Installation shall be conducted following guidelines established by the product manufacturer and industry standards.

1. Fiber Optic Cable: During installation of the fiber optic cable segments into the conduit system, special care shall be taken to avoid damage to the cable. While under pulling tension, the cable shall not be bent into a curve with a radius of less than 20 times the cable diameter. Pulling tension shall not exceed manufacturer's recommended maximum tensile load. The fiber optic cable shall be routed through the conduit and innerduct and onto the appropriate IDF backboard. Routing on the backboard shall be straight and plumb. A minimum fifteen (15) foot service loop shall be provided at each terminal location. Refer to drawings for cable configuration.

2.04 COPPER BACKBONE CABLE (EXCHANGE CABLE)

A. Description: From the MDF to each IDF a continuous segment 25, 50, 100 pair (or as required) outside plant cable shall be installed. This cable shall be routed along with the fiber optics cable discussed in Section 2.03 above. The cable shall contain required number of pairs and shall be suitable for underground installation. Each end of each cable shall be “dammed”, at the breakout point, to halt the flow of gel.

1. Product: AT&T 25-pair (or as required), exchange filled cable, PN #GFMW-25. {One (1) segment from the MDF to each IDF}.
2. Required Accessories and Quantities: [CLASS EXEMPT] 3M, ScotchcastTM 8964, Blocking Kit {One (1) for each cable segment}.

B. Installation: Cable installation shall be in accordance with manufacturer's instructions and recommendations and industry standards. All cable shall be affixed to the backboard via "D" rings and cable ties. Each end of each cable shall be dammed in accordance with instructions and recommendations supplied by the damming kit manufacturer. All pairs extending beyond the breakout point and dam shall be cleaned such that no gel remains on them. Binder groups shall be maintained and tied-off using the colored ribbon identifying each group.

2.05 WORK STATION CABLE

A. Description: From each IDF, 4-pair, Category 6 cables shall be routed to each work station (data outlets) served by the IDF. Cables shall be routed from the MDF to each workstation located in its building. Data outlet locations are depicted in the drawings and in the Outlet Summary.

1. Product:
   Data: Panduit PUR6004BU-U (Riser)
   Panduit PUP6004BU-U (Plenum)
2. Outside Plant Cable (OSP), for both voice and data, will be installed wherever the cabling will exit the indoor environment (i.e. cables running from one building to another in conduits and pullboxes). Product: Mohawk AdvanceNet LAN-Trak OSP Category 6 cable, part #M57622.
3. Voice Cables, for the purpose of this specification, will be any location which is designated as voice on the architectural signal drawings.
4. Wall Plate: Panduit CPFL6WH . One (3) for each workstation. Provide blank filler for all unused ports, part CHB2M. VERIFY COLORS FOR EACH JOB WITH DISTRICT.
5. Modular Outlets:
   Panduit CJ688TPBU (blue)

B. Installation: Installation shall be conducted in accordance with guidelines established by the product manufacturer and industry standards. Wall plates shall be mounted such that their vertical dimension is plumb. Each wall plate shall be labeled with its respective workstation numbers.

2.06 INTERMEDIATE DISTRIBUTION FACILITY (IDF)

A. Description: An IDF shall consist of a "fire-rated" plywood backboard, equipment rack or cabinet, fiber interconnect equipment, wire management, and wiring blocks. Contractor shall submit a floor plan and backboard/cabinet plan to Technology Services for approval prior to installation.

1. Products:
   a. Equipment Rack: Chatswork/CPI Dracon, 55053-503, 7' x 19", floor mount with 10250-112 12" cable ladder. Supply and install per Contract Drawings. In addition to the number of racks required for the fiber optic

and copper cable plants, supply and install one (1) empty racks for NCLUSD active equipment.

b. Fiber Interconnect: Panduit FRME2 with 3 FAP6WBUDSCZ fiber adapter panels. @ panels will be for Multimode and 1 panel for single mode One LIU is required for each IDF, mounted in the rack.

c. Category 6 Patch Panels: Panduit DP48688TP 48 port (DP24688TP, DP96688TP) DP6 Plus Patch Panels. Two (2) ports for each workstation served from the MDF with a minimum of 12 spare ports are required. Dedicated voice cables require a dedicated patch panel with one port for each dedicated voice cable plus an additional 10 percent spares. If the number of workstation / voice cables, plus required spare count (12) is greater than one\ panel, then a second patch panel is required. Supply and install as many patch panels in the MDF as necessary to service all workstation cables, dedicated voice cables, plus the required spare count for each system.

d. Patch Cables: Panduit UTPSPxxx (xxx denotes length and color. Contractor must verify with NCLUSD Technology Services prior to ordering) Patch cables shall be 3', and 6’ equally in length, 8-wire, 8-pin TIA/EIA-568A/B wiring configuration, conforming to Category 6 protocol. One patch cable is required for each link or workstation served.

e. Wire Management: Wire Panduit WMPV6X8 vertical wire management for each side of each rack installed. Side by side racks may share one unit. Contractor to install sufficient accessories to maintain full radius bend control for Category 6 standards.

f. "D" Rings: Provide and install sufficient quantities of 2" and 4" “D” rings to conform to Drawings.

B. Installation: Installation shall be conducted in accordance with manufacturer's recommendations, industry standards, and this specification. Installation includes complete assembly and mounting of the fiber interconnect equipment, dressing the fiber and copper cables, complete assembly and mounting of the equipment rack, and mounting of the wiring blocks.

2.07 TESTING AND DOCUMENTATION

A. Testing: Contractor shall test each fiber strand and each pair of each 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.

1. Fiber Optics Cable: Each fiber strand shall undergo bi-directional testing for signal attenuation losses.
   a. Test Equipment:
      1) Multimode: Fluke 4100 or equivalent.
      2) Singlemode: Fluke 4100 or equivalent.

b. Test:
   1) Multimode: Bi-directional signal attenuation at 850 and 1300 nm.
   2) Singlemode: Bi-directional signal attenuation at 1310 and 1550 nm.
c. Test Criteria: Signal loss of less than 10 dB through entire fiber path, including cable, couplers, and jumpers.

2. Workstation Cable: Each workstation cable shall be channel tested from the jack panel through the patch cord, in accordance to the following documents: ANSI/EIA/TIA - 568-A-TSB-67, ANSI/EIA/TIA - 568-A-TSB-95, and ANSI/EIA/TIA - 568-A, Amendment 5,
   a. Test Equipment: Fluke 4100 (with Category 6 “Perma-Link” adapter) or equivalent. All UTP drops shall be verified for performance using a Permanent Link or Channel Link test. Basic link shall NOT be used. UTP testing will be done by a level II or III tester. 100% of the cables will be tested and the documented results must be given to NCLUSD’s Technical Support on a CD which can be read by Microsoft Windows
   b. Test: Autotest, Continuity, Wiremap, NEXT, NEXT@Remote, ELFEXT, Length, Signal Attenuation, Impedance, Resistance, RL, RL@Remote, ACR, ACR@Remote, PSACR, PSACR@Remote, PSNEXT, PSNEXT@Remote, PSELFEXT, HDTDX, and Noise.
   c. Test Criteria: The system shall be tested to Category 6 compliance. The test path shall include workstation jacks, station cables, jack panels, and adapter cables.
   d. The channel will be tested to the following specifications:
      Category 6
      Insertion loss: 34.0 dB at 250 MHz
      PS-Next: 34.0 dB at 250 MHz
      Positive PS-ACR at 250 MHz
      Maximum length: 100 meters
      Return Loss 10.0 dB at 250MHz

B. Documentation: Contractor shall provide documentation to include computer generated test results and as-built drawings.
   1. Fiber Test Results: The results of the fiber testing shall be machine generated and printed equal to those by Fluke DSP4100 with fiber adapters. Handwritten results are NOT acceptable. Only original signed copies will be acceptable.
   2. Work Station Cable: The results of the work station cable tests shall be provided in the form of print-outs from the test equipment.
   3. As-Built Drawings: Contractor, upon request, will be provided with clean copies of the electrical drawings depicting data outlet locations as they were designed. The drawings, provided by the Owner, shall be modified to indicate actual cable routing, workstation locations, and workstation numbers.

2.08 ACCEPTANCE

A. 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 work station data cables must meet the criteria established in Section 2.08 above. With regard to functionality, Contractor must demonstrate to Owner that 1 Gbps 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.

2.09 DIVISION OF WORK

A. Contractor shall install the data communications system as described in this section. Installation shall result in a functional system pursuant to Section 2.08 above. The scope of work includes: (1) All necessary voice/data components; (2) Repair of damage to structures incidental to installation; (3) Supply and install all material discussed in this specification; (4) Test and document system, upon completion; (5) Supply and install all material necessary, whether or not discussed in this specification, to result in a complete and functional system (except for electronic components, unless otherwise specified).

END OF SECTION

COMMUNICATION, PAGING, CLOCK SIGNAL CONTROL
Section 275300

PART 1: GENERAL

1.1 RELATED DOCUMENTS

A. The drawings and general provisions of the Contract Documents apply to this Section.

1.2 SUMMARY

A. This section includes a fully operational IP platform for a school Critical Communications Solution, incorporating school safety notifications and general communications including but not limited to the following:
   1. The Clock System shall be Bogen, to match the existing campus.

1.3 DEFINITION OF TERMS

A. Installer(s): Shall refer to the person, persons, or company who or which contracts to perform the work specified herein.

1.4 SUBMITTALS

A. Product data for each component.

B. Shop Drawings: Prior to proceeding with the work: Provide detailed equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, location of each field connection, and a complete schedule of all equipment and materials with associated manufacturer's cuts sheets which are to be used.
   1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Identify terminals to facilitate installation, operation, and maintenance. Include a single-line diagram showing cabling interconnection of components and levels throughout system and impedances.
   2. Artwork drawings and lists indicating proposed nameplate nomenclature and arrangements for control panels and plug panels prior to fabrication reflecting equipment used.
   3. Each drawing shall have a descriptive title and all sub-parts of each drawing shall be labeled. All drawings shall have the name and locations of the project, Systems Contractor's name in the title block.
   4. Details and descriptions of any other aspect of the system, which must differ from the contract documents due to field conditions or equipment, furnished.

C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Include record of final matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.

D. Maintenance Data: For equipment to be included in maintenance manuals specified in Division 1.
   1. Record of Owners equipment-programming option decisions.
   2. All instructions necessary for proper operation and manufacturer's instructions.
   3. "Proof of Performance" information.
   4. Manufacturer's maintenance information.
   5. Copies of non-proprietary computer programs and system set up disks documenting all programmable features of the installed system.

E. Record Drawings: Prior to final acceptance, provide three (3) complete sets of drawings indicating all cable numbers and construction details in accordance with the actual system installation. Revise all shop drawings to represent actual installation conditions. These Record Drawings will be used during "Final Acceptance Testing".

F. System Training: Submit the following information describing the training programs and system trainers as outlined in paragraph 1.6 of this specification and in accordance with Division 1 specifications.
   1. Include with the submittal a preliminary staff development training program in outline form for review and approval by the owner's representative.
   2. Include with the submittal a current copy of the trainer's certification from the manufacturer that certifies and identifies the trainer(s) who are eligible to provide training and support for the project.
   3. Include with the submittal a current copy of trainer's needs assessment form which will be reviewed with the owner's designated representative for the system's preliminary system programming and configuration.
   4. Include with the submittal copies of all documentation used to identify for the owner those participants attending and completing the training programs.

G. A copy of the manufacturer's standard statement of warranty proving all equipment provided for the school communications network is covered with the required five-year warranty shall be included with the project submittal. This statement of warranty shall be provided on the manufacturer's stationary.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced Installer who is an authorized representative of equipment manufacturer for both installation and maintenance of equipment required for this Section. Provide the following within thirty (30) days after notification to proceed:

1. Provide a list of installations that the Installer has specifically installed for verification by the Owner. Random installations from other vendors and/or Installers shall not be accepted. The Installer, not its employees, must meet these qualifications.
2. The Installer shall be bondable.
3. The Installer shall demonstrate to the satisfaction of the Owner or his representative that he has:
    a) Adequate plant and equipment to pursue the work properly and expeditiously.
    b) Adequate staff and technical experience to implement the work.
    c) Suitable financial status to meet the obligations of the work.
    d) Technically capable and factory trained service personnel at a local service facility to provide routine and emergency service for all products used in this project.

B. Any Contractor, who intends to bid on this work and does not meet the requirements of the "Quality Assurance" paragraph(s), shall employ the services of an "Installer" who does meet the requirements and who shall provide the equipment, make all connections and continuously supervise the installation. A subcontractor so employed as the "Installer" must be acceptable to the Architect/Engineer. The "Installer" shall be identified within thirty (30) days of notification to proceed for acceptance by the Architect/Engineer.

C. Because the life expectancy of this type of communications structure normally exceeds 10 years, the owner expects continuity from the service provider. If the installing/servicing company has not been an authorized provider of the manufacturers product for it least (10) years, the following is required:
1. A list of (2) systems manufacturers of which they currently are authorized service providers where the relationship exceeds (xx) years.
2. A letter from the manufacturer outlining the details of changes in service providers over the last (10) years and what actions they will take to ensure continuity of service to the customer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

E. Comply with NFPA 70

F. Comply with NEMA Standard SB-40 for Emergency Communications in K-12 schools.

G. Comply with UL 60950.

1.6 WARRANTY

A. Provide a manufacturer's five-year warranty of the school communications network equipment against defects in material and workmanship. This warranty will cover all electronic system components. Additional warranties cover clocks, speakers, and call in switches. If any defects are found within the warranty period, the defective equipment shall be replaced at no cost (equipment only); a one-year warranty shall be provided for labor.

B. A copy of the manufacturer's standard statement of warranty proving all equipment provided for the school communications network is covered with the required five-year warranty shall be included with the project submittal. This statement of warranty shall be provided on the manufacturer's stationary. The standard five-year warranty is an important element in establishing a standard in quality. Manufacturers who circumvent the five-year warranty by offering special "extended warranties" that are not part of their normal published warranty will not be accepted.

C. Contractor shall respond, excluding weekends and holidays, within 24 hours to any warranty service calls. If equipment cannot be repaired within 24 hours of service visit, the contractor shall provide "loaner" equipment to the facility at no charge.

D. Make available a service contract offering continuing factory authorized service of the system after the initial warranty period.

1.7 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide the following system:
   1. Front Row IP Speakers Drivers Bojan Clocks. Bojan combination Clock Speakers (8ohm). Altlas Exterior Vandal Resistant Speakers (8ohm)

PART 2 - PRODUCTS

A. Zone Page Amplifier Module (Front Row)
   1. Depending on configuration the amp output is either 14 or 35 watts output.
   2. Can be wall or rack mounted.
   3. Powered with either a wall wort or POE+

B. Equipment Racks
   1. All equipment racks shall provide 44 spaces (77") minimum for mounted system equipment.
   2. All equipment racks shall be multi-rack format ("gangable") style, bolted together, and open cavity.
   3. All equipment racks will be provided with lockable rear doors.

4. Equipment rack(s) shall be in climate-controlled areas/rooms as shown on drawings.
5. All head-end, distribution, and source equipment, including data and power, shall be in racks configured as approved by the Engineer.
6. Rack mounted equipment shall be accessible from front and rear.
7. All unused rack spaces will be covered with appropriate blank/vent panels.

C. Interior Ceiling Speakers
1. Provide Ceiling Speaker Assembly consisting of 8 Ohm, 8" speaker mounted in a 2 foot by 2 foot, or 2 foot by 1 foot, lay-in baffle, with an integrated back box that covers the full area of the baffle.
2. The speaker shall be connected by inserting an 8-pin RJ45 terminated CAT 5e or Cat 6 cable.
3. The speaker shall include provisions to allow attachment of a safety cable if required.

D. Wall Mounted Horns
1. Provide double re-entrant type horn loudspeakers with integral driver. The horn loudspeaker shall be impervious to weather and vandalism. Horn shall be constructed of heavy-duty ABS plastic. Horn loudspeaker drivers shall be rated at 15 watts with a frequency response of 480 Hz to 14 KHz. Sensitivity shall be 106 dB 1 watt, 1 meter. Transformer assembly shall be dual voltage multi-tap type suitable for 25 or 70-volt installations. Dispersion pattern shall be 180 degrees conical. The horn loudspeaker shall be constructed of treated heavy gauge aluminum, with all exposed parts potted and a sealed driver. Wiring terminal shall be fully enclosed. The speaker flange and mounting surface shall have a cork-rubber gasket. The horn loudspeakers finish shall be gray baked on enamel.
2. The recessed back box shall be of heavy gauge cold-rolled steel, spot welded for stability with a rust-retardant gray primer finish. Acoustically treat the interior to eliminate mechanical resonance. The back box shall be 10-3/4"x10-3/4"x6" deep.
3. The baffle shall be vandal proof, the faceplate constructed of 14-gauge carbon steel with a minimum tensile strength of 55,000 PSI. A lattice grid sub-plate shall deny access to the horn but be acoustically transparent for sound projection. Provide tamper proof, stainless steel mounting hardware. The baffle shall a mar/scratch baked epoxy rust inhibitive finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with the Installer present, for compliance with requirements and other conditions affecting the performance of the School Communications and School Safety Network.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install system in accordance with NFPA 70 and other applicable codes. Install equipment in accordance with manufacturer's written instructions.

B. Furnish and install all material, devices, components and equipment for a complete operational system.

C. Impedance and Level Matching: Carefully match input and output impedance's and signal levels at signal interfaces. Provide matching networks where required.

D. Control Circuit Wiring: Install control circuits in accordance with NFPA 70 and as indicated. Provide number of conductors as recommended by system manufacturer to provide control functions indicated or specified.

E. All housings are to be located as indicated.

F. The contractor shall provide necessary transient protection on the AC power feed, all copper station lines leaving or entering the building, and all central office trunks. All protection shall be as recommended by the equipment supplier and referenced to earth ground.

G. Wiring within Enclosures: Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars.

H. Provide physical isolation from speaker-microphone, telephone, line-level wiring, and power wiring. Run in separate raceways, or where exposed or in same enclosure, provide 12-inch minimum separation between conductors to speaker-microphones, telephone wiring and adjacent parallel power. Provide physical separation as recommended by equipment manufacturer for other system conductors.

I. Identification of Conductors and Cables: Use color coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams.

J. Weatherproofing: Provide weatherproof enclosures for items to be mounted outdoors or exposed to weather.

3.3 GROUNDING

A. Provide equipment grounding connections for Integrated Electronic Communications Network systems as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.

B. Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

C. Provide all necessary transient protection on the AC power feed and on all copper station lines leaving or entering the building. Note in system drawings, the type and location of these protection devices as well as all wiring information.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a duly factory authorized service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.

B. Inspection: Make observations to verify that units and controls are properly labeled, and interconnecting wires and terminals are identified. Provide a list of final tap settings of paging speaker line matching transformers.

C. Testing: Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

3.5 FINAL ACCEPTANCE TESTING

A. The Final Acceptance Testing shall be provided to the Owner or the Owners designated representative only. Final acceptance testing to any other trade or service provider for the project will not comply with the Requirements of this section.

B. The contractor will provide a Final Acceptance Test record document signed by both the contractor and the Owner or designated Owner’s Representative establishing the “In Warranty” date. The warranty period will not commence until the Final Acceptance Test is completed.

C. Be prepared to verify the performance of any portion of the installation by demonstration, listening and viewing test, and instrumented measurements. Make additional adjustments within the scope of work and which are deemed necessary by the Owner because of the acceptance test.

3.6 COMMISSIONING

A. The contractor shall train the Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of the system. This training will be in accordance with the training as outlined in Section 1.6 of these specifications. In addition to the Training Materials provided, the contractor will also furnish Operators Manuals and Users Guides at the time of this training.

B. Schedule training with Owner through the owner’s representative, with at least seven days advance notice.

3.7 OCCUPANCY ADJUSTMENTS

A. The contractor shall provide Occupancy Adjustments in accordance with Section 1.6 of these specifications. A response scenario amenable to both the owner and the contractor will be established and followed for the first year of service.

3.8 CLEANING AND PROTECTION

A. Prior to final acceptance, the contractor shall vacuum and clean all system components and protect them from damage and deterioration. All blank spaces in equipment cabinets will be covered with blank panels. Top and side panels, and all cabinet doors will be installed. All general areas within and around all equipment rack/cabinets in the facility will be swept, vacuumed, and cleaned up. No cabinets will be left unlocked and all cabinet keys will be turned over to the owner or designated owner’s representative.

END OF SECTION

VIDEO SURVEILLANCE
SECTION 28 2000

PART I - GENERAL

1.01 SUMMARY

A. This section specifies equipment, accessories, wire, materials, installation, configuration, and testing requirements for a complete and operable Video Surveillance system. The system shall integrate into the existing system on campus. Cameras, mount, and software will be provided by owner. All installation by Contractor.

1.02 SCOPE

A. The work will include but not be limited to the following objectives:
   1. The Contractor shall provide and pay for all labor, supervision, materials, accessories, components, equipment, tools, transportation, and other facilities and services necessary for the proper installation of a complete and functional Video Surveillance System.

B. The CCTV system shall have the following minimum requirements:
   1. Cameras
      a. Weather resistant IP67 or greater (exterior only)
      b. Network/IP based equipment
      c. PoE capable equipment
      d. Resolution of 5MP or 4K
      e. H.265 video compression
      f. Day/Night capability with IR illumination
      g. Motion detection
      h. ONVIF
   2. Network Video Recorder
      a. Network/IP based equipment
      b. H.265 video compression
      c. RAID 5 or greater
      d. Motion detection activated recording
      e. 30 day+ video storage capability
   3. Software
      a. PC and mobile viewing enabled
      b. Capable of displaying both live and recorded video
      c. Search mode enabled
      d. Capable of saving video to MP4 format
      e. Able to generate notifications

1.03 RELATED REQUIREMENTS

A. See Drawings.

1.04 SYSTEM REQUIREMENTS

A. Any new installations or existing system modifications shall seamlessly integrate into the site's existing Video Surveillance system.

1.05 SUBMITTALS

A. Refer to Section 01 3300 for requirements.

1.06 CONTRACTOR "SHOP DRAWINGS" DESIGN REQUIREMENTS

A. Shop Drawings are required for this section.

1.07 QUALIFICATIONS

A. The Contractor shall be located within a 50-mile radius of the project site in order to provide a 2-hour response time.

B. The Contractor shall have five (5) years of experience in the installation of video surveillance equipment and be able to provide verification of this experience to the District prior to the Bid Opening Date.

1.08 WORKMANSHIP

A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.

B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

C. The Contractor shall comply with the highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship

D. The Contractor shall perform Work with persons experienced and qualified to produce the level of workmanship that is specified.

E. The Contractor shall maintain quality control over their suppliers and Subcontractors.

F. The Contractor shall be responsible for scheduling Subcontractors in a timely manner in order to meet scheduled deadlines.

1.09 WARRANTY

A. Refer to Division 01 – Warranty section.

B. Refer to Section 27 00 00 for additional requirements.

PART 2 - PRODUCTS

2.01 GENERAL

A. All products shall be new, unused and without blemishes and shall be of manufacturer's current and standard production.

B. The Contractor shall confirm all equipment part numbers with the Project Manager or District prior to ordering equipment and shall update the submittals as required.

C. The Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. The Contractor shall provide all components needed for complete and satisfactory installation and operation.

D. The Contractor shall install mounting hardware and anchors as recommended by the Manufacturer of equipment and adhere to all code requirements.

E. Product Availability:
   1. The Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.

2.02 MANUFACTURERS AND PRODUCTS

A. See Appendix A at the end of this document for pre-approved materials.

B. Product Substitutions require proof of equivalence to the specified product. Substitution requests shall be submitted to the District and/or its representative in writing. Do not order any substitute products until the substitution request has been approved.

C. All exterior cameras shall be IP67 rated or better.

PART 3 - EXECUTION

3.01 ACCEPTABLE INSTALLERS

A. All Installers utilized by the Contractor shall be qualified and, when such certification is available, certified to install, service, and maintain the systems related to this section.

B. Cable terminations (copper or fiber) shall be installed by manufacturer-certified technicians.

3.02 EXAMINATION

A. The Contractor shall be required to visit the installation site(s) prior to bidding the job. The Contractor acknowledges that the failure to visit the site(s) will not relieve the Contractor of the responsibility for observing and considering those conditions which a Contractor would have observed and considered during a site visit, estimating properly the difficulty and cost of successfully performing the Work or proceeding to perform the Work without additional cost to District.

B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

A. The Contractor shall verify that materials are readily available prior to submitting product submittals and notify the District's Project Manager of any products known to have long lead time items.

B. The Contractor shall order all required parts and equipment only after receipt of approved product submittals from the District's Project Manager.

C. The Contractor shall coordinate with the District's Technology Services department for needed IP addresses at least ten (10) business days prior to configuration/installation.

3.04 SHOP DRAWINGS

A. The Contractor shall create "Shop Drawings".

3.05 WORKMANSHIP

A. Quality workmanship is a high priority for the District and the Contractor shall be held to a high-level of professional workmanship.

B. The District's Project or Construction Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

C. The Contractor shall comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.

D. The Contractor shall perform Work with persons experienced and qualified to produce workmanship specified.

E. The Contractor shall maintain quality control over suppliers and Subcontractors.

3.06 PATHWAY AND EQUIPMENT INSTALLATION

A. Install all conduit and pathway per design documents.

B. Install all Category cables per design documents.

C. Equipment shall be installed according to the manufacturer's instructions.

D. Cameras shall be installed using tamper-proof fasteners.

E. Devices requiring PoE power shall be connected to a PoE switch in the MDF/IDF data rack – verify for adequate PoE power capacity.

3.08 CONFIGURATION

A. Coordinate with Technology Department for programming/configuration.

B. All equipment shall be fully configured and tested for functionality prior to District acceptance testing.

3.09 CAMERA VIEW

A. At completion of the installation the Contractor shall coordinate with the Technology Department for final aiming of the cameras.

B. Contractor shall provide all tools, ladders, and staff for final aiming of all cameras.

3.10 FIELD QUALITY CONTROL AND TESTING

A. Make all adjustments required from the District review.

B. The Contractor shall submit the Record Drawings to the District for review prior to the formal test and inspection.

C. During the formal Test & Inspection (Commissioning of the system) the Contractor shall have personnel available with the necessary tools and equipment to inspect wiring, devices, and system operation.

D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. The Contractor shall perform the needed corrections in a timely fashion.

E. The Contractor shall notify the District when they are ready to perform a re-inspection of the installation.

F. Upon a successful test and inspection, the District or its representative shall provide the Contractor with the final sign-off for acceptance.

END OF SECTION

FIRE ALARM SYSTEM
SECTION 283100

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire Alarm System.

1.2 RELATED SECTIONS

A. Section 26 0000: Electrical General Requirements.

B. Section 26 0533: Raceways & Boxes

1.3 QUALIFICATIONS

A. See Section 26 0000.

B. Fire Alarm System Subcontractor shall be established with 5 years in the area with a minimum of five years experience in Fire Alarm Systems.

1.4 REFERENCES/STANDARDS/CODES

A. California Electrical Code 2022 Edition.

B. California Building Code 2022 Edition.

C. California Fire Code 2022 Edition.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS: The Contractor shall provide a complete fully operational firealarm system as specified herein and on the drawings for the new building in compliance with the current California Electrical Code and California Building Codes.

A. The fire alarm system shall be an electrically supervised, battery standby, two wire Class B system, with fully addressable initiating devices to match the existing campus.

B. The fire alarm system shall be the product of one manufacturer, as specified on plans.

C. The fire alarm equipment shall have been listed by the State Fire Marshal.

D. The fire alarm system shall conform to CBC Sections 907.2.3 & CEC Article 760 and CFC Article 907.2.3. in the field of school fire alarm systems installation and service. The contractor must also have completed similar systems in the past five years.

E. It is the contractor's responsibility to provide the Owner with a complete and working system that meets the intent of these specifications. Omissions in the written specifications and/or plans will not relieve the contractor of this responsibility.

F. Contractor must be a factory authorized distributor for the equipment to be installed.

G. Contractor shall supply the Owner with three copies of operation and maintenance manuals, and three sets of keys required to operate or maintain system. The manual shall be bound in a 3 ring binder with instructions necessary for proper operation and servicing of the system and as-built installation drawings. The binder shall have project name/address and name and address of the installing contractor; a copy of all warranties.

H. Contractor shall supply flash drive (or equal) with installed fire alarm program.

I. The successful bidder must have a service facility within a 100-mile radius of the project. On-the-premises maintenance shall be provided for a period of twelve (12) months from date of completion of installation.

2.2 SUBMITTALS AND SUBSTITUTIONS:

A. Submittals for DSA approval are not required for the system specified and shown on the plans as it has already been approved by DSA. Minimum submittals as noted below are required for the review and approval by the Architect/Engineer to confirm that the system to be installed is the same as the system specified. Such submittals shall have the following as a minimum:

1. Index, including project title, DSA project number, scope of project and address and name of firm submitting the proposal.
2. Copy of authorized distribution's valid California State Contractor's License, letter of factory authorization and guarantee of service and list of projects of equal scope.
3. A statement by the installing contractor that the system to be provided is the components and devices.

B. In the event the electrical contractor proposes to substitute the specified system he shall provide detailed submittals as noted below in paragraph "C" for approval by the engineer. Any change in the Fire Alarm System shall be as "An Approved Equal" by the electrical engineer of record. Upon approval the electrical engineer shall submit to DSA a No-Cost change order request for the substituted Fire Alarm System.

C. Two (2) copies of submittals shall be provided for initial review by the Engineer. Each

submittal shall contain the following, minimum, as applicable.

1. Index, including project title, scope of project and address and name of firm submitting the proposal.
2. Copy of authorized distributor's valid California State Contractor's license, letters of factory authorization and guarantee of service and list of projects of equal scope.
3. Engineering data sheets on each item of the proposed system, including State Fire Marshal listing numbers as applicable. Provide an itemized equipment list as well.
4. Overall equipment location in the form of building floor plans, with all rooms identified, to the same scale as bid drawings. Point-to-point wiring diagram. Additionally, the drawings shall also include a complete legend, describing the equipment symbols and State Fire marshal listing numbers as applicable. Provide a cable schedule. Such drawings shall be limited to fire alarm equipment only. No other systems or wiring shall be shown on these drawings.
5. Complete Single line riser diagram for the whole system.
6. Battery capacity calculations.
7. Voltage drop calculations for each signal circuit.
8. California State Fire Marshal listing sheets showing expiration date of all components of the system.
9. Proposed anchorage detail of the fire alarm control panel.
10. A description of operation/events that would occur when the fire alarm system is activated. This description shall be noted on the submittal drawings. Upon successful review of the initial submittal the contractor shall provide to the engineer six (6) copies of complete submittals as noted above. The engineer will then submit a no-cost change order request to DSA.

C. The system equipment shall be is as manufactured by Gamewell E3 No other system is approved for this project.

2.3 <u>EQUIPMENT/SCOPE OF WORK:</u>

A. Verify all existing conditions at the site prior to bid. System is to be installed while existing system is still in operation.

B. Provide a fully automatic system with a Fire Alarm Control Panel, Strobes, Heat and Smoke Detectors, and related wiring.

C. Provide cables as required for system operation. Provide pull boxes, conduits, raceways as required for this. Connect all devices and the Fire Alarm Control Panel to provide a complete and fully functional single fire alarm system.

D. Equipment:

1. New Simplex Fire alarm control panel. Provide all required accessories modules, power supplies and battery. Minimum alarm initiation and signal circuit zones shall be as noted on the plans.
2. Fire alarm strobes-Candella as noted on plan.
3. Fire alarm smoke and heat detectors.
4. Carbon monoxide sensors.

2.4 Conduits, cables, pullboxes and all other accessories as required to provide a complete and fully functional system. All fire alarm system devices, which are to be surface mounted shall be provided with compatible, red, surface box. Regular outlet boxes are not acceptable for this use.

PART 3 – EXECUTION

3.1 <u>Installation and Testing of Fire Alarm System:</u>

A. Review the total system point to point wiring layout to assure that the correct number and type of conductors and conduit sizes are installed.

B. Final connections, testing and adjusting and calibrating shall be made under the direct supervision of factory-trained technician of the system supplier.

C. The entire system shall be installed in conduit. Minimum size of conduit shall be 3/4" indoors. Minimum size of underground conduit shall be 3/4". Cables shall be copper conductors with THWN insulation. Minimum sizes shall be as noted on the plans. All conduits installed underground and on exterior surfaces of a building shall have watertight fittings.

D. Program smoke detector and control relay for each smoke/fire damper such that only the damper associated with that smoke detector shuts down when the detector goes into alarm.

E. Work and coordinate with the owner to provide off-site monitoring of the system. Owners to arrange for leased telephone lines and to provide necessary information to the Fire Alarm Subcontractor as required.

F. Upon completion of the installation of the fire alarm system, a satisfactory test of the entire system shall be made in the presence of, and witnessed by, the IOR, Owner's Representative.

G. Provide 3 copies of a certificate to the Architect that the fire alarm system components and system installed is in accordance with the approved plans and specifications. Provide a Certificate of Completion per NFPA.

H. See operation matrix on the plans.

END OF SECTION

EARTHWORK
SECTION 31 0000

PART 1 - GENERAL

1.1 INCLUSION OF OTHER CONTRACT DOCUMENTS

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

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 5000, Temporary Facilities.

B. Section 02 2600, Geotechnical Investigation Report.

C. Section 03 3000, Cast-In-Place Concrete.

D. Section 31 2333, Trenching and Backfilling.

E. Section 31 2500, Erosion Control.

F. Section 32 8000, Irrigation.

G. Section 32 9000, Planting.

H. Section 33 4000, Site Drainage.

1.3 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.

B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.

C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting of inadequate compaction or moisture content is the sole responsibility of the contractor.

D. Tests (See Part 3 for Compaction Testing).

E. Contractor shall be solely responsible for all subgrade built. Failure resulting from inadequate compaction or moisture content are the responsiblity of the contractor. Contractor shall be solely responsible for any and all repairs.

1.4 SUBMITTALS

A. Refer to Section 01 3300.

B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.5 WARRANTY

A. Refer to General Conditions and Section 01 3300.

1.6 REFERENCE AND STANDARDS

A. General: Site survey, include in the drawings, was prepared by **Associated Engineering Group,** and is the basis for data regarding current conditions. While the survey is deemed generally accurate, there existing discrepancies and variations due to elapsed time, weather, etc. Existing dirt grades may vary 0.2 ft. from that shown.

B. Site Visitation: All bidders interfacing with existing conditions shall visit the site prior to bid to verify general conditions of improvements. Discrepancies must be reported prior to the bid for clarification.

C. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

D. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.

E. ANSI/ASTM D1557-02e2 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10lb. (4.54.Kg) Rammer and 18 inch (457 mm) Drop.

F. ANSI/ASTM D3017-05 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).

G. ANSI/ASTM D422-63(2007) e1 Test Method for Particle Size Analysis of Soil.

H. ANSI/ASTM D4318-05 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.

I.. CALTRANS Standard Specifications Section 17.

J. CAL-OSHA, Title 8, Section 1590 (e).

K. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

1.7 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.

B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.8 PROJECT CONDITIONS

A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.

B. Excavation dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for excavation dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.

1.9 EXISTING SITE CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.10 ON SITE UTILITY VERIFICATION AND REPAIR PROCEDURES

A. Ground-breaking requirements:
   1. All underground work performed by a Contractor must be authorized by the District's Construction Manager or the Low Voltage Consultant prior to start of construction.

2. The Contractor is to obtain and keep the original School's construction utility site plans on site during all excavation operations. Contractor can contact the District's Construction Manager, Facilities Manager, or the Low Voltage Consultant to procure the drawings.

B. Underground Utility Locating:
   1. The contractor shall hire an Underground Utility Locating Service to locate existing underground utility pathways in areas effected by the scope of work for excavation.
   2. Contractor must use an underground utility locator service with a minimum of 3 years experience. The equipment operator must have demonstrated experience.
   3. The Underground Utility Locator Service must have the use of equipment with the ability to locate by means of inductive clamping, induction, inductive metal detection, conductive coupling, or TransOnde (Radiodetection) to generate signals, passive locating (free scoping) for "hot" eclectic, and metal detector.
   4. The Underground Utility Locator Service must be able to locate existing utilities at a depth of a least 72".
   5. The Underground Utility Locator Service must be able to locate but are not limited to locating the following types of utility pathways:
      a) All conduit pathways containing 110 volt or greater 50-60Hz electrical wire.
      b) All conduit pathways containing an active cable TV system.
      c) All conduit pathways containing wire or conductor in which a signal can be attached and generated without damaging or triggering the existing systems.
      d) All empty conduit pathways or pipe in which a signal probe or sonde (miniatures transmitter) can be inserted.
      e) All conduit pathways containing non-conductive cables or wires in which a signal probe or sonde (miniature transmitter) can be inserted.
      f) All plastic and other nonconductive water lines in which a TransOnde (Radiodetection) or other "transmitter" can be applied to create a low frequency pressure waive (signal) without damaging or triggering the existing systems.
      g) All copper or steel waterlines and plastic or steel gas lines.
   6. All markings made by the Underground Utility Locator Service or other shall be clear and visible.
   7. The contractor shall maintain all markings made by Underground Utility Locator Service or other throughout the entire length of the project.
   8. The Underground Utility Locator Service shall provide the contractor with two sets of maps showing the locations of utilities and average depth. They will be referenced to permanent buildings. Contractor will deliver one copy to the district at no additional charge.
   9. Contractor is responsible to contract Underground Service Alert (U.S.A. 800/227-2600) and receive clearance prior to any excavation operations.
   10. Contractor shall inform the Architect no later than five (5) days prior to the date scheduled for the utility locator service to be on site.

1.11 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by-on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.

B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.

C. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullying of sides of excavation.

D. Surfaces Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.

E. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.

F. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

G. Trees: Carefully protect existing trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

I. **ENVIRONMENTAL PROTECTION**

1. No ground-disturbing activities shall be allowed outside of the project construction boundary. Construction fencing shall be placed at the boundary of the project site to clearly mark the limits of ground-disturbing activities.
2. All project-related traffic shall be restricted to designated access roads, routes, and construction areas within the project boundary. No vehicular or pedestrian traffic shall be allowed outside the designated project boundary.
3. To prevent sediment, hazardous materials, and other pollutants from washing or running off into the vernal swale and vernal pools outside of the project site, the contractor shall implement best management practices as identified in a Storm Water Pollution Prevention Plan (SWPPP).
4. Dirt roadways or other areas of disturbed bare ground within 100 feet of elderberry shrubs will be watered at least twice a dat to minimize dust emissions.

5. A worker awareness training program for construction personnel will be conducted by a qualified biologist prior to beginning construction activities. The program will inform all construction personnel about the life history and status of the beetle, requirements to avoid damaging the elderberry plants, and the possible penalties for not complying with these requirements. Written documentation of the training will be submitted to USFWS within 30 days of its completion.
6. Contractor to avoid and protect all protected species.

1.12 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

B. Excessively wet fill material shall be bladed and aerated per section 3.08, B.

1.13 TESTING

A. General: Refer to Section 01 4000 - TESTING AND INSPECTION.

B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of building pad preparation with Soils Report, and to direct adjustments in moisture conditioning. Costs of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and back charged to Contractor.
1. Testing of import fill for compliance with Department of Toxic Substance Control (DTSC) shall be paid for by the Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lime treatment
1. See Civil drawings for lime treatment areas and specifications.

B. Engineered Fill Materials: All fill shall be of approved local materials supplemented by imported fill if necessary. “Approved” local materials are defined as local soils tested and approved by Geotehnical Engineer free from debris, and concentrations of clay and organics; and contain rocks no larger than **4** inches in greater dimension. The soil and rock should be thoroughly blended so that all rock is surrounded by soil. This may require mixing of the soil and rock with a dozer prior to placement and compaction. Clods, rocks, hard lumps or cobbles exceeding **1** inch in final size shall not be allowed in the upper **6** inches of any fill. Native clay or clayey soils will not be permitted within the upper **24** inches of building pad areas or paved areas.

C. Imported Engineered Fill Material: Imported fill may be required to complete work. Proposed import fill material shall meet the above requirements; shall be similar to the native soils. Import fill shall meet the above requirements; shall have plasticity index of **4** or less; be free of particles greater than **4** inches in largest dimension; be free of contaminants have corrosion characteristics within the acceptable limits. All import fill material shall be tested and approved by Soils Engineer prior to transportation to the site. Proposed fill material shall comply with DTSC guidelines to include Phase 1 environmental site assessment and related tests. Refer to the October 2001 DTSC Information Advisory for clean imported fill material.

1. DTSC TESTING: Site work contractor is to coordinate testing with an analytical lab, hired by the owner, licensed by the State of California of the DTSC testing. The costs associated with testing will be paid by the contractor.
2. DTSC testing shall include documentation as to the previous land use, location, and history. Soils shall be analyzed for all compounds of concern to ensure the imported soil is uncontaminated and acceptable. Testing shall be performed per the recommendations included in DTSC Imported Fill Advisory (http://www.dtsc.ca.gov/Schools/upload/SMP_FS_Cleanfill-Schools.pdf) . Soils shall be tested prior to import to the project site.
3. Lab shall determine geographically which tests and analysis comparison will be appropriate for the testing. (CAM 17 / Title 22); (RWQCB) Regional Water Quality Control Board; or (OEHHA) Office of Environmental Health Hazard Assessment.
4. Frequency of testing shall be conducted in accordance with DTSC's Imported Fill Advisory as follows;

Fill Material Sampling Schedule

Area of Individual Borrow Area	**Sampling Requirements**
2 Acres or Less	Minimum of 4 Samples
2 to 4 Acres	Minimum of 1 Sample every ½ Acre
4 to 10 Acres	Minimum of 8 Samples
Greater than 10 Acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	
Up to 1,000 Cubic Yards	1 sample per 250 cubic yards
1,000 to 5,000 Cubic Yards	4 samples for the first 1,000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 Cubic Yards	12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

5. Reports/ Documentation
    a. Results of the testing analysis shall be sent tot he Owner; Architect; Project Inspector, Project Civil Engineer, DTSC, and DSA. Letter shall reference DSA file and application numbers.

D. Landscape Backfill Material:
1. The top **4"** of native topsoil stripped from the site may be used for landscape backfill material provided it meets the requirements as specified in Section 32 9000.
2. Imported Topsoil may be required to complete work. See Section 32 9000 for requirements. Proposed Topsoil material shall comply with DTSC guidelines to include Phase 1 environmental site assessment and related tests. Refer to the October 2001 DTSC Information Advisory for clean imported fill material.

E. Water: Furnish all required water for construction purposes, including compaction and dust control.

F. Aggregate Base: Provide Class, 2, 3/4" Aggregate Base Conforming to standard gradation as specified in Caltrans Standard Specifications, Section 26, -1.02A.

G. Decomposed Granite: Decomposed Granite shall be well graded mixture of fine to 1/8" particle in size with no clods. The material shall be free of vegetation, other soils, debris and rock. The material shall be redish-tan to tan in color.

H. Decomposed Granite Solidifier: PolyPavement or Equal.

PART 3 - EXECUTION

3.1 INSPECTION LAYOUT AND PREPARATION

A. Prior to installation of the work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point were this installation may properly commence.

B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.

C. Verify that specified items may be installed in accordance with the approved design.

D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.2 PERFORMANCE

A. GENERAL:

1. General: Do all grading, excavating and cutting necessary to conform finish grade and contours as shown. All cuts shall be made to true surface of subgrade.
2. Archaeological Artifacts: Should any artifacts of possible historic interest be encountered during earthwork operations, halt all work in area of discovery and immediately contact the Architect for notification of appropriate authorities.
3. Degree of Compaction: Percentage of maximum density, hereinafter specified as degree of compaction required, means density equivalent to that percentage of maximum dry density determined by ASTM D1557 Compaction Test method, and such expressed percentage thereof will be minimum acceptable compaction fort specified work.
4. Optimum Moisture Content: Optimum moisture content will be determined by Soils Engineer and this information supplied to Contractor. Optimum moisture content shall be maintained until subgrade is covered by surfacing materials.

3.3 DEMOLITION, DISPOSAL AND DISPOSITION OF UNDESIRABLE MAN-MADE FEATURES

A. All other obstructions, such as abandoned utility lines, septic tanks, concrete foundations, and the like shall be removed from site. Excavations resulting from these removal activities shall be cleaned of all loose materials, dish shaped, and widened as necessary to permit access for compaction equipment. Areas exposed by any required over-excavation should be scarified to a depth of **6**", moisture-conditioned to near optimum moisture content, and re-compacted to at least **95%** of the maximum dry density.

3.4 TESTING AND OBSERVATION

A. All grading and earthwork operations shall be observed by the Geotechnical Engineer or his representative, serving as the representative of the Owner.

B. Field compaction tests shall be made by the Geotechnical Engineer or his representative. If moisture content and/or compaction are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified moisture or compaction. Notify Geotechnical Engineer at least 48 hours in advance of any fill operation.

C. Earthwork shall not be performed without the notification or approval of the Geotechnical Engineer or his representative. The Contractor shall notify the Geotechnical Engineer at least two (2) working days prior to commencement of any aspect of the site earthwork.

D. If the Contractor should fail to meet the compaction or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory, as determined by the Geotechnical Engineer or Architect/Engineer.

E. After each rain event Geotechnical Engineer shall test fill material for optimum moisture. Do not place any fill material until desired moisture is achieved.

3.5 CLEARING AND GRUBBING

A. Prior to grading, remove all debris off-site. Remove trees and brush including the root systems. Holes resulting from tree and brush removal should be prepared and backfilled in accordance with paragraphs 3.07, 3.08, 3.09, and 3.10. This may require deepening and/or widening the holes to adequately remove disturbed soil and provide room for compaction equipment. Strip the surface of all organics. Strippings meeting the requirements of Section 02 9000 may be used in landscape areas only.

3.6 CUTTING

A. Building pads that are located within a cut/fill transition area will have to be over-excavated to provide a semi-uniform fill beneath the building pad. The portions of building pads located in cut areas shall be over-excavated to provide no more than **1** foot difference in fill placed in the same building pad.

B. Do all cutting necessary to bring finish grade to elevations shown on Drawings.

C. When excavation through roots is necessary, cut roots by hand.

D. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.

3.07 NOT USED

3.08 SUBGRADE PREPARATION

A. Grade compact and finish all subgrades within a tolerance of 0.10' of grades as indicated on Drawings and so as not to pool water. Subgrade within building pads and concrete walks shall be within 0.05' of grades indicated.

B. After clearing, grubbing and cutting, subsurface shall be plowed or scarified to a depth of at least **6"**, until surface is free from ruts, hummocks or other uneven features. Moisture condition to 3 to 5% above optimum moisture content and re-compact to **95%** of the maximum dry density as determined by ASTM Test Method D1557. If the existing soils are

at a water content higher than specified, the contractor shall provide multiple daily aerations by ripping, blading, and/or discing to dry the soils to a moisture content where the specified degree of compaction can be achieved. After seven consecutive working days of daily aerations, and the moisture content of the soil remains higher than specified, the contractor shall notify the architect. If the existing soils have a moisture content lower than specified, the contractor shall scarify, rip, water and blade existing soil to achieve specified moisture content. The contractor shall make proper allowance in schedule and methods to complete this work.

C. After subgrade for fill within building pad area or within paved areas has been cleared, plowed and scarified, it shall be disked or bladed until uniform and free from large clods, brought to 2% above optimum moisture content and compacted to not less than **90%** of maximum dry density, as determined by ASTM Test Method D1557, and such expressed percentage thereof will be minimum acceptable density for specified work.

D. Subgrade in areas to receive landscaping shall be compacted to (**90%**).

E. Where Contractor over-excavates building pads through error, resulting excavation shall be re-compacted as engineered fill at Contractor's expense.

F. In building pad areas with cut/fill transitions or building pad areas, which are entirely in cut, over-excavate a minimum of 2 feet so that differential fill thickness does not exceed 1 foot over a horizontal distance of 5 feet.

3.09 PLACING, SPREADING AND COMPACTING FILL MATERIAL IN BUILDING PAD AND PAVEMENT AREAS

A. Selected fill material shall be placed in compacted layers and geogrid reinforcement.
   1. Each layer shall be spread evenly and thoroughly mixed to insure uniformity in moisture content. Compaction of rocky fill materials should be achieved by at least successive passes with a compactor or an equivalent self-propelled sheepsfoot compactor. Compactive effort should be applied uniformly across the full width of the fill. Large rocks that cannot be properly incorporated into the engineered fill should be removed.

B. Selected fill material shall be moisture-conditioned to specified moisture content. Selected fill material shall be unfrozen. When moisture content of fill material is below that specified, add water until proper moisture content is achieved. When moisture content is above that specified aerate by blading or other methods mentioned in 3.08 B until moisture content is satisfactory.

C. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to a minimum of **90%** as determined by the ASTM D1557 Compaction Test. Compact each layer over its entire area until desired density has been obtained.

D. Re-compaction of Fill is Trenches and Compaction of Fill Adjacent to Walls: Where trenches must be excavated, backfill with material excavated. Place in lifts that when compacted do not exceed 6", moisture conditioned to (optimum)(2% above optimum) moisture content, and compact to a minimum of **95%** relative compaction in building pad and paved area, and to 90% relative compaction in landscape areas.

E. Jetting of fill materials will not be allowed.

3.10 FINAL SUBGRADE COMPACTION

A. Slab on grade: Upper **18"** of all final court pad subgrades shall be uniformly compacted at specified moisture content to at least **95%** of maximum dry density, as determined by ASTM D1557 Compaction Test, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.

B. Paved Areas: Upper **6"** of all final subgrades supporting pavement sections and all other flatwork shall be brought to specified moisture content and shall be uniformly compacted to not less than **95%** of maximum dry density, regardless of whether final subgrade elevation is attained by filling, excavation, or is left at existing grade. After acceptance of final compaction test, contractor shall maintain the required moisture content of subgrade until concrete flatwork is placed.

C. Other Fill and Backfill: Upper **6"** of all other final subgrades or finish grades shall be compacted to **90%** of maximum dry density.

D. Gravel Fill: Do not place compacted gravel fill until after underground work and foundations are in place. Compact gravel fill with vibratory plate or similar equipment to preclude settlement.

3.11 PLACING, SPREADING, AND COMPACTION OF LANDSCAPE BACKFILL MATERIALS

A. All landscaped areas shall receive topsoil. After subgrade under landscape area has been scarified and brought to **85%** maximum dry density, top soil shall be placed evenly to depth of **6"** at 85% of maximum dry density.

B. Project Inspector must verify that materials are uniformly spread to minimum depth specified.

3.12 SLOPE CONSTRUCTION

A. Cut slopes shall be constructed to no steeper than **2:1** (horizontal:vertical). Fill slopes shall be constructed to no steeper than **3:1** (horizontal:vertical). Prior to placement of fill on an

existing slope the existing slope shall be benched. The benches shall be in a ratio of **1** horizontal to **1** vertical. The face of the fill slopes shall be compacted as the fill is placed, or the slope may be overbuilt and then cut back to the design grade. Compaction by track walking will not be allowed.

3.13 FINISH GRADING

A. At completion of project, site shall be finished graded, as indicated on Drawings. Finish grades shall be "flat graded" to grades shown on the drawing. Mounding of finish grades will not be allowed unless otherwise directed on the landscape drawings. Tolerances for finish grades. Leave all landscaped areas in finish condition for lawn seeding. Landscaped planters shall be graded uniformly from edge of planter to inlets. If sod is used for turf areas the finish grade on which it is placed shall be lowered to allow for sod thickness.

B. All landscape areas shall be left free of rock or foreign material.

C. All landscape areas shall be approved by Architect prior to any planting.

3.14 SURPLUS MATERIAL

A. Excavated material not required for grading or backfill shall be removed from site at contractor's expense.

3.15 CLEANING

A. Refer to Section 01 7423.

B. Remove from fill all vegetation, wood, form lumber, casual lumber, and shavings, in contact with ground; buried wood will not be permitted in any fill.

END OF SECTION

SITE CLEARING AND REMOVAL
SECTION 310505

PART 1 - GENERAL

1.01 REQUIREMENTS

A. All applicable portions of Division 1- General Requirements are to be considered as included with this section.

1.02 CODES

A. The following are minimum requirements and shall govern, except that all local, state and/or federal codes and ordinances shall govern when their requirements are in excess hereof.

1.03 DESCRIPTION

A. Furnish all materials, labor, equipment, services, etc., necessary and incidental for the completion of all site clearing and removal work as shown on the drawings and as specified herein.

B. All onsite and offsite work included consists of but is not limited to the following:
   1. Removal of existing sidewalks, drives, curbs, pavements, etc. per plans. Trees, shrubs, irrigation. See Abatement Report.
   2. Removal and capping off or relocation of existing underground utilities, underground structures, etc. per plans.
   3. Removal from site and disposal of all waste, debris and unusable material.
   4. Backfill all open excavations created by the removal of underground utilities, underground structures, etc.

1.04 RELATED SECTIONS

A. Related work specified elsewhere:
   1. Section 310000 - EARTHWORK

1.05 QUALITY ASSURANCE

A. Obtain and pay for any permits, bonds, licenses, etc., required for Site Clearing and Removal work.

B. All clearing and removal work shall be accomplished in strict accordance with all local and state building codes, requirements and regulations including but not limited to noise abatement, dust control, classification of disposal materials, etc.

C. Any work within street or highway right-of-way shall be done in accordance with the requirements of the governmental agencies having jurisdiction and shall not begin until these governing authorities have been notified.

1.06 JOB CONDITIONS

A. An attempt has been made to show all existing structures, utilities, drives, pavements, curbs, walks, etc. in their approximate location on the survey and/or working drawings. However, others that are not shown may exist and may be found upon visiting the site or during the clearing and removal work. It will be the responsibility of this contractor to accurately locate all existing facilities and to determine their extent. If such facilities obstruct the progress of the work and are not indicated to be removed or relocated, they shall be removed or relocated only as directed by the Owner.

1. Report any existing site element not shown on the working drawings to the Architect of Record so that the proper dispensation of that element may be made.

B. Natural features, existing structures, existing landscaping, existing utilities, etc. which are indicated to remain on the drawings and specifications shall be protected and shall not be defaced or damaged in any manner.

C. Restore to their present conditions any pavement in the public right-of-way that is disturbed by the work under this section. All pavement restoration work in public rights-of-way shall be performed to the full satisfaction of the governmental agencies having local jurisdiction.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Noise producing activities shall be held to a minimum. Internal combustion engines and compressors, etc., shall be equipped with mufflers to reduce noise to a minimum. Comply with all noise abatement ordinances.

B. Keep all areas within the clearing and removal area sufficiently dampened to prevent dust from rising due to clearing or removal operations. Comply with all anti-pollution ordinances.

1. This contractor shall see to it that trucks leaving the site shall do so in such a manner that debris, vegetation, mud and earth will not be deposited on adjacent street pavements. Any debris, vegetation, mud or earth deposited on street pavements shall be promptly removed by this contractor.

C. All clearing and removal operations shall be performed in a manner such as to prevent any wash-off of soils from the site into streams and/or storm drainage systems. Appropriate sedimentation ponds, dikes, silt fences, collars, and filter media shall be employed to insure compliance with these requirements. Where a specific statute governs these procedures, such statute shall be complied with in it’s entirety.

1.08 PROTECTION AND SHORING

A. Protect all existing structures, utilities and landscaping indicated to remain on the drawings.
   1. All trees, shrubs, and other items, indicated to remain shall be protected during the entire progress of the work. This includes protection of the root system. The trees shall be fenced if they are located in or near an area being used for material storage or subject to damage by traffic during construction. Low hanging branches and unsound or unsightly branches on trees or shrubs designated to remain shall be removed. All trimmings shall be done by skilled workmen and in accordance with good tree surgery practices.

B. Any damage done by this contractor to existing structures, pipe lines, utilities, landscaping, etc. indicated to remain shall be repaired by him and at his expense in a manner acceptable to the Owner of the damaged property. This contractor shall report any existing damage prior to the beginning of this work.

C. All temporary shoring, bracing, etc., and maintenance there to required for the completion of clearing and removal work shall be provided by the Contractor whose work requires protection.
   1. This contractor shall work in concert per local and state codes to insure the provisions of adequate bracing, shoring, temporary cross over for pedestrian and vehicular traffic including guard rails, lamps, warning signs and flags as required by agencies having jurisdiction as directed by the Owner. Remove same when necessity for protection ceases.

1.09 DRAINAGE MAINTENANCE

A. During the entire course of clearing and removal operations, all existing drainage ways, both into and from the project area shall be rerouted as required and/or maintained in a functional condition.

B. At all times during the clearing and removal operation, the exposed areas of subgrade shall be maintained in a condition compatible with positive drainage of the work area. Failure to maintain such drainage shall be considered adequate cause for the District Representative to order temporary suspension of the work.

B. If it should become necessary to stop work for indefinite periods, take every precaution to prevent damage or deterioration of the work already performed. Provide suitable and functional drainage by installing ditches, filter drains, temporary cut-off lines, etc., and erect temporary protective structures where necessary. All embankments shall be back-bladed and suitably sealed to protect against adverse weather conditions.

PART 2 - PRODUCT

2.01 MATERIALS

A. All materials used to backfill excavations, trenches, holes, pits, etc. caused by utility, underground structure or underground storage tank removal shall meet the requirements for fill material and compaction indicated in Section 02200 and 02210.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Visit the site so that a full understanding of the difficulties and restrictions attending complete clearing of the site and removal of underground tanks and utilities is obtained. Verify the location of all pertinent items.

B. Verify with sewer department, water department, gas company, electric company, etc. that all existing utilities, services and overhead lines have been deactivated and abandoned prior to beginning removal work. Notify affected utility department or company prior to beginning removal work.
   1. Contact the local **Underground Service Alert (USA)** prior to beginning clearing and removal work.

3.02 PREPARATION

A. Cut drainage swales and provide temporary grading to carry storm water away from clearing area. No storm water will be permitted to stand in open excavations.

B. Provide, erect and maintain temporary barriers and security devices as required. Protect all existing landscaping, structures, utilities and site elements which are not to be demolished.

C. Notify all affected utility companies and local authorities and agencies prior to beginning the work.

D. Identify and tag all existing trees and other landscaping designated to remain.

E. Identify and locate a permanent stockpile area for topsoil. Verify with District Representative and see plans for fill soil stockpile area. Coordinate with Landscape Contractor.

F. Identify and locate a waste area for temporary storage of removed materials and a permanent topsoil stockpile area.
   1. No materials may be buried or burned on the site as a means of disposal.

3.03 PERFORMANCE

A. This contractor shall be responsible for all clearing, grubbing, removing and disposing of trash and debris and for clearing and stockpiling all topsoil which are within the designated limits of the property, easements and roadway rights-of-way, unless otherwise indicated on the drawings.

B. Prior to rough grading, storage of construction materials or the installation of any temporary construction facilities, strip areas per plans to be occupied by site improvements.

C. This contractor shall be responsible for removal of sidewalks, pavements, curbs and gutters, exterior slabs and sidewalks indicated to be removed on plans.

D. This contractor shall be responsible for removal of all underground utilities, underground structures, etc., according to plans.

E. Protect any existing structures, utilities and all appurtenances to remain. Prevent movement or settling. Provide bracing and shoring as required.
   1. Cease cleaning and removal operations immediately if any existing structure or utility appears in danger. Notify the District Representative and Civil Engineer of Records. Do not resume operations until directed.

F. All broken construction material, trash and debris, tree slash, sidewalks, curbs, etc. will be considered "waste" and shall be removed from the site.

G. “Waste” material shall be removed from the site as soon as possible and shall not be allowed to accumulate. Short-term storage of removed material shall be restricted to previously designated “waste” areas or as directed by the District Representative.
   1. No burning or burying of “waste” material will be permitted.

H. Continuously dampen all clearing and removal areas to prevent dust from rising during the operation. Provide hoses and/or water trucks as required.

3.04 FIELD QUALITY CONTROL

A. The Owner shall retain an independent inspection firm or contact local officials and inspectors at locations where local building codes require special inspections.

3.05 CLEAN UP

A. Material designated for removal shall become the property of this contractor, and any salvage value therefrom will accrue to this contractor.

B. Remove from the site and make legal disposition of all waste and debris. No waste or debris shall be burned or buried on the site as a means of disposal.

END OF SECTION

FINISH GRADING
SECTION 31 2219

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Weeding and finish grading of planting areas.

B. Preparing subgrades for planting areas.

C. Excavating and backfilling trenches for buried irrigation and associated electrical utilities and pits for buried irrigation components.

1.3 MEASUREMENT AND PAYMENT

A. Payment of the various Construction Items described in the Schedule of Values shall be considered full compensation for work of this Section.

1.4 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

C. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

D. Excavation: Removal of material encountered above subgrade elevations.
   1. Additional Excavation: Excavation below subgrade elevations as directed by Landscape Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
   2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Landscape Architect. Unauthorized excavation, as well as remedial work directed by Landscape Architect, shall be without additional compensation.

E. Fill: Soil materials used to raise existing grades.

F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

H. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

I. Finish Grading: Finish grading shall consist of finishing surfaces by raking smoothly and evenly, removing, and disposal of extraneous matter to facilitate natural run-off water.

1.5 SUBMITTALS

A. Samples: For the following:
   1. 12-by-12-inch (300-by-300-mm) sample of separation fabric.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Landscape Architect and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Landscape Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Landscape Architect's written permission.
   3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General:
   1. Conform to the Geotechnical (Soils) Report prepared for the project.
   2. Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Backfill and Fill: Satisfactory soil materials.

E. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

2.2 ACCESSORIES

A. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile: made from polyolefins, polyesters, or polyamides: and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
   1. Grab Tensile Strength: 200 lbf (890 N); ASTM D 4632.
   2. Tear Strength: 75 lbf (333N); ASTM D 4533.
   3. Puncture Resistance: 90 lbf (400N); ASTM D 4833.
   4. Water Flow Rate: 4 gpm per sq. ft. (2.7 L/s per sq. m); ASTM D 4491.
   5. Apparent Opening Size: No. 30 (0.6 mm); ASTM D 4751.

PART 3 - EXECUTION

3.1 GENERAL

A. Conform to the Geotechnical (Soils) Report prepared for the project.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditioned encountered, including rock, soil materials, and obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR IRRIGATION TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

3.6 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.7 IRRIGATION TRENCH BACKFILL

A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Place and compact initial backfill free of particles larger than 1 inch to a height of 4 inches over the utility pipe or conduit.
   1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of irrigation piping or conduit to avoid damage or displacement of utility system.

C. Coordinate backfilling with utilities testing.

D. Place and compact final backfill of satisfactory soil material to finish grade.

3.8 FILL AND LANDSCAPE MOUNDING

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations. Mounding to be installed in natural undulating form and to the heights and extents as indicated on the drawings. Contractor to notify Landscape Architect when mounding has been completed for review and approval of mounding.

3.9 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 6 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
   1. Under structures, steps, and pavements, scarify and re-compact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.
   2. Under walkways, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 92 percent.
   3. Under lawn or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.

3.10 LANDSCAPE GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Landscape Grading: Slope grades to direct water away from buildings and to prevent ponding. Provide positive drainage swales from all buildings, walkways, etc. to drainage catch basins or site drainage swales. No ponding is to be allowed. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus 1 inch.
   2. Walks: Plus or minus 1 inch.
   3. Pavements: Plus or minus 1/2 inch.

C. Grading for Shrubs and Ground Cover: The finish grade of shrubbery and ground cover areas shall be 1½ inches below grade of adjacent pavement, walks, curbs, or headers and 3 inches below adjacent walls, except when drainage conditions may require flush grades, as directed by Landscape Architect.

D. Lawn Areas: The finish grade of lawn areas shall be 1½ inches below grade of adjacent pavement walks, curbs or headers, except when drainage conditions may require flush grade as directed by Landscape Architect. Roll lawn areas with 300 pound roller until a uniformly compact and even surface is obtained.

E. Immediately prior to planting operations, planting areas shall be cleaned of weeds, debris, rocks over 1 inch in diameter, and clumps of earth that will not break up. Adjust any areas disturbed by installation of sprinkler irrigation system.

3.11 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.12 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION

TRENCHING AND BACKFILLING
SECTION 31 2333

PART 1 - GENERAL

1.1 INCLUSION OF OTHER CONTRACT DOCUMENTS

A. The general conditions, supplementary conditions and Division 1 are fully applicable to this section as if repeated herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 5000, Temporary Facilities.

B. Section 02 2600, Geotechnical Investigation Report.

C. Section 31 0000, Earthwork.

D. Section 33 4000, Site Drainage.

E. Section 33 1100, Piped Utilities.

1.3 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.

B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.

C. Contractor/ Installer shall have been in business for five (5) years providing/finishing similar size projects and complexity.

1.4 SUBMITTALS

A. Refer to Section 01 3300.

B. Submit Manufacturers data and shop drawings.

1.5 WARRANTY

A. Submit fully executed warranty for work and materials in this section per 01 3300.

1.6 REFERENCES AND STANDARDS

A. California Building Code current edition.

B. California Plumbing Code current edition.

1.7 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.

B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.8 PROJECT CONDITIONS

A. Contractor shall acquaint himself with all existing site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instruction. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

B. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

C. Trench dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for trench dewatering no matter what the source. Dewatering shall be continuous until all sire utilities are installed and backfilled.

1.9 PROTECTION

A. Adequate protection measures shall be provided to protect workers and passers-by on and off site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations. Repair all trenches in grass areas with new sod (seeding not permitted) and "stake-off" for protection.

B. Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.

C. Any construction review of the Contractor's performance conducted by the Architect or Owner is not intended to include review of the adequacy of the Contractor's safety measures, in, on or near the construction site.

D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullying of sides of excavation.

E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. Keep all excavations free from water during entire progress of work, regardless of cause, source or nature of water.

F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.

G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance.

H. Trees: Carefully protect existing trees which are to remain.

1.10 TRENCH SAFETY PROVISIONS

A. General Contractor shall be solely responsible for safety design, construction and coordination with agencies having jurisdiction. If such plan varies from shoring system standards established by Construction Safety Orders, plan shall be prepared by registered civil or structural engineer.

B. Nothing herein shall be deemed to allow use of shoring, sloping or protective system less effective than that required by Construction Safety Orders of California State Division of Industrial Safety.

C. When trenching through paved surface, provide steel trench plates to cover open trenches daily until trenches are backfilled.

1.11 SEASONAL LIMITS

A. No backfill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, full operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

B. Material above optimum moisture shall be processed per section 02200, 3.08, B.

1.12 TESTING

A. General: Refer to Section 01 4100 - Testing and Inspection.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill materials: Pipeline and conduit trench backfill as shown on the plans and as specified below.
   1. 3/4 inch crush rock as specified on the plans.
   2. Native Materials: Soil native to Project Site, free of wood, organics, and other deleterious substances. Rocks shall not be greater than 2-inches.
   3. Sand: Fine granular material, free of organic matter, mica, loam or clay.
   4. Lean Mix Concrete: 3 sacks of cement per yard plus sand.
   5. Class 2 aggregate base, 3/4" rock, per Caltrans section 26-1.02B.
   6. Controlled Density Fill: 3 sack slurry backfill.
   7. Provide continuous warning tape.

B. Water: Furnish all required water for construction purposes, including compaction and dust control.

C. Provide other bedding and backfill materials as described and specified in Section 33 1000, Section 33 4000, and Division 22 and 26.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verification of Conditions:
   1. Examine areas and conditions under which work is to be performed.
   2. Identify conditions detrimental to proper or timely completion of work and coordinate with General Contractor to rectify.

3.2 COORDINATION

A. General Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

3.3 INSTALLATION

A. Perform work in accordance with pipe manufacturer's recommendations, as herein specified and in accordance with drawings.

3.4 TRENCHING

A. Make all trenches open vertical construction with sufficient width to provide free working space at both sides of trench around installed item as required for caulking, joining, and

backfilling and compacting; not less than 12 inches wider than pipe or conduit diameter, unless otherwise noted.

B. Carefully excavate around existing utilities to avoid unnecessary damage. The contractor shall anticipate and perform hand work near existing utilities as shown on the survey, without additional claims or cost.

C. Trench straight and true to line and grade with bottom smooth and free of edges or rock points.

D. Where depths are not shown on the plans, trench to sufficient depth to give minimum fill above top of installed item measured from finish grade above the utility as follows:

1.	Sewer pipe:	Depth to vary
2.	Storm drain pipe:	Depth to vary
3.	Water pipe - Fire Supply:	36 inches
4.	Water pipe - Domestic Supply:	30 inches

3.5 BACKFILL

A. Pipe Trench Backfill is divided into three zones:
   1. Bedding: Layer of material directly under the pipe upon which the pipe is laid.
   2. Pipe Zone: Backfill from the top of the bedding to 6 inches (compacted) over the top of the pipe.
   3. Upper Zone: Backfill between top of Pipe Zone and to surface of subgrade.

B. Bedding: Type of material and degree of compaction for bedding backfill shall be as defined in the Details and Specifications.

C. Pipe Zone and Upper Zone Backfill:
   1. Type of material and degree of compaction Pipe Zone and Upper Zone Backfill shall be as required by Drawings, Details, & Specifications.
   2. Upper Zone Backfill shall not be placed until conformance of Bedding and Pipe Zone Backfill with specified compaction test requirements has been confirmed.
   3. Backfill shall be brought up at substantially the same rate on both sides of the pipe and care shall be taken so that the pipe is not floated or displaced. Material shall not be dropped directly on pipe.

D. Backfill Compaction:
   1. Backfill shall be placed in layers which, when compacted shall not exceed 6 inches in thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity. Do not backfill over, wet, frozen or soft subgrade surfaces. Employ a placement method that does not disturb or damage foundation walls, perimeter drainage, foundation, damp-proofing, waterproofing or protective cover.
   2. When moisture content of fill material is below that required to achieve specified

density, add water until proper moisture content is achieved. When moisture content is above that required, aerate by blading or other methods until specified moisture content is met, see section 02200, 3.08, B.

3. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to 90% of maximum dry density while at specified moisture content. Compact each layer over its entire area until desired density has been obtained.
4. Compaction: All backfill operations shall be observed by the Inspector of Record and/or Geotechnical Engineer. Field density tests shall be made to check compaction of fill material. If densities are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified densities. Notify Inspector and Architect at least 24 hours in advance of any operation.

E. Backfill in Areas Previously Lime or Cement Treated

1. Where trenching occurs in areas that have been lime or cement treated, class 2 aggregate bases or approved controlled density backfill material shall be used for the top 12-inches minimum of the trench or thickness shall match the depth of treated material.

3.6 TRENCH AND SITE RESTORATION

A. Finished surface of trenches shall be restored to a condition equal to, or better than the condition as existed prior to excavation work.

3.7 PROTECTION

A. Protect existing surfaces, structures, and utilities form damage. Protect work by others from damage. In the event of damage, immediately repair or replace to satisfaction of Owner.

B. Repair existing landscaped areas to a new condition. Replant trees, shrubs or groundcover with existing materials if not damaged or with new materials if required. Replace damaged lawn areas with sod, no seeding will be permitted.

C. Replace damaged pavement with new compatible matching materials Concrete walks to be removed to nearest expansion joint and entire panel replaced. Asphalt to be cute neatly and replaced with new materials.

3.8 SURPLUS MATERIAL

A. Remove excess excavated material, unused materials, damaged or unsuitable materials from site.

3.9 CLEANING

A. Refer to Section 01 7423.

B. Contractor will keep the work areas in a clean and safe condition so his rubbish, waste, and debris do not interfere with the work of others throughout the project and at the completion of work.

C. After completion of work in this section, remove all equipment, materials, and debris. Leave entire area in a neat, clean, acceptable condition.

END OF SECTION

EROSION CONTROL
SECTION 312500

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. General: Provide all materials, equipment and labor necessary to furnish and install erosion and sediment control measures as require by the Storm Water Pollution Prevention Plan.

B. Storm Water Pollution Prevention Plan (SWPPP): A SWPPP has been prepared and is part of the contract documents. The contractor will be responsible for implementing and maintaining the SWPPP.

1.02 QUALITY ASSURANCE

A. General: Comply with State and local codes and regulations.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Supply all material as shown and described on the SWPPP.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install all items necessary as shown on the SWPPP or as required by State and local agencies.

3.02 MAINTENANCE AND REMOVAL:

A. General: Maintain and repair existing and new erosion control facilities throughout the construction period. Remove silt build up as needed. Repair damage to earth slopes and banks. Erosion control BMP's shall be left in place.

B. Monitoring: Provide monitoring of erosion control measures before and after storm events. Provide a daily log of construction activities and impact on erosion control measures. Update SWPPP continuously throughout construction period. Daily log shall be available on site at all times.

C. Cleaning: Keep area clean of debris.

D. Removal: Remove all erosion control measures after landscaping is complete.

END OF SECTION

LANDSCAPE MAINTENANCE
SECTION 32 0190

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, apply to this Section.

1.2 SECTION INCLUDES

1. Mowing
2. Edging
3. Weeding
4. Watering
5. Spraying
6. Fertilizing
7. Trash pick up

1.3 MEASUREMENT AND PAYMENT

A. Payment of the various Construction Items described in the Schedule of Values shall be considered full compensation for work of this Section.

B. Unit prices for soil preparation and for items that include backfill mixes shall be adjusted to reflect changes due to the requirements of soil lab recommendation.

1.4 RELATED SECTIONS

A. Section 32 80 00 – Irrigation.

B. Section 32 90 00 – Planting

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with all applicable codes regulations of governmental agencies having jurisdiction. Where those requirements conflict with the specifications, comply with the more stringent provision.

B. Contractor or an experienced crew chief shall be present during maintenance operations.

1.06 PROTECTION AND CLEAN UP

A. Protection of persons and property shall be provided throughout progress of work. Use temporary barricades as required. Work shall proceed in such a manner as to minimize spread of dust and flying particles and to provide safe working conditions for personnel.

B. Execute all work in an orderly and careful manner to protect new concrete walks, work of other trades, and other improvements.

C. Maintain cleanliness on paving areas and other public areas used by equipment, and be responsible for immediate removal of all spillage. Remove from the project site all rubbish and debris found thereon leaving the site in a safe and clean condition.

1.7 START AND LENGTH OF LANDSCAPE MAINTENANCE PERIOD

A. Landscape maintenance period does not start until all landscaping work has been completed, all punch list items have been corrected, and the landscape has been approved in writing by the Landscape Architect or the owner's representative.

B. All items that have been listed in the punch list as items that may be corrected during the maintenance period must be done so prior to the last day of the maintenance period. The contractor will be responsible for an extended maintenance period until all items have been addressed to the satisfaction of the Landscape Architect and/or owner's representative.

C. Landscape Maintenance period shall extend for the time period as specified on the plans or through an agreement with the owner. During this time, continually maintain all areas involved in this Contract until final acceptance by the Landscape Architect. Improper maintenance or poor condition of any plantings at the end of the maintenance period may cause postponement of the final completion date. Maintenance shall be continued until all work is accepted.

D. Final inspection at the end of the maintenance period shall include an overview with the owner new maintenance contractor.

1.8 GUARANTEE

A. Guarantee all new plant materials for a period of one year. Plants not alive or in satisfactory growing condition as determined by the Landscape Architect, shall be replaced within one week of notification without additional cost to the owner.

B. Replacement guarantee shall include all plants damaged or destroyed by any action, including but not limited to vandalism, theft, vermin, neglect, etc. All replacement shall be plants of the same kind and size and installed as specified in the plans.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials used shall be in conformance with Sections 32 80 00 and 32 90 00, or any other applicable specification.

PART 3 - EXECUTION

3.1 IRRIGATION SYSTEM

A. Check the system weekly for proper operation. Lateral lines shall be flushed out when needed. All sprinkler heads are to be adjusted as necessary for unimpeded coverage with no overspray onto buildings and minimal overspray onto paving.

B. Set and program automatic controller for seasonal water requirements based on irrigation audit or schedule. Give owner's representative a spare key to the controller with instruction as to operation for emergency purposes.

C. Repair all damage to irrigation system at Contractor's expense and in a timely manner. Repairs are to be made within one watering period or one week, whichever is shortest.

3.2 GENERAL LANDSCAPE MAINTENANCE

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditioned encountered, including rock, soil materials, and obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 STORAGE OF SOIL MATERIALS

A. All planted areas shall be completely weeded and/or cultivated weekly. Sidewalks, gutters, etc. shall be cleaned weekly. Failure to comply will result in an extension of the maintenance period as determined by the Landscape Architect.

B. All planting shall be kept in a healthy growing condition by watering, weeding, cultivation, pruning, mowing, edging, spraying, fertilizing, and by performing any other necessary operation of maintenance.

C. Landscape is to be maintained to meet the desired intent of the plans. Hedges are to be pruned and trained as a hedge. Informal shrub masses, groundcovers, and grass-like plants are not to be formally pruned into individual balls or boxes. Pruning is to be done in relation to the growth pattern of the individual plant species.

3.4 LAWN

A. Mowing of turf is to begin when the grass has reached a height of three inches. The height of cut will be one and a half to two inches. Mowing and edging are to be done at least weekly after the first cut until the growing season has changed. Turf must be well established and free of bare spots and weeds to the satisfaction of the Landscape Architect.

B. All grass clippings are to be picked up and removed from the site.

C. Edges shall be trimmed at least twice monthly or as needed for a neat appearance. Clippings to be removed from paving.

D. Lawns shall be watered at such a frequency as weather conditions require to replenish soil moisture at and below the root zone. Normally over one inch of water is required weekly.

E. Fertilize the lawn areas at the start of the landscape maintenance period and every 30 days thereafter with a minimum sulfate at the rate of five pounds per 1,000 sf. unless otherwise directed by owner.

F. Re-seed lawn as needed and directed.

3.5 GROUNDCOVER, TREES, AND SHRUBS

A. Water enough so that moisture penetrates throughout the root zone and only as frequently as necessary to maintain healthy growth. Water shall not be allowed to run over sidewalk or to pool in shrub areas.

B. Construct and or remove water basins around individual plants, depending on the time of year and as directed.

C. Do not prune unless directed.

D. Re-stake and re-tie trees as needed. Reset to grade or up-right any plants that are not in their proper growing position.

E. Immediately remove any dead or dying plants and replace per this specification.

3.6 INSECT AND HERBICIDE APPLICATION

A. If needed control weeds with selective herbicides and sprays that have been approved for use by governing jurisdictions.

B. Material, timing, rate of application, and application shall be performed by a licensed Pest Control Operator.

C. Provide a monthly report to the owner of all herbicides, insecticides, and disease control chemicals used as well as the dates and rates of application.

D. Apply pre-emergent weed control at end of maintenance period.

3.7 TRASH PICK-UP

A. All trash and/or debris found in planted or paved areas shall be removed from the site on a weekly basis.

END OF SECTION

HOT-MIX ASPHALT PAVING
SECTION 321200

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Hot-mix asphalt paving.
   2. Hot-mix asphalt patching.

1.3 SYSTEM DESCRIPTION

A. Provide hot-mix asphalt pavement according to the materials, workmanship and other applicable requirements of the standard specifications of the state of authorities having jurisdiction.
   1. Standard Specifications: as indicated.
   2. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.4 SUBMITTALS

A. Product Data: For each product specified, include technical data and tested physical and performance properties.

B. Job-Mix Designs: Certification, by authorities having jurisdiction of approval of each job mix proposed for the work.

C. Job-Mix Designs: For each job mix proposed for the work.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:
   1. Prime and Tack Coats: Minimum surface temperature of 60 degrees Fahrenheit (15.5 degrees Celsius).
   2. Asphalt Base Course: Minimum surface temperature of 40 degrees Fahrenheit (4 degree Celsius) and rising at time of placement.

3. Asphalt Surface Course: Minimum surface temperature of 60 degrees Fahrenheit (15.5 degree Celsius) at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: Sound; angular crushed stone; crushed gravel; or properly cured, crushed blast-furnace slag; complying with ASTM D 692.

C. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone; gravel, properly cured blast furnace slag or combinations thereof; complying with ASTM D 1073.
   1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: Rock or slag dust, hydraulic cement or other inert material complying with ASTM D 242.

2.2 ASPHALTIC MATERIALS

A. Asphalt cement: ASTM D 3381 for viscosity-graded material; ASTM D 946 for penetration-graded material.

B. Asphalt Cement: ASTM D 3381 for viscosity-graded material.

C. Undersealing Asphalt: ASTM D 3141, pumping consistency.

D. Prime Coat: ASTM D 2027; medium-curing cutback asphalt; MC-30, MC-70 or MC-250.

E. Prime Coat: Asphalt emulsion prime conforming to state DOT requirements.

F. Prime Coat: ASTM D 977, emulsified asphalt of ASTM D 2397, cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.

G. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, factory diluted in water of suitable grade and consistency for application.

H. Fog Seal: ASTM 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for applications.

I. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by Environmental Protection Agency (EPA). Provide granular, liquid or wettable powder form.

B. Sand: ASTM D 1073, Grade nos. 2 or 3.

2.4 MIXES

A. Hot-Mix Asphalt: Provide dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and designed according to procedures in AI's "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types".
   1. Provide mixes with a history of satisfactory performances in geographical area where project located.
   2. Provide mixes complying with the composition, grading and tolerance requirements of ASTM D 3515 for the following nominal, maximum aggregate sizes:
      a. Base Course: 1" (25 mm).
      b. Surface Course:
         1) Parking Area: ½" (13mm)
         2) Play Courts: 1/4"-3/8" (7mm-10mm)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

C. Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.

3.2 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
   1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
   1. Mix herbicide with prime coat when formulated by manufacturer for that purpose.

3.3 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt mix on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each coarse to required grade, cross section and thickness, when compacted.
   1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
   2. Place hot-mix asphalt surface course in single lift.
   3. Spread mix at minimum temperature of 250 degrees Fahrenheit (121 degrees Celsius).
   4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
   5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10' (3 m) wide, except where infill edge strips of a lesser width are required.
   1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete asphalt base course for a section before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

A. Construct joints to ensure continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
   1. Clean contact surfaces and apply tack coat.
   2. Offset longitudinal joints in successive courses a minimum of 6" (150 mm).
   3. Offset transverse joints in successive courses a minimum of 24" (600 mm)
   4. Construct transverse joints by bulkhead method or sawed vertical face method as described in AI's the "The Asphalt Handbook".
   5. Compact joints at soon as hot-mix asphalt will bear roller weight without excessive displacement.
   6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
   1. Complete compaction before mix temperature cools to 185 degrees Fahrenheit (85 degrees Celsius).

B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and rerolling to required elevations.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
   1. Average Density: 96 percent of reference laboratory density according to ASTM D 1559, but not less than 95 percent nor greater than 100 percent.
   2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 95 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances.
   1. Base Course: Plus or minus ½” (13 mm).
   2. Surface Course: Plus 1/4" (6 mm), no minus.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10' (3 m) straightedge applied transversely or longitudinally to paved areas:
   1. Base Course: 1/4" (6 mm).
   2. Surface Course: 1/8" (3 mm).
   3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4" (6 mm).

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
   1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.

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

C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by testing agency according to ASTM D 979.
   1. Reference laboratory density will be determined by averaging results from four(4) samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 1559 and compacted according to job-mix specifications.
   2. Reference maximum theoretical density will be determined by averaging results from four (4) samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
   3. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
      a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, but in no case will fewer than three (3) cores be taken.
      b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION

PAVEMENT SEALER AND STRIPING
SECTION 321236

PART 1 - GENERAL

1.01 INCLUSION OF OTHER CONTRACT DOCUMENTS

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

1.02 QUALITY ASSURANCE

A. Applicator Qualification: Company specializing in the application of seal coat with two (2) years documented experience.

B. Reference and Standards:

1. American Society for Testing and Materials (ASTM)
2. State of California, Department of Transportation (CSS) - "Standard Specifications", (latest Edition.).

1.03 SUBMITTALS

A. Refer to Section 013300.

B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.04 WARRANTY

A. Refer to General Conditions and Section 017833.

1.05 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.

B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.06 PROJECT CONDITIONS

A. Do not apply seal coat during wet weather or when atmospheric temperature is below 50 degrees.

1.07 EXISTING SITE CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown conditions are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Seal Coat: shall be a pre-mixed asphalt emulsion blended with select fillers and fibers such as:

1. "Park-Top No. 302", Western Colloid Products.
2. "Overcoat", Reed and Graham.
3. "Drivewalk", Conoco Oil.

B. Crack Fill:

1. Cracks ¼" – 1": "Docal 1100 Viscolastic, distributed by Conoco, Inc., Elk Grove, CA, (916) 685-9253, or approved equal.
2. Cracks greater than 1": Hot Mix.

2.02 PAVEMENT MARKING PAINT

A. Approved Manufacturers: FS TTP-1952 B traffic paint.

B. Colors: As directed by Architect

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine areas to receive asphalt concrete and verify following:

1. Absence of wet receiving surfaces or other conditions to adversely affect execution of his work.

B. Do not start work until unsatisfactory conditions have been corrected.

3.02 PAVEMENT SEALER (Seal Coat)

A. Surface Preparation: surface shall be clean of all dirt, sand, oil or grease. Pressure wash, broom, blow or hose down entire area with a strong jet of water to remove all debris.

1. Remove soft, loose, or otherwise damaged areas of asphalt concrete to full depth of damage and replace with compacted asphalt concrete as specified herein.
    a. Minor holes and imperfections may be patched using hot mix asphalt or mastic using sand/SS-1-H.
2. Use wire brush for removal of oil and grease; prime with shellac or synthetic resin as recommended by manufacturer of pavement sealer material.

B. Seal Coat Application: Thoroughly mix materials and apply in accordance with manufacturer's written instructions.

C. Clean-Up and Precautions: As recommended by pavement sealer material manufacturer.

3.03 PAVMENT MARKING

A. Painted pavement markings shall be done only after the seal coat has thoroughly dried.

B. Clean surfaces to be painted with traffic paint of dust, dirt, grime, oil, rust or other contaminants which will impair the quality of work or interfere with proper bond of paint coats. Surfaces shall be cleaned to the extend and by whatever means that will satisfactorily accomplish the purpose without damage to asphalt concrete.

C. Provide measured layouts, temporary markings, templates, and other means necessary to provide required marking.

D. Prepare and apply paint in accordance with manufacturer’s instructions; paint shall be applied by spray and shall achieve complete coverage free from voids and thin spots.

E. Where indicated on the Drawings, paint parking stall strips, lettering, arrows, accessible symbols, playfield markings, etc. on asphalt concrete paving. Paint strips shall be 3 inches wide (except otherwise indicated) and applied with two (2) coats of herein specified Traffic Line Paint; white (except as otherwise specified or indicated).

1. International Accessible Symbol: Symbol shall be white figures on a blue background. Blue shall be equal to color No. 15090 in Fed. Std. 595C.

F. Lines and symbols shall be accurately formed and true to line and form; lines shall be straight and uniform in width.

G. Painted edges shall be clean cut and free from raggedness, and corners shall be cut sharp and square.

H. Tolerances: Apply striping within a tolerance of 1/2 inch in 50 feet. Apply markings and striping to widths indicated with a tolerance of 1/4 inch on straight sections and 1/2 inch on curved sections.

3.04 PROTECTION

A. Provide barricades and warning devices as required to protect pavement.

3.05 CLEANING

A. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

B. Clean excess material from surface of all concrete walks and utility structures.

END OF SECTION

CHAIN LINK FENCES AND GATES
SECTION 323113

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Galvanized steel chain link fence.

2. Galvanized steel chain link gates.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Product Data: in the form of manufacturer's technical data, specifications, and installation instructions for posts, fabric and accessories.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain chain link fences and gates as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.

PART 2 - PRODUCT

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Galvanized Steel Fencing and Fabric:
   Allied Tube and Conduit Corp.
   American Chain Link Fence Company
   American Tube Company
   Anchor Fence, Inc.

Capitol Wire and Fence Co., Inc.
Century Tube Corp.
Cyclone Fence Div./USX Corp.
Master Halco

2.2 FABRIC

A. Steel Fabric: Comply with Chain Link Fence Manufacturers Institute (CLFMI) Product Manual. Furnish one-piece fabric widths for fencing **up to 8 feet high**. Wire size includes zinc coating. Gate fabric shall match fence fabric.

1. Size: 2-inch mesh, 9-gage (0.148-inch diameter) wire.

2. Galvanized Steel Finish: ASTM A 392, Class 2, with not less than 1.2 oz. zinc per sq. ft. of uncoated wire surface on wire coated before weaving or not less than 1.2 oz. zinc per sq. ft. of uncoated wire surface on wire of fabric coated after weaving as determined from the average of two or more samples and not less than 1.2 oz. zinc per sq. ft. of uncoated wire surface for any individual sample. Top and bottom edges shall have knuckled edges.

2.3 FRAMING

A. Strength requirements: for posts and rails conforming to ASTM F 669.

B. Pipe: shall be straight, true to section, material, and sizes specified, and shall conform to the following weights per foot:

NPS in inches	Outside Diameter (OD) in inches	Type 1 steel
1	1.315	1.6
1-1/4	1.660	2.27
1-1/2	1.900	2.72
2	2.375	3.65
2-1/2	2.875	5.79
3	3.500	7.58
3-1/2	4.000	9.11
4	4.500	10.79
6	6.625	18.97
8	8.625	28.55

C. Steel Framework, General: Posts, rails, braces, and gate frames.

1. Type I Pipe: Hot dipped galvanized steel pipe conforming to ASTM F 1083, plain ends, standard weight (schedule 40) with not less than 1.8 oz zinc per sq. ft. of surface area coated.

D. Top Rail : Manufacturer's longest lengths, with expansion-type couplings, approximately 6 inches long, for each joint. Provide means for attaching top rail securely to each corner, pull, and end post.

2.4 FITTINGS AND ACCESSORIES

A. Material: Comply with ASTM F 626. Galvanized iron or steel, to suit manufacturer's standards.

1. Zinc Coating: Unless specified otherwise, galvanize steel fence fittings and accessories in accordance with ASTM A 153, with zinc weights per Table I.

B. Tension Wire: 7 gauge metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.

1. Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.

C. Tie Wires: 11-gage galvanized steel with a minimum of 0.80 oz. per sq. ft. of zinc coating of surface area in accordance with ASTM A 641.

D. Post Brace Assembly: Manufacturer's standard adjustable brace at end posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturers standard galvanized steel or cast iron cap for each end.

E. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.

F. Tension or Stretcher Bars: Hot-dip galvanized steel with minimum length 2 inches less than full height of fabric, minimum cross-section of 3/16 inch by 3/4 inch and minimum 1.2 oz. zinc coating per sq. ft. of surface area. Provide one bar for each end post, and two for each corner and pull post, except where fabric is integrally woven into post.

G. Tension and Brace Bands: Minimum 3/4-inch-wide hot-dip galvanized steel with minimum 1.2 oz. zinc coating per sq. ft. of surface area.

1. Tension Bands: Minimum 14 gage (0.074 inch) thick.

2. Tension and Brace Bands: Minimum 12 gage (0.105 inch) thick.

H. Concrete: Provide concrete consisting of Portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi. Use at least 4 sacks of cement per cu. yd., 1-inch maximum size aggregate, maximum 3-inch slump, and 2 to 4 percent entrained air.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install fence in compliance with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

B. Excavation: Drill or hand excavate (using post-hole digger) holes for posts in firm, undisturbed or compacted soil.

1. Excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.

2. Unless otherwise indicated, excavate 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 maximum 8 feet o.c., unless otherwise indicated.

1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

2. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.

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 and fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

E. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.

F. Bottom Rail: Install as close to existing grade as possible.

G. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

H. Tension or Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.

I. Tie Wires: Use U-shaped wire of proper length to secure fabric firmly to posts and rails with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.

J. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.

K. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

L. Gates: Size as indicated on Drawings. Gate posts shall be 4" minimum O.D. schedule 40. Gate hinges, Master Halco industrial pressed steel, 180 swing. Gate frames, size as detailed but minimum 1 5/8" O.D. schedule 40. Provide 3/8" truss rod with tightener at each leaf. Provide pressed steel fork latch. At double gate provide 2 3/8" ⌀ center drop rod assembly.

END OF SECTION

IRRIGATION
SECTION 32 8000

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe and fittings, valves, sprinkler heads, and accessories.

1.2 RELATED SECTIONS

A. Section 32 90 00 - Planting: Coordination with fine grading and soil preparation.

B. Section 31 22 19 – Finish Grading

1.3 MEASUREMENT AND PAYMENT

A. Measurement and Payment for Work of this Section shall be as indicated in the General Conditions.

1.4 REFERENCES

A. ASTM A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

B. ASTM D1784 - Specification for Rigid PVC Compounds and CPVC Compounds.

C. ASTM D1785 - Standard Specification for PVC Plastic Pipe, Schedules 40, 80, and 120.

D. ASTM D 2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2004b.

E. ASTM D2464 - Standard Specification for Threaded Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80

F. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

G. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

H. ASTM D 2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2004.

I. ASTM D3139 - Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals.

J. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

K. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe

L. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2003.

1.5 DEFINITIONS

A. Extra Wire: Control wire that is intended for future valve.

B. Lateral Line: Pipe downstream of zone valve.

C. Mainline: Pipe from backflow device to zone valves.

D. Spare Control Wire: Control wire that is intended as a backup in case of faults or unknown conditions.

1.6 SYSTEM DESCRIPTION

A. Contractor shall provide and install a complete irrigation system with the intent of the Drawings and Specifications. System shall provide 100% coverage to all planted areas in a uniform manner.

1.7 SUBMITTALS

A. Conform to City Standards.

B. Shop Drawings: Prepare an submit the following fully dimensioned and labeled:
   1. POC Connection enclosure including all appurtenances and equipment, to scale of detail not less than 1”=10’.
   2. Backflow prevention assembly.
   3. Booster Pump.
   4. Controller assemblies including electrical.
   5. Layout plan for controller area.

C. Product Data: Provide for all components incorporated into the Work and as requested to illustrate compliance with the Project Documents.

D. Samples: Provide as requested.

E. Test Reports as described in Part 3.

F. Record Documents: Record actual locations of all concealed components, piping system, conduit, and other items listed below. Dimension from two permanent points of reference, building corners, sidewalk, or road intersections, etc., the location of the following items:
1. Connection to existing water lines.
2. Connection to existing electrical power.
3. Modifications to existing system.
4. Gate valves.
5. Routing of main line indicating all changes in direction and points along straight runs at intervals no more than 100'.
6. Sprinkler control valves.
7. Routing of control wiring.
8. Quick coupling valves.
9. Other related equipment as directed by the Landscape Architect.

G. Controller Charts: Provide color coded diagram of irrigation system as follows:
1. Prepare at a scale that will fit inside of controller door or in standard size 3-ring binder or spiral bound as directed by Owner.
2. Scale shall be legible and no less than 1" = 50'. Use multiple pages as required.
3. Laminate all sheets with minimum 10 mil. plastic.
4. Submit and obtain approval of Landscape Architect prior to requesting final observation of irrigation system.

H. Operation and Maintenance Data:
1. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.
2. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

C. Contractor shall check static pressure and electrical supply at the irrigation point of connection to the water supply before beginning work and notify Owners Representative in writing of the water pressure available a minimum of 10 days prior to beginning the installation of the irrigation system.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's instructions and requirements.

B. Coordinate on-site storage with Owner.

C. Handling of PVC Pipe and Fittings: Exercise care in handling, loading, unloading, storing and installation of PVC pipe and fittings. All PVC pipe shall be transported in a vehicle that allows the length of pipe to lie flat so as not to subject it to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded and, if installed, shall be replaced with new piping.

1.10 PROJECT CONDITIONS

A. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the Landscape Architect. In the event this notification is not performed, the irrigation Contractor shall assume full responsibility for any revision necessary.

1.11 REGULATORY REQUIREMENTS

A. Requirements of Regulatory Agencies: All work and materials shall be in full conformance with the latest rules and regulations of the California Plumbing and Electric codes.

B. Manufacturer’s Directions: Manufacturer’s directions and detailed drawings shall be followed in all cases where the manufacturers of articles used in this contract furnish directions covering points not shown in the drawings and specifications.

C. Underwriters Laboratories: Electrical wiring, controls, motors, and devices shall be UL listed, and so labeled.

1.12 PRE-INSTALLATION MEETING

A. Convene one week prior to commencing work of this Section.

B. Schedule after major components have been initially staked.

1.13 COORDINATION

A. Coordinate the work with site backfilling, landscape grading and delivery of plant life.

1.14 SEQUENCE AND SCHEDULING

A. Install all piping and provisions for equipment assemblies such as risers, swing joints, and nipples when subgrade has been established but prior to spreading any on-site or imported material over subgrade.
B. Stage installation of work in area of stock piled material as necessary.

1.15 MAINTENANCE SERVICES

A. Maintain system during plant establishment and turf grow-in period specified in Section 32 90 00.

B. Instruct Owner personnel on detailed operation of system.

1.16 EXTRA MATERIALS

A. Furnish extra components:
   1. Two valve keys for manual valves.
   2. Two valve box keys.
   3. Two keys for valve markers.
   4. Two wrenches for each type head core and for removing and installing each type head.

1.17 WARRANTY

A. The warranty for the sprinkler irrigation system shall be made in accordance with the following form.

B. A copy of the warranty form shall be included in the operations and maintenance manual.

C. The warranty form shall be retyped onto the Contractor's letterhead and contain the following information

D. WARRANTY FOR SPRINKLER IRRIGATION SYSTEM
   1. We hereby warrant that the sprinkler irrigation system we have furnished and installed is free from defects in materials and work quality, and the work has been completed in accordance with the drawings and specification. We agree to repair or replace any defects in material or work quality that may develop during the period of one year from the date of acceptance, except those that may be caused by ordinary wear and tear, unusual abuse or neglect. We also agree to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Owner, after receipt of written notice. In the event of our failure to make such repairs or replacements within a reasonable

time after receipt of written notice from Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense, and we will pay the costs and charges therefore upon demand.

2. PROJECT:_____
3. CONTRACTOR:_____ PHONE NO.:_____
4. ADDRESS:_____ BY:_____
5. _____
6. DATE OF ACCEPTANCE:_____BY:_____

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. PVC Materials: ASTM D1784, Type I Polyvinyl chloride plastic (PVC), cell classification 12454-B.

B. Class 200 PVC Pipe: ASTM D2241 listed with NSF-PW Standard 61 and Standard 14.

C. Class 315 PVC Pipe: ASTM D2241 listed with NSF-PW Standard 61 and Standard 14.

D. Schedule 40 PVC Pipe: ASTM D1785 listed with NSF-PW Standard 61 and Standard 14.

E. Flexible PVC Pipe: Agricultural Products Inc. 1174AG, Heavy Wall IPS Flex Vinyl (PVC) Pipe (C).
   1. 1/2" IPS: 0.840" O.D., 0.147" wall thickness
   2. 3/4" IPS: 1.05" O.D., 0.154" wall thickness
   3. 1" IPS: 1.315" O.D., 0.179" wall thickness

F. PVC, Schedule 40 Socket Fittings: ASTM D2466 listed with NSF-PW Standard 61 and Standard 14.

G. PVC, Schedule 80 Socket Fittings: ASTM D2467 and listed with NSF-PW Standard 61 and Standard 14.

H. PVC, Schedule 80 Threaded Fittings: ASTM D2464 and listed with NSF-PW Standard 61 and Standard 14.

I. Gasket Joints: Comply with ASTM F477 and ASTM D3139

2.2 STEEL PIPE AND FITTINGS

A. Galvanized Pipe: Standard weight Schedule 40. Comply with ASTM A53.

B. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe with threaded ends.

C. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.

D. Gray-Iron Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.

E. Cast-Iron Flanges: ASME B16.1, Class 125.

F. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, galvanized.

G. Galvanized Fittings: 150lbs. malleable iron, threaded. Comply with ASTM A53

H. Ductile Iron Pipe and Fittings: Comply with Section 33 11 00.

I. Cast Iron Pipe and Fittings: Comply with Section 33 11 00.

2.3 PIPE SCHEDULE

A. Water Service: Conform to City standards.

B. Equipment Assemblies: Per referenced details.

C. Irrigation Mainline:
1. NPS ½" to 3": Schedule 40 PVC, solvent weld joints and fittings.
2. NPS 4" and larger: Class 200 PVC bell-end gasketed joints, ductile iron fittings.

D. Lateral Lines:
1. NPS ½" to 2": Schedule 40 PVC, solvent weld joints and fittings.
2. NPS 2½" and 3": As specified on the Drawings, solvent weld fittings.

E. Sleeves: Materials as specified on plans. Inside diameter shall be twice the outside diameter of pipe for which it is used.

F. PVC Fittings: Schedule 40 PVC unless otherwise indicated.

G. Swing Joint Assembly: Rainbird SA series, size and length as required.

2.4 EQUIPMENT

A. Remote Control Valves: As specified on the Drawings.

B. Ball Valves: Spears PVC Industrial Grade Compact Ball Valve

C. Gate Valves:
   1. As specified on the Drawings.
   2. 3" to 12": Comply with City Standards for water.

D. Quick Coupling Valves: As specified on the Drawings.

E. Master Valve: As specified on the Drawings.

F. Flow Sensor: As specified on the Drawings.

G. Controllers:
   1. As specified on Drawings.
   2. Powder coat enclosure color as selected by Landscape Architect. Submit available standard colors for selection.

2.5 ACCESSORIES

A. Control Wire: Copper, UL rated for direct burial, Type UF. Conform to NEC. Common shall be white and pilot wire shall be red. Spare control wires shall be of a different color approved by the Engineer.
   1. Pilot Wire: 14 Gauge
   2. Common Wire: 12 Gauge

B. Control Wire Connectors: Water tight. Rain Bird Pen-Tite Connectors, 3M DBY ore DBR direct burial splice kits, or fusible heat shrinking tubing, as specified on the Drawings or as approved. Sized as required for wire size and quantities at each splice.

C. Valve boxes: As specified on the Drawings and below. Provide extensions by same manufacturer as required and heat stamp cover with identification of equipment or valve and controller number as applicable. Verify sizes are sufficient to completely house valves and unions as necessary to facilitate removal with valve box in place. Use concrete vehicle traffic rated boxes of appropriate size when located in road shoulder.
   1. Isolation Valves: Carson 1220 with T-cover and Bolt Down Loc-Kit, green.
   2. Master Valve: Carson 910 with T-cover and Bolt Down Loc-Kit, green.
   3. Flow Sensor: Carson 1220 with T-cover and Bolt Down Loc-Kit, green.
   4. Remote Control Valves: Carson valve box with T-cover and Bolt Down Loc-Kit, green. Size as required by valve configuration. All unions, ball valves, filters, and pressure regulators must fit in box with sufficient room for removal.
   5. Quick Couplers: Carson 910 with T-cover and Bolt Down Loc-Kit, green
   6. Stub-Outs: Carson 1324 with T-cover and Bolt Down Loc-Kit, green.

D. Primer: Weldon P-70 PVC, IAMPO-UPC and NSF listed.

E. Solvent Weld Cement:

1. Comply with ASTM D2564, IAMPO-UPC and NSF listed. Compatible with pipe being joined and job site conditions.

F. Galvanized Pipe Paint: Carbon elastic Paint No. 2221 by American Tar Company or equal.

G. Thrust Blocks: As specified in the Drawings.

H. Pull line/cord: Polypropylene braided line or Let-line #232 or equal of 1/8" diameter with a minimum break strength of 200 pounds.

I. Tracer Wire: All water pressure lines to be installed with metallic detection tape or tracer wire except where control wires are located adjacent to pressure lines.

J. Utility Marker Tape and Wire Conduit: Any control wires that do not follow irrigation pipes shall be 24 inches deep in Sch 40 conduit for protection. They shall be marked with continuous utility marking tape located 6 inches below finish grade. Conduit shall be a minimum of 1" and big enough to comfortably carry all wire, with approximately one-half of the volume remaining.

K. Remote Control Valve ID Tag: All vinyl, with embossed lettering and tie for valve connection. Christie, Ewing or equal.

2.6 IRRIGATION HEADS

A. Gear-driven Rotor Heads: As specified on Drawings.

B. Pop-up Spray Heads: As specified on Drawings

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify location of existing utilities.

B. Verify that required utilities are available, in proper location, and ready for use.

C. Verify that field conditions are acceptable and are ready to receive work.

D. Verify location of underground utilities and facilities. Drawings may show utilities in some locations but do not necessarily represent all underground utilities and facilities. Obtain locations prior to start of Work.

E. Verify that required utilities are available, in proper location, and ready for use.

F. Verify locations of existing sleeves. Notify Landscape Architect of discrepancies in existing sleeve locations and system requirements.

G. Beginning of installation shall signify acceptance of existing conditions.

H. Verification of Existing Pressure:
   1. Verify existing static pressure prior to ordering irrigation components. Submit test results to Landscape Architect for further direction.

3.2 PREPARATION

A. Call Underground Service Alert 48 hrs prior to start of work. Field mark underground utilities prior to excavation. Make provisions to protect underground utilities and facilities.

B. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, utilities, and structures and as directed. Locate in landscape areas wherever possible

C. Layout and stake locations of system components.
   1. Layout by Survey: At a minimum, the following shall be laid out by survey using a qualified surveyor.
      a. Mainline
      b. Gear-driven Rotor Heads
   2. Spray Heads: Locate by survey or tape measurement as required to provide uniform 100% coverage of area requiring irrigation.

D. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.

E. Layout shall be reviewed by the Landscape Architect or Owner at pre-installation meeting prior to installation.

3.3 GENERAL

A. Install all equipment in compliance with applicable codes and regulations and manufacturer's printed instructions and specifications.

B. Provide all incidental materials, equipment, and components required for a complete and functional system even if such material, equipment, and components are not specifically included in the Drawings or Specifications.

3.4 TRENCHING

A. Trench and backfill in accordance with Section 31 22 19.

B. Trench bottom shall be flat to ensure piping is supported continuously on an even grade.

C. Where lines occur under paved areas, consider dimension to be below the subgrade.

D. Trench Size:
   1. Width: As indicated on the Drawings.
   2. Depth as required to provide for bedding and minimum cover as specified. Coordinate depths of various pipe runs as required to minimize conflict. Maintain consistent depths of each of line except as pre-approved by Landscape Architect.

E. Schedule of Minimum Cover:
   1. Water Service Line: Per City or other local Standards
   2. Mainline:
      a. Pipe Sizes Less Than 4 inches: 24 inches.
      b. Pipe 4 inches and Larger: 30 inches
   3. Lateral Lines: 12 inches.
   4. Control Wire: 24 inches.
   5. All Pipe and Control Wire under Paving: 30 inches minimum. Provide additional depth as required to provide a minimum of 12 inches cover to bottom of subgrade in new paving areas.

F. Trenching adjacent to existing trees shall be excavated by hand or machine boring as directed by the Landscape Architect. Comply with the City Standards.

G. Trench to accommodate grade changes.

H. Maintain trenches free of debris, material, or obstructions that may damage pipe.

3.5 PIPE INSTALLATION

A. General
   1. Comply with manufacturer's printed instructions and recognized industry standards.
   2. Pipe and equipment installed in trenches shall be fully supported by approved trench foundation material.
   3. Pipe and equipment installed above grade shall be properly and securely anchored and supported by approved devices and means.
   4. Pipe under paved areas shall be installed in PVC pipe sleeves.

5. Line Clearance: All lines shall have a minimum clearance of 6 inches from each other and from lines of other trades. Comply with applicable regulations for clearance between irrigation lines and other trades.
6. Parallel lines shall not be installed directly over one another.
7. Install pipe to allow for expansion and contraction without stressing pipe or joints.
8. Install trace wire as indicated in drawings.
9. Install 3" warning tape 12" above mainline.

B. PVC, Solvent-Cement Welded Joints
1. Comply with manufacturers' written specifications.
2. Comply with ASTM D2855 and ASTM F402

C. PVC, Threaded Joints:
1. Use teflon tape for plastic to plastic and plastic to galvanized joints. Hand tighten and use only light wrench pressure as required to produce sound, water tight joint.
2. Use pipe joint compound for galvanized to galvanized joints.

D. PVC, Gasket Joints:
1. Comply with manufacturers' written instructions.
2. Comply with ASTM D3139.

E. Galvanized Pipe:
1. Comply with industry standards.
2. Paint all below grade galvanized pipe with specified galvanized pipe paint.

F. Thrust Blocks:
1. Thrust blocks shall be cast-in-place concrete of the size and configuration appropriate for installation condition.
2. Comply with Standard Specifications and as indicated on the Drawings.
3. Leave thrust blocks exposed until pressure testing is complete.

3.6 EQUIPMENT INSTALLATION

A. Remote Control Valves:
1. Locate all valves a directed.
2. Install per applicable details.
3. Install after mainline has passed pressure test.
4. Flush mainline of all debris before installing valves.
5. Install each valve in a separate valve box.
6. After installation, re-pressurize mainline, check for leak, and eliminate all leaks.
7. Securely attach one ID tag per valve with number or lettering corresponding to valves station on controller schedule.

B. Manual Drain Valves: Install at all low points in system.

C. Controller:
   1. Locate as directed.
   2. Install and wire in conformance with manufacturer's published instructions and specifications
   3. Construct concrete footings as indicated and as required to support the controller cabinet.
   4. Wire only one valve per station.
   5. Make connection to electrical supply. Conform to applicable regulations and codes. Provide dedicated breaker of proper size for each controller. Provide one (1) additional duplex outlet at each controller. All electrical work shall be performed by properly licensed electrician.

D. Remote Control Valve Control Wiring:
   1. Above grade wire shall be installed in approved conduit. Extend conduit to the full required depth of cover. Transition from vertical to horizontal alignment shall be made with a sweep elbow.
   2. Lay control wire in mainline trench immediately adjacent to mainline wherever possible. Bundle wires with electrical tape at 10 feet intervals. Do not tape to mainline.
   3. Run a separate pilot wire to each control valve.
   4. Run a common ground for all control valves on a common controller. Provide a separate ground wire for each controller.
   5. Make splices in valve boxes only. Use specified connectors. Provide a 36-inch loop at each valve.
   6. Extra Control Wire: Install for future valves, if any, where indicated on the Drawings. Extra control wire shall not be used as spares without approval from Landscape Architect.
   7. Spare Control Wires:
      a. Install one spare common wire the full length of the mainline.
      b. Install spare control wires at a ratio of 1 per each 6 valves the full length of the mainline. Provide a 36-inch loop at each valve.
   8. Label ends of control wire indicating controller, valve number, and station. Use waterproof marker.

E. Valve Boxes
   1. Excavate to required subgrade.
   2. Place drain rock to specified depth and width prior to setting support blocks and valve box. At a minimum, drain rock shall be 12 inches deep and shall be the full width and length of the box extending 3 inches past the edges of the valve box.
   3. Set valve boxes plumb and square with adjacent structures and adjacent boxes.
      a. Paved condition: Set box so that top of box is flush with adjacent paving.
      b. Turf: Set box so that top of box is 1/2" above adjacent finish grade.

c. Landscape Condition: Set boxes so that top of box is 1" above adjacent finish grade.

4. Mark top of each box with approved designation of type of equipment housed within it. Use approved permanent means of marking. Identify zone number of remote-control valves.

F. Sprinkler Heads
1. Comply with referenced details and City Standards.
2. Install swing joints, flush lines and cap for pressure testing.
3. After passing pressure test, lay swing joints down in trench, accurately record location as indicated above, and back fill excavation.
4. After soil preparation is complete and final grade has been established, expose swing joints, flush lines, and install heads.
5. Thoroughly flush lines before installing nozzles or emitters.

G. Quick Coupler
1. Locate 12" from paved surface unless approved otherwise.

3.7 FIELD QUALITY CONTROL

A. Identify the following scheduled observations in the Progress Schedule and provide notifications to Landscape Architect and Owner prior to each as follows:
1. Backflow assembly location: 48 hours.
2. Pressure supply line installation and testing: 48 hours.
3. Automatic controller location: 48 hours.
4. Control wire installation: 48 hours.
5. Lateral line and sprinkler installation: 48 hours.
6. Coverage test: 48 hours.
7. Final site review: 7 days.

B. When observations have been conducted by other than the Landscape Architect or Designated Representative, show evidence in writing of when and by whom these observations were made.

C. No site observations will commence without Record Drawing redline prints.

D. Pressure Testing:
1. General:
a. All hydrostatic pressure tests in the presence of the Landscape Architect or Owner representative. No pipe shall be completely backfilled until it has been inspected, tested and approved in writing.
b. Center load all pipe runs and secure as required to prevent damage to system during testing. Do not cover any joints or fittings.
c. Fill pipe with water a minimum of 24 hours prior to testing.

d. Furnish all force pumps and equipment required to conduct tests. Do not use system's booster pump to pressurize lines.
e. Conduct all pressure tests prior to spreading any soil amendment material.
f. Correct all deficiencies revealed by testing.

2. Mainline: Prior to installation of electrical control valves, quick couplers or any other equipment that might prevent a proper test from being performed pressurize mainline to 150 pounds per square inch and maintain pressure for a period of 6 hours.
3. Lateral Lines: Prior to installation of heads, cap risers and swing joints and pressurize to 100 pounds per square inch and maintain pressure for a period of 2 hours.
4. All Piping Under Paved Areas: pressurize to 150 pounds per square inch for a period of 2 hours and proved watertight prior to paving.

E. Coverage Test: When the sprinkler irrigation system is completed, perform a coverage test in the presence of the Landscape Architect or Designated Representative to determine if the water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from plans.
1. Perform in presence of Landscape Architect and Owner representative.
2. Run each zone for sufficient length of time to demonstrate coverage and uniform application.
3. Adjust system components as required to correct inadequate or non-uniform coverage.

F. All tests that fail will require additional testing at Contractor's expense, including Landscape Architect's time and expenses, until accepted by Landscape Architect.

G. Final Observation:
1. The Contractor shall operate each system in its entirety for the Landscape Architect or Designated Representative at time of final observation. Any items deemed not acceptable by the Landscape Architect or Owner, or not in compliance with these specifications and drawings, shall be reworked to the complete satisfaction of the Landscape Architect and Owner.
2. The Contractor shall show evidence to the Landscape Architect that the Owner has received all accessories, charts, record drawings, and equipment as required before final observation can occur.

3.8 BACKFILLING

A. Clean trenches of debris and deleterious material.

B. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

C. Backfill only after specified tests have been performed and Engineer's acceptance has been obtained.

D. Clean trenches of debris and rocks.

E. Bed pipe as indicated on the Drawings.

F. Place initial fill of select material as indicated on Drawings.

G. Backfill with approved native soil free of rocks, sticks, debris and other deleterious material.

H. Compaction
   1. In landscape areas match compaction of landscape area soil and as required to prevent settling.
   2. Under areas to be paved compact to a minimum of 95% per ASTM D1557. Meet minimum compaction requirements for pavement section

3.9 TEMPORARY REPAIRS

A. The Owner reserves the right to make temporary repairs as necessary to keep the sprinkler system equipment in operating condition. The exercise of this right by the Owner shall not relieve the Contractor of his responsibilities under the terms of the warranty as herein specified.

3.10 SYSTEMS STARTUP

A. Adjust control system to achieve time cycles required.

B. Adjust control system to achieve time cycles required to deliver proper precipitation rates for the various planting types. Adjust sequencing of stations such that the required watering can be accomplished during the Owner-specified watering time window.

C. Change head and nozzle types as directed and as required to achieve proper coverage and precipitation rates.

D. Adjust heads and valve pressures as required to provide proper irrigation coverage and precipitation rates.

E. Adjust all sprinkler heads to prevent as much as possible any overspray onto walks and roadways. No spray is permitted on buildings.

F. Radii shall not be reduced by more than 25% of the nozzle's radius as determined by manufacturer.

3.11 MAINTENANCE

A. The entire sprinkler irrigation system shall be under full automatic operation for a period of seven days prior to any planting.

B. The Landscape Architect or Owner Representative reserves the right to waive or shorten the operation period.

C. Maintain system during the plant establishment period specified in Section 32 90 00.

3.12 CLEANUP

A. Cleanup shall be performed as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage sustained to the work of others shall be repaired and work returned to its original condition.

3.13 OPERATING INSTRUCTIONS

A. The Contractor shall train Owner’s maintenance personnel in proper operation of all major equipment. Provide written evidence of the person or persons so trained.

3.14 DEMONSTRATION

A. Instruct Owner's personnel in operation and maintenance of system. Use operation and maintenance material as basis for demonstration.

END OF SECTION

PLANTING
SECTION 32 9000

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, apply to this Section.

1.2 SECTION INCLUDES

A. Trees.

B. Lawns.

C. Topsoil and soil amendments.

D. Fertilizers and mulches.

E. Stakes and guys.

1.3 MEASUREMENT AND PAYMENT

A. Payment of the various Construction Items described in the Schedule of Values shall be considered full compensation for work of this Section.

B. Unit prices for soil preparation and for items that include backfill mixes shall be adjusted to reflect changes due to the requirements of soil lab recommendation.

1.4 RELATED SECTIONS

A. Section 32 80 00 – Irrigation: Coordination with head, pipe, and equipment locations.

B. Section 31 22 19 – Finish Grading: Topsoil

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Materials List:
   1. Within 15 days of Award, submit documentation that specified plants have been ordered. Include names and addresses of suppliers, and make arrangements for Landscape Architect to inspect plants at supplier's nursery.
   2. Submit requests for substitutions with materials list.

C. Delivery Tickets:
   1. Submit for all plants installed as part of the Project.
   2. Include full botanical and common names of all plants.

D. Product Data - Submit data on the following:
   1. Soil amendments.
   2. Herbicides.
   3. Fertilizers.
   4. Substitutions for specified accessories.
   5. Root Barrier.

E. Product certificates signed by manufacturers certifying that their products comply with specified requirements.
   1. Manufacturer's certified analysis for standard products.
   2. Analysis for other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
   3. Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.

F. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
   1. Certification of each seed mixture for sod, identifying sod source, including name and telephone number of supplier.

G. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
   1. Analysis of existing surface soil.
   2. Analysis of imported topsoil.

H. Samples of each of the following:
   1. 5 lb of mineral mulch for each color and texture of stone required for Project, in labeled plastic bags.
   2. Submit a 1 cubic foot sample of the following. Indicate supplier.
   3. Organic matter.

4. Mulch.
5. Edging materials and accessories to verify color selection.

I. Planting schedule indicating anticipated dates and locations for each type of planting.

J. Test Reports: Submit soil test results and recommendations.

K. Maintenance instructions recommending procedures to be established by Owner for maintenance of landscaping during an entire year. Submit before expiration of required maintenance periods.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
   1. Installer's Field Supervision: Require Installer to maintain an experienced fulltime supervisor on the Project site during times that landscaping is in progress.

B. Provide quality, size, genus, species, and variety of trees and shrubs indicated, complying with applicable requirements of ANSI Z60.1 "American Standard for Nursery Stock."

C. Plant nomenclature shall conform to that used in New Sunset Western Garden Book, 2012 edition or later, published by Sunset Publishing Corporation. Names and varieties not listed in this reference shall be those most commonly used in the nursery trade.

D. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, and mineral and plant-nutrient content of topsoil.
   1. Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce satisfactory topsoil.

E. Measurements: Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

F. Herbicides shall be applied by licensed applicator. Submit name, address, and license number of application firm.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association's (ASPA) "Specifications for Turfgrass Sod Materials and Transplanting/Installing."

C. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

D. Trees and Shrubs: Deliver trees and shrubs in sizes as indicated in the drawings. Do not prune before delivery, except as approved by Landscape Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop trees and shrubs during delivery.

E. Deliver trees, shrubs, ground covers, and plants after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set planting materials in shade, protect from weather and mechanical damage, and keep roots moist.
   1. Do not remove container-grown stock from containers before time of planting.
   2. Water root systems of trees and shrubs stored on site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.8 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Landscape Architect before planting.

C. Planting operations shall not be conducted under the following conditions:
   1. Freezing weather.
   2. Excessive heat.
   3. High winds.
   4. Excessively wet conditions.

1.9 SEQUENCING AND SCHEDULING

A. Coordinate planting operations with other construction to avoid damage to plants by other trades.

1.10 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Warrant the following living planting materials for the following specified time period after date of Substantial Completion, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.
   1. Trees – 1 year.
   2. Shrubs – 6 months.
   3. Ground covers – Length of maintenance period.

C. Remove and replace dead planting materials immediately unless required to plant in the succeeding planting season.

D. Replace planting materials that are in a substantially unhealthy condition (more than 25 percent of the plant dead or removed due to death of branches, etc.) at end of warranty period.

E. A limit of one replacement of each plant material will be required, except for losses or replacements due to failure to comply with requirements.

1.11 MAINTENANCE

A. Maintain trees, shrubs, groundcovers, and lawns by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Time period of the maintenance periods as specified on the drawings, or if not specified then a minimum of 3 months.

B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth lawn.

C. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 40 percent of the grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowing. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

D. Post-fertilization: Apply fertilizer to lawn after first mowing and when grass is dry.
   1. Use fertilizer that will provide actual nitrogen of at least 1 lb per 1000 sq. ft. of lawn area.

PART 2 - PRODUCTS

2.1 TREE AND SHRUB MATERIAL

A. General: Furnish nursery-grown trees and shrubs conforming to ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully-branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Grade: Provide trees and shrubs of sizes and grades conforming to ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to Landscape Architect.

C. Label at least 1 tree and 1 shrub of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.

2.2 GRASS MATERIALS

A. Sod: Certified turf grass sod complying with ASPA specifications for machine-cut thickness, size, strength, moisture content, and mowed height, and free of weeds and undesirable native grasses. Provide viable sod of uniform density, color, and texture of the following turfgrass species, strongly rooted, and capable of vigorous growth and development when planted.
   1. Sod species as indicated on the plans.

B. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances. Seed shall be of the latest crop, labeled in accordance with the California Food and Agricultural Code.
   1. Seed mix as indicated on the plans.

2.3 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth. Any topsoil added shall be thoroughly mixed with the existing site soil to a depth of 12" minimum (unless otherwise noted on drawings).
   1. Topsoil Source: Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.

2.4 SOIL AMENDMENTS

A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.
   1. Provide lime in the form of dolomitic limestone.

B. Aluminum Sulfate: Commercial grade, unadulterated.

C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.

F. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

G. Manure: Well-rotted, un-leached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

H. Water: Potable.

2.5 HERBICIDES

A. EPA registered and approved, of type recommended by manufacturer.

B. Surflan, Round-Up or approved equal.

2.6 FERTILIZER

A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural original sources of urea-form, phosphorous, and potassium in the compositions as indicated on the drawings or as recommended by the soil test (soil test recommendation to take precedence over drawings).

2.7 MULCHES

A. Organic Mulch: Organic mulch, free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
   1. Type: Wood and bark chips – refer to drawings.

B. Mineral Mulch: Hard, durable stone, washed free from loam, sand, clay, and other foreign substances, of following type, size range, and color:
   1. Rounded riverbed gravel or smooth faced stone.
   2. Crushed stone or gravel. – per plans.

C. Peat Mulch: Provide peat moss in natural, shredded, or granulated form, of fine texture, with a pH range of 4 to 6 and a water-absorbing capacity of 1100 to 2000 percent.

2.8 STAKES AND GUYS

A. Upright: Rough-sawn, sound, new hardwood, redwood, or pressure-preservativetreated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches by length indicated, pointed at one end.

B. Guy and Tie Wire: ASTM A 641, Class 1, galvanized-steel wire, 2-strand, twisted, 0.106 inch in diameter.

C. Guy Cable: 5-strand, 3/16-inch diameter, galvanized-steel cable, with zinc-coated turn buckles, 3-inch- long minimum, with two 3/8-inch- galvanized eyebolts.

D. Hose Chafing Guard: Reinforced rubber or plastic hose at least 1/2 inch in diameter, black, cut to lengths required to protect tree trunks from damage.

E. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

2.9 ROOT BARRIER

A. Deep Root UB-24-2.

B. Century Products CPU Series

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Start of work shall indicate Contractor's acceptance of existing conditions.

3.2 PREPARATION

A. Conduct weed control measures as specified in the drawings.

B. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, and secure Landscape Architect's acceptance before the start of planting work. Make minor adjustments as may be required.

3.3 PLANTING SOIL PREPARATION

A. Soil Testing: confirm that required soil testing has been completed and that soil mixes and soil preparation specifications have been revised to reflect the recommendations of the soils laboratory as approved by Landscape Architect.

B. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

C. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days.

D. For tree pit or trench backfill, mix planting soil before backfilling and stockpile at site.

E. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

3.4 LAWN PLANTING PREPARATION

A. Limit subgrade preparation to areas that will be planted in the immediate future.

B. Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous materials.

C. Spread planting soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.
   1. Place approximately 1/2 the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.
   2. Allow for sod thickness in areas to be sodded.

D. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches in any dimension, and other objects that may interfere with planting or maintenance operations.

E. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.5 GROUND COVER AND PLANT BED PREPARATION

A. Till soil in beds to a minimum depth of 12 inches and mix with specified soil amendments and fertilizers.

3.6 EXCAVATION FOR TREES AND SHRUBS

A. Pits and Trenches: Excavate with vertical sides and with bottom of excavation slightly raised at center to assist drainage. Loosen hard subsoil in bottom of excavation.
   1. Container-Grown Trees and Shrubs: Excavate pits twice the width and 1½ the depth of the container.

B. Mix subsoil removed from landscape excavations with soil amendment to use as backfill.

C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.

E. Fill excavations with water and allow to percolate out before placing setting layer and positioning trees and shrubs.

3.7 PRE-EMERGENT HERBICIDE

A. Apply herbicides in accordance with manufacturer's recommended rates and procedures.

B. Apply to soil of all planting bed areas prior to placement of mulch.

3.8 PLANTING TREES AND SHRUBS

A. Set container-grown stock plumb and in center of pit or trench with top of ball raised above adjacent finish grades as indicated.
   1. Carefully remove containers so as not to damage root balls.
   2. Place stock on setting layer of compacted planting soil.
   3. Place backfill around ball in layers, tamping to settle backfill and eliminate voids and air pockets. When pit is approximately 1/2 backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing and tamping final layer of backfill.

B. Dish and tamp top of backfill to form a 3-inch-high mound around the rim of the pit (not in turf). Do not cover top of root ball with backfill.

3.9 TREE AND SHRUB PRUNING

A. Prune, thin, and shape trees and shrubs as directed by Landscape Architect.

3.10 TREE AND SHRUB GUYING AND STAKING

A. Upright Staking and Tying: Use a minimum of 2 stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 72 inches above grade. Set vertical stakes and space to avoid penetrating balls or root masses. Support trees with 2 strands of tie wire encased in hose sections at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree. Refer to staking detail in the drawings.

B. Guying and Staking: Guy and stake trees exceeding 14 feet and more than 3-inch caliper unless otherwise indicated. Securely attach no fewer than 3 guys to stakes 30 inches long, driven to grade. Attach flags to each guy wire, 30 inches above finish grade.

3.11 MULCHING

A. Mulch backfilled surfaces of pits, trenches, planted areas, and other areas indicated.

B. Mulch: Apply the following average thickness of mulch per plans and finish level with adjacent finish grades. Do not place mulch against trunks or stems.
   1. Thickness: As indicated on drawings.

3.12 SODDING NEW LAWNS

A. Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
   1. Lay sod across angle of slopes exceeding 1:3.
   2. Anchor sod on slopes exceeding 1:6 with biodegradable organic plastic staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within 2 hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1- 1/2 inches below the sod.

3.13 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

B. Protect landscaping from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION

PIPED UTILITIES
SECTION 33 1100

PART 1 - GENERAL

1.1 INCLUSION OF OTHER CONTRACT DOCUMENTS

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

1.2 SCOPE OF WORK

A. The work includes, but is not necessarily limited to, the following:

1. Domestic water piping system.
2. Fire protection piping system.
3. Sewer piping system.

B. Other items that may be specified or shown on the Drawings.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02 2600, Geotechnical Investigation Report.

B. Section 03 3000, Cast-In-Place Concrete.

C. Section 31 0000, Earthwork.

D. Section 31 2333, Trenching and Backfilling.

1.4 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
1. Sun damaged or discolored PVC pipe will be rejected.

B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.

C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects or deficiencies discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.

D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction or incorrect grades will be is the responsibility of th econtractor.

E. Per 2016 NFPA 13, with California amendments, provide Contractor's material and test certificate to the Owner, Architect, Project Inspector and Local Fire Authority.

1.5 SUBMITTALS

A. Refer to Section 01 3300.

B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

C. Provide sieve analysis from accredited testing lab on pipe bedding material. Analysis shall have a current date not older than project contract signing date.

D. Substitution: Provide all data of proposed material being submitted as a substitution. Provide comparison with specified product data and identify all differences. Failure to provide comparison will be reason for rejection.

1.6 FEES, PERMITS, AND UTILITY SERVICES

A. Obtain and pay for permits and service charges required for installation of Work. Arrange for required inspections and secure written approvals from authorities having jurisdiction.

B. Upon completion of work within right-of-way, provide copies of written final approval to the Architect.

1.7 WARRANTY

A. Refer to the General Conditions and Section 01 7833 - Warranties and Bonds.

1.8 REFERENCE AND STANDARDS

A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.

C. ANSI/ASTM D1557-02 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) Drop.

D. ANSI/ASTM D 3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).

E. ANSI/ASTM D 422-63 Test Method for Particle Size Analysis of Soil.

F. ANSI/ASTM S 4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.

G. CALTRANS Standard Specifications.

H. CAL-OSHA, Title 8, Section 1590 (e).

I. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

J. NFPA 13, 24 and 25, latest Editions.

K. California State Health and Safety Code Section 116875, Lead Free Public Water Systems.

L. California Plumbing Code, latest edition.

1.9 DELIVERY, STORAGE AND HANDLING

A. Transport, store and handle in strict accord with the local jurisdiction.

B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.10 PROJECT CONDITIONS

A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.

1.11 EXISTING SITE CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.12 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building are disturbed by operations.

B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.

C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.

D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion or gullying of sides of excavation.

E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance to adjacent areas. The contractor shall make a reasonable effort on a daily basis to provide pumps and all equipment necessary to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.

F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.

G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

H. Trees: Carefully protect exiting trees that are to remain. Provide temporary irrigation as necessary to maintain health of trees.

1.13 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field test indicate that moisture content and density of fill are satisfactory.

1.14 RECORD DRAWINGS

A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.

B. Upon completion of this Contract, furnish one tracing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.

C. All symbols and designations used in preparing Record Drawings shall match those used in Contract drawings.

D. Properly identify on as-builts and provide dimensions for all stubs for future connections. Provide concrete markers 6" dia. 12" deep, flush with finish grade at the ends of all stubbed pipes.

E. Provide record drawing per section 01 7823 - Project Record Documents.

PART 2 - MATERIALS

2.1 GENERAL

A. Provide each item listed herein or shown on drawings of quality noted or approved equal. All material shall be new, full weight, standard in all respects and in first-class condition. Insofar as possible, all materials used shall be of same brand or manufacture throughout for each class of material or equipment. Materials shall be of domestic manufacture and shall be tested within Continental United States.

B. Grade or quality of materials desired is indicated by trade names or catalog numbers stated herein.

C. Dimensions, sizes, and capacities shown are minimum and shall not be changed without permission of Architect.

D. All materials in this section used for any public water system or domestic water for human consumption shall be lead free.
   1. For the purposes of this section, “lead free” means not more than 0.2 percent lead when used with respect to solder and flux and not more than 8 percent when used with respect to pipes and pipe fittings.
   2. All pipe, pipe or plumbing fitting or fixtures, solder, or flux shall be certified by an independent American National Standards Institute (ANSI) accredited third party, including, but not limited to, NSF International, as being in compliance with this section.

E. All materials used for fire system piping shall be UL and FM approved.

2.2 VALVE BOXES

A. Provide at each valve or cock in ground a Christy, Brooks, or equal to Christy G05CT, concrete valve box with cover marked for service, domestic water shall be marked “Water” and fire supply shall be marked “Fire”. Furnish extension handles for each size square nut valve, and provide “fork” handle for each size of “wheel handle” valve as required. Do not locate valve boxes in walk, or covered passages, curbs & gutters, unless necessary. If valve location is within concrete or asphalt paved surface valve box shall be as detailed on plans for such condition. Provide valve box extensions as required to set bottom of valve box to bottom of piping in which valve is installed. Provide Owner with set of special wrenches and/or tools as required for operation of valves.

2.3 PIPES AND FITTINGS

A. Sanitary Sewer: PVC sewer pipe and fittings with Ring-Tite joints, ASTM D224I SDR 26.

B. Domestic water Lines 3 ½" and smaller: PVC Schedule 40.

C. Water lines 4" and larger: AWWA C-900 Class 235 with rubber gasket joints.

D. Fire lines 4" and larger: AWWA C-900 Class 200/DR14 with rubber gasket joints.

E. Solder: Lead Free. 95/5; 95% Tin/ 5% Antimony.

F Ductile Iron Pipe; AWWA C151, Class 350 with polyethylene encasement in conformance with AWWA C105.

G. Ductile Iron Pipe Fittings; AWWA C110, C153, Ebba Iron, Mega-Lug if specified, or equal.

H. PVC Mechanical Fittings; Ebba Iron, Mega-Lug, or equal.

I. Mechanical Fitting Bolts; Bolts and nuts shall be carbon steel with a minimum 60,000 psi tensile strength conforming to ASTM A 307, Grade A. Bolts shall be standard ANSI B1.1 Class 2A course threads. Nuts shall conform to ASTM A 563 and be standard ANSI B1.1, Class 2A course thread. All bolts and nuts shall be zinc coated.

J. Fasteners Anti-Rust Coatings; After assembly, coat all fasteners with an Aspahltic Bituminous coating conforming to 2007 NFPA 25, 10.3.5.2 and 10.8.3.5.

K. Pipe Wrap; 8 mil polyethylene pipe wrap conforming to ANSI/AWWA C105/A21.5 standards.

2.4 SANITARY SEWER MANHOLES

A. Shall be constructed as shown on plan details.

2.5 CLEANOUTS

A. Cleanouts of same diameter as pipe up to 8" in size shall be installed in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18" from building so as to provide sufficient space for rodding. No horizontal run over 100 feet shall be without cleanout whether shown on drawings or not.

B. All cleanout boxes shall be traffic rated with labeled lid, Christy G05CT or approved equal. Lid shall be vandal proof with stainless steel screws.

2.6 UNIONS

A. Furnish and install one union at each threaded or soldered connection to equipment and 2 unions, one on each side of valves on pipes ½" to 3".

B. Locate unions so that piping can be easily disconnected for removal of equipment or valve. Provide type of specified in following schedule:

Type of Pipe Union	
Steel Pipe:	150 lb. Screwed malleable ground joint, brass, brass-to-iron seat, black or galvanized to match pipe.
Copper tubing:	Brass ground joint with sweat connections.
PVC Sch 80 pipe:	PVC union, FIPT X FIPT

2.7 VALVES

A. Provide valves as shown and other valves necessary to segregate branches or units. Furnish valves suitable for service intended. Valves shall be properly packed and lubricated. Valves shall be non-rising stem. Place unions adjacent to each threaded or sweat fitting valve. Install valves with bonnets vertical. All valves shall be lead free.

B. Valves ½" thru 2"; shall be made of bronze, full size of pipe and lead free. Nibco S-113-FL Series; American G-300 Series; Matco 511 FL Series; Apollo 102T-FL Series. Brass valves of brass parts within valves will not be accepted.

C. Valves, 2 ½" thru 3" shall be class 150; shall be made of bronze, full size of pipe; Jenkins Fig. 2310 J; Lunkinheimer Fig. 2153; Grane Fig. 437; Stockham Fig. B-128.

D. Valves, Flanged; 4" thru 12" Ductile Iron Resilient Wedge Gate Valve; Nibco F 609 RW; American 2500 Series; Kennedy 8564; Mueller 2360 Series.

2.8 FIRE HYDRANTS

A. Clow 960 Factory Painted per Local Jurisdiction Requirements, or approved equal, 36" (min) bury, two 2-1/2" hose nozzles, one 4-1/2" pumper nozzle, intermediate section to serve as break-off flange with check valve. Hydrant shall conform to, and installation sha comply with the Local Jurisdiction.

2.9 POST INDICATOR

A. Post Indicator shall be Mueller Co. A-20806 (adjustable) or as approved by local jurisdiction approved equal.

2.10 BACKFLOW PREVENTERS

Double Check Valve, Double Check Detector and Reduced Pressure Backflow Preventers

A. Backflow preventers shall be as required by the local agency and by the State of California's Department of Health Services most recent list of approved reduced pressure backflow preventers. All approved backflow preventers shall have ductile iron bodies.
   1. Provide Backflow preventer blankets with locking device. Weatherguard R-30 insulated or equal.
   2. Provide ball valve at all test ports with brass plug in valve.

2.11 TAPPING SLEEVE

A. Shall not be used on pipe sizes 6" thru 12" and shall be made with stainless steel material including stainless steel bolts. Flanges shall be ductile iron or high carbon steel. Gaskets shall seal full circumference of pipe. Shall be manufactured for operating pressure of 200 psi, and shall pass test pressure of 300 psi. Romac SST series; Smithblair 662; Mueller H304; Ford “FAST” tapping sleeve.

2.12 SERVICE SADDLES

A. Shall be used on pipe size 2" thru 4". Body shall be made from ductile iron with epoxy coating or bronze. Cascade Style CSC-1; A.Y. McDonald model 3891 AWWA/3892 FNPT; Smith-Blair #317; Ford S70, S71, S90 (style B). All service saddles in the right of way shall be per the local jurisdiction.

2.13 TRACER WIRE

A. No. 10 THW solid copper wire. Use waterproof wire connectors all joints.

PART 3 - EXECUTION

3.1 DRAWINGS AND COORDINATION

A. General arrangement and location of piping, etc., are shown on Drawings or herein specified. Install work in accord therewith, except for minor changes that may be necessary on account of other work or existing conditions. Before excavation, carefully examine other work that may conflict with this work. Install this work in harmony with other craft and at proper time to avoid delay of work.

B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.

C. In advance of construction, work out minor changes if conflicts occur with electrical or mechanical. Relocate services to suit actual conditions and work of other trades to avoid conflict therewith. Any adjustments or additional fittings to make adjustments shall not be cause for additional cost to the owner.

D. Execute any work or apparatus shown on drawings and not mentioned in specifications, or vice versa. Omission from Drawings or Specifications of any minor details of construction, installation, materials, or essential specialties does not relieve Contractor of furnishing same in place complete.

E. Graded pipes shall take precedence. If conflict should occur while placing the domestic water and fire service piping, the contractor shall provide any and all fittings necessary to route the water lines over such conflicting pipes at no additional costs to the owner.

3.2 ACCESS

A. Continuously check for clearance and accessibility of equipment or materials specified herein to be placed. No allowance of any kind shall be made for negligence on part of Contractor to foresee means of installing his equipment or materials into proper position.

3.3 EXCAVATING AND BACKFILLING

A. Excavation and Bedding:
   1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width to be a minimum of 12" wider than outside diameter of pipe. Follow manufacturer's recommendations for use of each kind and type of pipe.

   2. Bedding: Provide a bedding as noted on drawing details for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, which ever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make joints.

B. Laying of Pipe:
   1. General: Inspect pipe prior to placing. Sun damaged pipe will be rejected. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe bell upgrade, true to line and grade.
      a. Sewer pipe shall be laid in strict conformity to the prescribed line and grade, with grade bars set and each pipe length checked to the grade line. Three consecutive points on the same rate of slope shall be used at all times to detect any variation from a straight grade. In any case of discrepancy, work shall be stopped and the discrepancy immediately reported to the Owner's Representative, a string line shall be used at all times to detect any variation from a straight grade. In any case of discrepancy, work shall be stopped and the discrepancy immediately reported to the Owner's Representative, a string line shall be used in the bottom of the trench to insure a straight alignment of the sewer pipe between manholes. The maximum deviation from grade shall not be excess of 1/4 inch. In returning the pipe to grade, no more than 1/4" depression shall result.
      b. The Contractor shall expose the end of existing pipe to be extended, for verification of alignment and elevation, prior to trenching for any pipe which may be affected. All costs of such excavation and backfill shall be included in the price paid for the various items of work.

c. A temporary plug, mechanical type shall be installed on sewer pipe at the point of connection to existing facilities. If connecting to a public facility the plug shall conform to the requirements of the local jurisdiction. This plug shall remain in place until the completion of the balling and flushing operation.

2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.

C. Backfilling:

1. General: Do not start backfill operations until required testing has been accomplished.
2. Compaction and Grading: Remainder of backfill shall be in accordance with Section 0 2210 - TRENCHING AND BACKFILLING.
3. If trenching in area previously lime or cement treated backfill top of trench section, same depth as lime or cement treatment with Class 2 Aggregate Base compacted to 95% minimum relative compaction.

3.4 INSTALLATION OF WATER PIPING

A. Immediately cap or plug ends of, and opening in, pipe and fittings to exclude dirt until final connections made. Use reducing fittings where any change in pipe size occurs. Bushings shall not be used.

B. General: Should existing conditions or other work prevent the running of pipes or the setting of equipment at the points indicated by drawings, changes as authorized by the Architect shall be made without additional cost to the Owner.

C. All bolts used on mechanical fittings shall be thoroughly coated with an asphaltic bituminous coating conforming to latest edition NFPA 24.

D. All buried metal shall be incased with 8 mil polyethylene wrap so that no soil is in contact with metal.

E. Do not install water lines in same trench with non-metallic sewer lines unless bottom of water pipe at all points is at least 12" above top of sewer line and water line is placed on solid shelf excavated at one side of common trench with a minimum of 12 inch horizontal separation.

3.5 CLOSING OF UNINSPECTED WORK

A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected, tested, and approved. Should work be enclosed or covered up before it has been approved, uncover work at own expense. After it has been inspected, tested and approved, make repairs necessary to restore work of other contractors to condition in which it was

found at time of cutting.

3.6 CARE AND CLEANING

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in new condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures and trim that are installed as part of this work. Leave system and equipment in satisfactory new operating condition.

B. Drain and flush piping to remove grease and foreign matter.

C. Sewer piping shall be balled and flushed, and air tested.

D. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

E. Flush fire service piping 3 times in the presence of the project inspector. Each flushing shall be 3 minutes minimum.

3.7 SEWER INTERNAL INSPECTION

A. Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which resulted from the new installation, shall also be removed. Pipes shall be cleaned by the controlled balling and flushing method. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt, and debris from entering the existing facility.

3.8 TEST OF PIPING

A. Test piping at completion of roughing-in, in accord with following schedule, and show no loss in pressure or visible leaks after minimum duration or four (4) hours at test pressure indicated.

TEST SCHEDULE

System Tested	Test Pressure PSIG Test With
Public Water Mains	Per local jurisdiction requirements.
Private Domestic Water Piping:	150 PSI Water 2 hrs.
Fire Protection Piping:	200 Lbs. water pressure, 4 hrs duration with no pressure loss, or per Fire Code.

Sanitary Sewer Piping:	Sewer system shall be air tested at 3.5 PSI for 5 minutes minimum.

B. Testing equipment, materials, and labor shall be furnished by contractor.

3.9 WATER SYSTEM STERILIZATION

A. Public Water Mains: Shall be flushed and disinfected per the local jurisdiction requirements.

B. Clean and disinfect all site water systems connected to the domestic water systems in accordance with AWWA Standard C651 and as required by the local Building and Health Department Codes, and EPA.
   1. Clean and disinfect industrial water system in addition to the domestic water system.
   2. Disinfect existing piping systems as required to provide continuous disinfection upstream to existing valves. At Contractors option, valves may be provided to isolate the existing piping system from the new piping system.

C. Domestic water sterilization shall be performed by a licensed "qualified applicator" as required by CAL-EPA Pesticide Enforcement Branch for disinfecting and sterilizing drinking water.

D. Disinfecting Agent: Chlorine product that is a registered product with Cal-EPA for use in California potable water lines, such as Bacticide, CAL-EPA Registration No. 37982-200001.

E. Contractor to provide a 1" service valve connected to the system at a point within 2'-0" of its junction with the water supply line. After sterilization is complete Contractor to provide cap at valve.

F. Sterilization Procedure to be as follows:
   1. Flush pipe system by opening all outlets and letting water flow through the system until clear water flows from all outlets.
   2. Inject disinfecting agent to provide a minimum chlorine residual concentration of at least 50 parts per million (ppm) of free chlorine at each outlet.
   3. Provide sign at all outlets which reads" Water Sterilization in Progress - Do not operate." Remove signs at conclusion of test.
   4. Close all outlets and valve. Retain treated water in pipe for a minimum of twenty-four hours. Should chlorine residual at pipe extremities by less than 50 PPM at this time, pipe shall be re-chlorinated. As an option, the water systems may be filled with a water-chlorine solution containing a minimum of 200 PPM of chlorine and allowed to stand for three hours.
   5. After chlorination, flush lines of chlorinated water and refill from domestic supply. Continue flushing until residual chlorine is less than or equal to 0.2 ppm, or a residual the same as that of the test water.

G. Chemical and bacteriological tests shall be conducted by a state-certified laboratory and approved by the local authorities having jurisdiction.

H. Submit written report to Health Department as required by State Regulations. Provide a copy of report to Architect prior to completion of project.

I. The costs of sterilization and laboratory testing shall be paid for by the contractor.

3.10 CLEANING

A. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

END OF SECTION

WATER DISTRIBUTION SYSTEM
SECTION 331116

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American Society for Testing Materials (ASTM) Publications:

1. A 120 Pipe, Steel, Black and Hot-dipped, zinc-coated (Galvanized) Welded and Seamless, for ordinary use.

2. C 94 Ready-Mixed Concrete.

3. D 2774 Underground Installation of Thermoplastic Pressure Piping (ANSI/ASTM D 2774).

4. D 3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

5. F 477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. American Water Works Association (AWWA) Publications:

1. C104 Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water (ANSI/AWWA C104).

2. C110 Gray Iron and Ductile Iron Fittings, 3" through 48", for Water and Other Liquids (ANSI A21.10).

3. C111 Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings (ANSI/AWWA C111).

4. C115 Flanged Ductile Iron an Gray Iron Pipe with Threaded Flanges.

5. C151 Ductile Iron, Centrifugally Cast in Metal Molds or Sand Lined Mold for Water or other Liquids.

6. C500 Gate Valves, 3 through 48 Inches NPS for Water and Sewage Systems.

7. C503 Wet Barrel Fire Hydrants.

8. C504 Rubber Seated Butterfly Valves.

9. C600 Installation of Gray and Ductile Cast Iron Water Mains and Appurtenances (ANSI/AWWA C600).

10. C651 Disinfecting Water Mains.

11. C704 Cold Water Meters - Propeller Type for Main Line Applications.

12. C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 through 12 Inches for Water Distribution.

13. C901 Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, ½" through 3" for Water.

14. C905 Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14" through 36".

15. M16 Work Practices for Asbestos-Cement Pipe, 1978 Edition.

1.2 GENERAL REQUIREMENTS

A. Manufacturer's Data: Submit manufacturer's standard drawings or catalog cuts of the following items, except where both are specified and data which indicates that the following materials conform to the specifications:

1. Pipe and Fittings.

2. Joints and Couplings, including gaskets for joints.

3. Valves.

4. Corporation Stops, Curb Stops, Saddles, Meter Box.

5. Valve Boxes.

6. Tracer Wire.

7. Meter.

8. Tapping Sleeve and Valve.

1.3 DELIVERY, STORAGE AND HANDLING OF MATERIALS

A. Delivery and Storage: Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosure or under protective covering. Store plastic piping and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

B. Handling: Handle pipe, fittings, valves, hydrants and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry pipe to the trench; do not drag it. Do not leave rubber gaskets and plastic piping that are not to be installed immediately out in the sunlight, but store under cover out of direct sunlight.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS FOR WATER DISTRIBUTION MAINS

A. Polyvinyl Chloride (PVC) Plastic Piping:

1. Pipe and Fittings: Pipe shall conform to AWWA C900 (Class 235) and shall be plain end or gasket bell end unless noted otherwise, with cast iron pipe equivalent OD. Fitting shall be gray iron or ductile iron conforming to AWWA C110, and shall have cement mortar lining conforming to AWWA C104, standard thickness. PVC pipe for on site fire lines shall be Class 200.

2. Joint and Jointing Materials: Joints for pipe shall be push on joints as specified in ASTM D3139. Joints between pipe and metal fittings, valves and other accessories shall be mechanical joints as specified in AWWA C111. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling with which it is to be used. Gaskets for push on joints for pipe shall conform to ASTM F477. Gaskets for mechanical joints for joint connections between pipe and metal fitting, valves and other accessories shall be as specified in AWWA C111. Joints between fittings and between fitting and valves shall be flanged.

B. Ductile Iron Pressure Piping:

1. Pipe and Fittings: Ductile iron pipe shall conform to AWWA C151, Thickness Class 350. Flanged pipe shall conform to AWWA C115. Flanged pipe shall conform to AWWA C115. Fittings shall conform to AWWA C110. Fittings shall have a minimum pressure rating of 250 psi. Ends of pipe and fittings shall be suitable for the joints specified hereinafter. Pipe and fittings shall have cement mortar lining conforming to AWWA C104, standard thickness. Below ground pipe shall be bituminous coated.

2. Jointing Materials: Above ground pipe, and pipe and fittings as indicated, shall have flanged joints. Bolts, nuts and gaskets for flanged connections shall be as recommended in the Appendix to AWWA C115. Horizontal below ground joints may be made with "Tryton" joints, except as noted hereinafter. Joints between fittings and between fittings and valves shall be flanged. Joints between pipe and fittings, valves and other accessories shall be mechanical joints as specified in AWWA C111.

2.2 PIPE 3 1/2" DIAMETER OR SMALLER (except for service lines)

A. PVC:

1. Pipe and Fittings: Pipe shall conform to PVC, Schedule 40.

2.3 PIPE MATERIALS FOR WATER SERVICE LINES

A. Plastic Piping: All plastic pipe and fittings shall bear the seal of approval of the National Sanitation Foundation for potable water service. Plastic pipe and fittings shall be supplied from the same source.

1. Polyethylene (PE) Plastic Piping: Pipe and tubing shall conform to AWWA C900, Class 235.

2.4 VALVES

A. Valves Placed Underground: Valves shall be butterfly type conforming to AWWA C504, Class 150B. Valves shall turn right to close, and be suitable for underground installation. Valve shall have a mechanical joint or a flanged end, as indicated, suitable for connection to flanged fittings.

Size of Valve	Turns to Close
4"	8 - 21
6"	14 - 28
8"	20 - 30

1. Input shaft and 2" square operating nut shall be at a right angle to the operating shaft and input shaft shall extend vertically from the side when the valve is not horizontal position. Disc shall be fusion coated cast iron, cast iron with 3M epoxy 302 coating or Ni-Resist Type 1.

B. Valves Placed Aboveground:

1. Valves 3" and Larger: Valves shall be gate valves conforming to AWWA C500 with flanged ends non-rising stem, and hand wheel. Valves for vertical installation shall be designed to operate satisfactorily in the vertical position. Valves stem shall be O-ring sealed and valve shall turn right to close.

2. Valves Smaller Than 3": Valves shall be gate valves of bronze construction with malleable iron hand wheel, rated for minimum 125 psi working pressure. Packing shall be teflon-asbestos and valves shall have threaded ends.

2.5 VALVE BOXES

A. Box shall be Christy G-5 with C275 cast iron traffic lid and frame. The lid shall have the word "water" cast into it.

2.6 TRACER WIRE AND WARNING TAPE

A. Tracer wire shall be insulated copper or aluminum wire not less than 0.10 inch in diameter and shall be provided in sufficient length to be continuous over each separate run of nonmetallic pipe. Polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines shall be provided on rolls, 3" minimum width, color coded blue with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED WATER LINE BELOW" or similar wording. Color and printing is to be permanent, unaffected by moisture or soil.

2.7 SLEEVE TYPE MECHANICAL COUPLINGS

A. Couplings shall be made from cast iron compatible with the pressure rating of the pipe. Couplings shall have shop coat enamel, and shall be made by Dresser, Rockwell or approved equal and shall be suitable for installation above or below ground.

2.8 WATER SERVICE LINE APPURTENANCES (for water sampling)

A. Saddles: Saddles shall be all bronze, including nuts, and shall utilize "O" ring gaskets. Saddles shall be James Jones, Mueller, Rockwell or approved equal.

B. Corp Stops: Shall be Ford, James Jones, Mueller or equal suitable for use with IPS polyethylene pipe with stainless steel liner.

C. Curb Stops: Shall be right angle Ford, James Jones, Mueller or equal suitable for use with IPS polyethylene pipe, with stainless steel liner and lock wing.

2.9 TAPPING SLEEVE AND VALVE

A. Tapping sleeve and valve shall be Mueller or equal suitable for installation on the existing pipe material.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPELINES

A. General Requirements: These requirements shall apply to all pipeline installation except where specific exception is made in the "Special Requirements" paragraphs hereunder.

1. Earthwork: Do earthwork in accordance with Section 02200, Earthwork.

2. Pipe Laying and Jointing: Pipe, fittings, valves and accessories will be carefully inspected before and after installation and those found defective will be rejected. Remove fins and burrs from pipe and fittings. Before placing in position, clean pipe. fittings, valves and accessories and maintain in a clean condition. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, fittings, valves, or any other water line material into trenches. Cut pipe accurately to measurements established at the site and work into place without springing or forcing. Lay bell and spigot pipe with the bell end pointing in the direction of laying. Grade the pipeline in straight lines, taking care to avoid the formation of any dips or low points. Support pipe at its proper elevation and grade, taking care to secure firm and uniform support. Wood support blocking will not be permitted. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints and couplings. Provide anchors and supports (where indicated and) where necessary for fastening work into place. Make proper provision for expansion and contraction of pipelines. Keep trenches free of water until joints have been properly made. At the end of each day's work or to keep trench water out of the pipelines, close open ends of pipe with water tight plugs. Do not lay pipe when conditions of trench or weather are unsuitable.

3. Installation of Tracer Wire: Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe. Attach wire to top of pipe in such manner that it will not be displaced during construction operations. Terminate at valve and curb boxes.

4. Connections to Existing Lines: Make connections to existing water lines in an approved manner in accordance with AWWA 601 and do so with a minimum interruption of service on the existing line.

B. Special Requirements for Installation of Polyvinyl Chloride (PVC) and Associated Fittings:

1. Installation, General: Install pipe and fittings in accordance with the general requirements for installation of pipelines and with the requirements of AWWA C900 or C905 for laying the pipe and joining of pipe to valves, hydrants and fittings except as otherwise specified in the other subparagraphs hereunder.

2. Jointing: Make joints for pipe with the couplings and rubber rings previously specified for joints with this pipe; assemble these joints in accordance with the requirements of AWWA C900 or C905 for pipe joints. Make mechanical joints between pipe and fittings, valves and other accessories. Make mechanical joints with the glands, gaskets, bolts and nuts previously specified for this type joint; assemble these joints in accordance with the applicable requirements of AWWA C900 or C905 for joint assembly and with the recommendations of Appendix A to AWWA C111. Take special care to assure that the correct rubber ring or gasket, compatible with the annular groove of the bell or coupling, is used at each joint. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer, as approved.

3. Pipe Anchorage: Provide concrete thrust blocks. Thrust blocks shall be as indicated for reaction or thrust backing and plugging of dead ends. Use concrete conforming to ASTM C 94 having a minimum compressive strength of 2,500 psi at 28 days.

C. Special Requirements for Installation of Ductile-Iron Pressure Lines:

1. Installation, General: Install pipe and fittings in accordance with the general requirements for installation of pipelines and with the requirements of AWWA C600 for pipe installation, joint assembly, and valve and fitting installation, except as otherwise specified in the other subparagraphs hereunder.

2. Joints: Make flanged joints with gaskets, bolts and nuts previously specified for this type joint. Make flanged joints up tight, taking care to avoid undue strain on flanges, fittings and other accessories. Align bolt holes for each flanged joint. Use full size bolts for the bolt holes; use of undersized bolts to make up for misalignment of bolt holes or for other purposes will not be permitted. Do not allow adjoining flange faces to be out of parallel to such degree that the flanged joint cannot be made watertight without over-straining the flange. When any flanged pipe or fitting has dimensions that do not allow the making of a proper flanged joint as specified in this paragraph, replace it by one of proper dimensions. Assemble joints made with sleeve type mechanical couplings in accordance with the recommendations of the coupling manufacturer as approved.

3. Pipe Anchorage: Provide concrete thrust blocks (reaction backing) for pipe anchorage. Size and position thrust blocks as indicated. Use concrete conforming to ASTM C94 having a minimum compressive strength of 2,500 psi at 28 days.

D. Installation of Valves: Install gate valves in accordance with the requirements of AWWA C600 for valve and fitting installation. Make and assemble joints to gate valves as previously specified for making and assembling the same type joints between pipe and fittings.

E. Special Requirements for Installation of Water Service Piping:

1. Install pipe and fittings in accordance with the general requirements for installation of pipelines and with the applicable requirements of ASTM D 2774, except as otherwise specified in the other subparagraphs hereunder.

F. Installation of tapping sleeve and valve: Install per manufacturer's recommendations.

3.2 PRESSURE AND LEAKAGE TESTING

A. Field Tests and Inspections, General: The Engineer will conduct field inspections and witness all field tests specified in this section. The Contractor shall perform all field test and provide all labor, equipment and incidentals required for testing. Do not begin testing on any section of a pipeline until compaction is completed and until at least seven (7) days after placing of the concrete thrust blocks.

B. Testing Procedure: Pressure and leakage test all water mains and water service lines. The pressure test shall be run at 150 psi and the leakage test at 100 psi, except that the pressure test at the well site shall be run at 100 psi. Compaction of the backfill must be completed before testing can occur. Allowable leakage will be as follows:

Pipe Size	Gal.s/Hour/1000'
4"	.27
6"	.41
8"	.54

3.3 STERILIZATION

A. After the system has passed the pressure and leakage tests, the system shall be disinfected in accordance with AWWA Standard C651-S2.

END OF SECTION

SANITARY SEWER SYSTEM
SECTION 333100

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SCOPE OF WORK

A. The scope of work includes all site related sanitary sewer system to within five (5) feet of building. See Division 22 for the building portions of the sanitary sewer system.

1.3 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American Society for Testing Materials (ASTM) Publications:

1. C 94 Ready-Mixed Concrete.

2. D 3034 Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

3. D 3139 Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

4. D 3212 Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

5. F 477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

1.4 SANITARY SEWER GRAVITY SYSTEM

A. The system shall include pipelines and connections to existing pipe stubout.

1. Pipelines: Provide mains and laterals of polyvinyl chloride (PVC) plastic pipe, except where specifically called out, or where ductile-iron pipe is required at sewer/water line crossings.

1.5 SUBMITTALS

A. Submit shop drawings in accordance with Section 013300, for the following:

1. Gravity sewer Pipeline.

B. Submit manufacturer's standard drawings or catalog cuts of the following items:

1. Fittings.

2. Joints and couplings.

C. Submit manufacturer's certificate of conformance or compliance for each of the following materials which are specified to conform to publications referenced under paragraph, "Materials" in this Section:

1. Pipe and fitting, including factory applied linings.

2. Pipe joint materials.

D. All tests required by the applicable referenced publication shall have been performed, wether specified in that publication to be mandatory or otherwise. For tests which are not specified in the referenced publication to be performed at definite intervals during manufacture, the tests shall have been performed within three (3) years of the date of submittal of certificates on the same type, class, grade and size of material as is being provided for the project.

1.6 DELIVERY, STORAGE AND HANDLING OF MATERIALS

A. Delivery and Storage:

1. Piping: Inspect materials delivered to site for damage; store with minimum of handling. Store materials on site in enclosures or under protective coverings. Store plastic piping and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

2. Handling: Handle pipe, fittings and other accessories in such manner as to ensure delivery to the trench in sound undamaged condition. Take special care not to injure linings of pipe and fittings; if lining is damaged, make satisfactory repairs. Carry pipe to trench; do not drag it. Do not leave rubber gaskets and plastic piping that are not to be installed immediately in the sunlight, but store under cover out of direct sunlight.

PART 2 - PRODUCTS

2.1 GRAVITY SEWER PIPING

A. Polyvinyl Chloride (PVC) Plastic Piping:
   1. Pipe and Fittings: Polyvinyl chloride (PVC) pipe shall conform to ASTM 2241 (SDR 26).

   2. Joints and Jointing Materials: Joints shall conform to ASTM P3212. Gaskets shall conform to ASTM F477.

2.2 CONCRETE MATERIALS

A. Poured in place Concrete: Use concrete conforming to ASTM C94, 1" maximum, having a minimum compressive strength of 2,500 psi at 28 days.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Do earthwork in accordance with Section 310000, “Earthwork”.

3.2 PIPE LAYING AND JOINTING

A. Each pipe and fitting will be inspected before and after installation and those found defective will be rejected. Provide proper facilities for lowering sections of pipe into trenches. Lay non-pressure pipe with the bell ends in the upgrade direction. Adjust spigots in bells to give a uniform space all around. Blocking or wedging between bells and spigots will not be permitted. Replace by one of the proper dimensions any pipe or fitting that does not allow sufficient space for proper calking or installation of joint material. At the end of each day’s work, close open ends of pipe temporarily with wood blocks or bulkheads.

B. Connections to Existing: Make connections to existing in an approved manner. Conduct work so that there is minimum interruption of service on existing line.

3.3 SPECIAL REQUIREMENTS FOR INSTALLATION OF PVC PLASTIC PIPING

A. Install pipe and fittings in accordance with the general requirements for installation of pipelines and with the requirements of UNI-B-5 for laying and joining pipe and fittings. Make joints with the gaskets previously specified for joints with this piping; assemble these joints in accordance with the requirements of UNI-B-5 for assembly of joints. Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

3.4 FIELD TESTS AND INSPECTIONS

A. Field Test and Inspections, General: The Engineer or Inspector will witness all field tests specified in this section. The Contractor shall perform all field test and provide all labor, equipment and incidentals required for testing.

B. Pipeline Testing: Check each straight run of pipeline for visible deficiencies by holding a light in a manhole; it shall show a practically full circle of light through the pipeline when viewed from the adjoining end of line.

C. Pressure Testing:

1. All gravity lines shall be tested in accordance with this section. Tests shall not take place until compaction requirements have been met. Final pressure tests of the gravity lines shall be conducted in the presence of the Engineer.

2. PVC Gravity Sewer:
   a. Clean pipe to be tested by propelling snug fitting inflated rubber ball through the pipe with water.
   b. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
   c. If the pipe to be tested is submerged in ground water, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
   d. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig plus ground water pressure.
   e. After an internal pressure of 4.0 psig plus ground water pressure is obtained, allow at least tow minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
   f. When pressure decreases to 3.5 psig plus ground water pressure, start stopwatch. Determine the time in seconds that is required for the internal air pressure to reach 3.0 psig plus ground water pressure. Minimum permissible pressure holding times are as indicated below:

Pipe Size	Time (Minutes)
4	2 min. 30 sec.
6	4 minutes
8	5 minutes

   g. If the pipe installation fails to meet these requirements, the Contractor shall determine, at his own expense the source or sources of leakage, and he shall repair or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of this test.

3.5 DEFLECTION TESTING

A. Deflection Testing (PVC Gravity Sewer Only): Deflection shall be measured not less than thirty (30) days after the pipe has been installed, backfilled and compacted. A go-no-go Mandrel shall be pulled through the pipe by hand. All locations with deflection over 5 percent shall be excavated and reinstalled. Any pipe subjected to any method or process other than removal, which attempts, even successfully to reduce or cure any over deflection, shall be uncovered, removed from the site and replaced with new pipe. The Mandrel shall be a rigid, non-adjustable, odd-numbering-leg (9 legs minimum) Mandrel having an effective length not less than its nominal diameter.

END OF SECTION

SITE DRAINAGE
SECTION 33 4000

PART 1 - GENERAL

1.1 INCLUSION OF OTHER CONTRACT DOCUMENTS

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

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03 3000 - Cast-In-Place Concrete.

B. Section 31 2333 - Trenching and Backfilling.

1.3 QUALITY ASSURANCE

A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.

B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.

C. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will the direct construction operations. Neither the presence of the Owner's testing lab representatives not the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the contractor.

D. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction is the responsibility of the contractor.

1.4 SUBMITTALS

A. Refer to Section 01 3300.

B. Manufacturer's Data: Submit list and complete descriptive data of all products proposed for use. Include manufacturer's specifications, published warranty or guarantee, installation instructions, and maintenance instructions.

1.5 WARRANTY

A. Refer to General Conditions and Section 01 7833.

1.6 REFERENCES AND STANDARDS

A. ANSI/ASTM D698-00 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.52 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

B. ANSI/ASTM D1556-00 - Test Method for Density of Soil in Place by the Sand-Cone Method.

C. ANSI/ASTM D1557-02 - Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lbs (4.45 Kg) rammer and 18 inch (457 mm) Drop.

D. ANSI/ASTM D3017-05 Test Methods for Moisture Content of Soils and Soil-Aggregate Mixture by Nuclear Methods (Shallow Depth).

E. ANSI/ASTM D422-63 Test Method for Particle Size Analysis of Soil.

F. ANSI/ASTM D4318-05 Test Method for Liquid Limit, Plastic Limit, and Plasticity Limit.

G. CALTRANS Standard Specifications.

H. CAL-OSHA, Title 8, Section 1590 (e).

I. Any work within the street, highway or right-of-way shall performed in accordance with the requirement of the government agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

J. California Plumbing Code current edition.

1.7 DELIVERY, STORAGE AND HANDING

A. Transport, store and handle in strict accord with the local jurisdiction.

B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

1.8 PROJECT CONDITIONS

A. Existing civil, mechanical and electrical improvements are shown on respective site plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, he is to immediately notify the Architect before continuing work.

1.9 EXISTING SITE CONDITIONS

A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to those utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.

1.10 PROTECTION

A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside building area disturbed by operations.

B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.

C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.

D. Provide shoring, sheeting, sheet piles and/or bracing to prevent caving, erosion or gullying of sides of excavation.

E. Surface Drainage: Provide for surface drainage during period of construction in manner to avoid creating nuisance of adjacent areas. The contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during the entire progress of work, regardless of cause, source, or nature of water.

F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.

G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

H. Trees: Carefully protect existing trees that are to remain.

1.11 SEASONAL LIMITS

A. No fill material shall be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.

1.12 TESTING

A. General: Refer to Section 01 4520 - TESTING LABORATORY SERVICES AND STRUCTURAL TEST AND INSPECTIONS LIST, DSA - 103.

B. Geotechnical Engineer: Owner is retaining a Geotechnical Engineer to determine compliance of fill with Specifications, and to direct adjustments in fill operations. Cost of Geotechnical Engineer will be borne by Owner; except those costs incurred for re-tests or re-inspection will be paid by Owner and backcharged to Contractor.

1.13 RECORD DRAWINGS

A. Keep a daily record of all pipe placed in ground, verified by Project Inspector.

B. Upon completion of this Contract, furnish one Record Drawing showing all outside utility lines, piping, etc., installed under this Contract. Locate and dimension all work with reference to permanent landmarks.

C. All symbols and designations used in preparing Record Drawing shall match those used in Contract Drawings.

D. Properly identify all stubs for future connections, as to location and use, by setting of concrete marker at finished grade in the manner suitable to Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe: Use one of the following, unless noted on the Drawings otherwise.
   1. Polyvinyl Chloride Pipe (PVC): SDR35 conforming to ASTM D3034 with elastomeric joints conforming to ASTM D3212 for pipe to 12". Sun damaged pipe will be rejected.
   2. High density polyethylene pipe (HDPE): The pipe shall be corrugated exterior/smooth interior pipe. 12" to 60" maximum diameter conform to AASHTO M294, water tight per ASTM D3212 with water tight gasket fittings.

B. Perforated Pipe (for subdrains): Shall be ADS N12 pipe, 3 hole, ASTM F 405, AASHTO M 252; PVC ASTM D3034 SDR-35 storm drain pipe.

C. Manhole: Shall be as shown on the drawing details.

D. Drop Inlet: Shall be as shown on the drawing details.

E. Curb Inlet: Shall be as shown on the drawing details.

F. Mortar: For pipe connections to concrete drainage structures, conform to ASTM C270 type N mortar. Place within one half hour after adding water.

G. Crushed Rock: Imported washed crushed rock. Minimum 100% passing 3/4% inch sieve.

H. Trench drain: Polycast, Polydrain or equal and as shown on drawings.

I. Area Drains: Shall be as shown on the drawing details.

J. Floor Drains: Shall be as shown on the drawings details.

K.. Clean-outs: Shall be as shown on the drawings details.

L. Planter drains: Shall be as detailed on the drawing details.

M. Filter Fabric: Mirafi 140N.

PART 3 - EXECUTION

3.1 INSPECTION LAYOUT AND PREPARATION

A. Prior to installation of work of this Section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point were this installation may properly commence.

B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities; all prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.

C. Verify that specified items may be installed in accordance with the approved design.

D. In event of discrepancy, immediately notify Owner and the Architect. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.2 INSTALLATION

A. General: Installation shall be in strict conformance with referenced standards, the manufacturer's written directions, as shown on the drawings and as herein specified.

B. Verify invert elevations at points of connection to existing systems prior to any excavation. If invert elevations differ from that shown on drawings, notify Architect immediately.

C. Excavation and Bedding:
   1. General: Trench straight and true to line and grade with bottom smooth and free of irregularities or rock points. Trench width in accordance with pipe manufacturer's recommendations and as per the drawings. Follow manufacturer's recommendations for use of each kind and type of pipe.
   2. Bedding: Provide bedding as detailed on plans for the full length of the pipe. Bedding shall have a minimum thickness beneath the pipe of 4" or 1/8 the outside diameter of the pipe, which ever is greater. Provide bell holes and depressions for pipe joints only of size required to properly make joint.

D. Laying of Pipe:
   1. General: Inspect pipe prior to placing. Set aside any defective or damaged material. Do not place pipe in water nor place pipe when trenches or weather are unsuitable. Lay pipe upgrade, true to line and grade.
   2. Bell and Spigot Joints: Lubricate inside of bells and outside of spigots with soap solution or as recommended by manufacture. Wedge joints tight. Bell of bell and spigot pipe to be pointed upgrade.
   3. Pipe shall be bedded uniformly throughout its length.
   4. Pipe elevation shall be within 0.02 feet of design elevation as shown on plans.
   5. Off Site Work: All work beyond the property lines shall be done in strict conformance with the requirements of the governing agency.

E. Backfilling:
   1. General: Do not start backfill operations until required testing has been accomplished.
   2. Trenches and Excavations: Backfill with material as detailed on plans, filling both sides of the pipe at the same time, carefully tamping to hold pipe in place without movement. Refer to Section 31 2333 - TRENCHING AND BACKFILLING for fill above this layer.

F. Grouting of Pipes: Grout pipes smooth and water tight at drop inlet, manholes, and curb inlets. Grout back side of hood at curb inlets all grouting shall be smooth and consistent.

G. Off Site Work: All work beyond the property lines shall be done in strict conformane with the requirements of the local agency.

H. Cutting and Patching: Remove and replace existing surface features per applicable specification section (i.e. asphaltic concrete or concrete paving) where pipe is installed in areas of existing improvements.

3.3 TOLERANCES

A. Storm Drain structure grates:
   1. In landscape and lawn area +-0.05'.
   2. In sidewalk and asphalt pavement +-0.025'.
   3. In curb and gutter application +-0.0125'.

B. Cleanout Boxes and Lids:
   1. In landscape areas; 0.10 higher than surrounding finish grade, +-0.05'.
   2. In sidewalks and asphalt pavement; Flush with surrounding finish grade, +-0.025'.

3.3 DEWATERING

A. Contractor to provide trench dewatering as necessary, no matter what the source is, at no additional cost to the owner.

3.4 FLUSHING

A. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.

B. Clean the dirt, rocks, and debris from the drop inlets and storm drain manholes.

END OF SECTION