MADERA UNIFIED SCHOOL DISTRICT

SPECIFICATIONS
FOR THE CONSTRUCTION OF

BERENDA ELEMENTARY SCHOOL
BUS DROP OFF AND ADA IMPROVEMENTS
DSA File No. 20-30, DSA App NO. 02-121164

Plans and Specifications Prepared by:

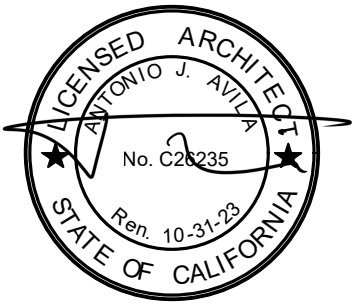
Civil Engineer:

Lane Bader
Blair, Church & Flynn
451 Clovis Avenue, Suite 200
Clovis, California 93612
(559) 326-1400

Architect:

Antonio Avila
Darden Architects
6790 N. West Avenue
Fresno, California 93711
(559) 448-8051

03-06-23
Date Signed:



IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 02-121164 INC:
REVIEWED FOR
SS ☐ FLS ☑ ACS ☑
DATE: 03/21/2023

PROJECT MANUAL

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

SECTION 01 57 23 – Erosivity Waiver & Stormwater Pollution Prevention

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, and services necessary to: comply with the Construction General Permit (CGP) by complying with the Project Erosivity Waiver; and local stormwater regulations; install, maintain, and implement appropriate Best Management Practices (BMP) according to the California Stormwater Quality Association (CASQA) Construction BMP Handbook.
   2. Designate a knowledgeable person to be responsible for erosion/sediment control and stormwater pollution prevention.
   3. All Contract requirements in Division 00 and 01.

B. This Section does not include:
   1. Implementation of a SWPPP. The Project is expected to be completed by the Contractor in a time frame that qualifies for an erosivity waiver under the CGP.
   2. The Owner shall retain a Qualified SWPPP Developer (QSD) to prepare the Project Erosivity Waiver.
   3. The Owner shall submit the Notice of Intent (NOI) for an Erosivity Waiver, and file a SWPPP if needed due to construction delays.
   4. The Owner shall pay the NOI application fee and annual renewal fees.
   5. The Owner shall maintain the role of LRP and all responsibilities associated, except where those responsibilities are assigned to the Contractor within these specifications.
   6. The Owner shall complete online digital certification of online reporting on SMARTS
   7. Owner shall ensure that the Project design has incorporated all post-construction requirements specified by the CGP by complying with the Project Erosivity Waiver and local stormwater regulations.

C. Acronyms:

1.	BMP	Best Management Practices
2.	CGP	Construction General Permit
3.	CASQA	California Stormwater Quality Association
4.	EPA	Environmental Protection Agency
5.	NOI	Notice of Intent
6.	MS4	Municipal Separate Storm Sewer System
7.	NPDES	National Pollution Discharge Elimination System
8.	QSD	Qualified SWPPP Developer
9.	LRP	Legally Responsible Person
10.	PRD	Permit Registration Documents
11.	SMARTS	Stormwater Multiple Application and Report Tracking System
12.	SWPPP	Storm Water Pollution Prevention Plan
13.	SWRCB	State Water Resources Control Board
14.	RWQCB	Regional Water Quality Control Board

1.2 REFERENCES

A. Construction General Permit:
   1. 2009-0009-DWQ CONSTRUCTION GENERAL PERMIT (As amended by 2010-0014-DWQ and 2012-0006-DWQ)
   2. https://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

B. Project Erosivity Waiver NOI
   1. Available on SMARTS once approved by SWRCB
   2. Available by request from the Owner.

C. Local Stormwater Regulations: Madera County, CA- Code of Ordinances Chapter 16.12
   1. https://online.encodeplus.com/regs/maderacounty-ca/doc-viewer.aspx?secid=5#secid-70

D. CASQA construction BMP Handbook: https://www.casqa.org/resources/bmp-handbooks

1.3 RELATED SECTIONS

A. Section 31 11 00 – Site Clearing

B. Section 31 20 00 – Earthwork

C. Section 33 41 00 – Storm Drainage

1.4 SUBMITTALS

A. None.

1.5 REQUIREMENTS

A. General:
   1. Contractor is responsible for understanding and carrying out all provisions of the CGP by complying with the Project Erosivity Waiver, and local stormwater regulations (except as excluded above in 1.1.B., where Owner responsibilities are specified).
   2. The erosivity waiver requirements specified by the CGP, and local stormwater regulations shall be reviewed by Contractor, prior to initiating any ground disturbance or other activities that could lead to stormwater pollution, for a full understanding of the intent, objectives, and implementation.
   3. Contractor responsibilities begin immediately upon execution of the contract containing these specifications and continue until all ground disturbance activities have permanently ceased.
   4. Specific requirements include, but are not limited to:
      a. Installation, implementation, and maintenance of BMPs for erosion and sediment control, including the following as needed based on current construction activities and anticipated rainfall events:
         1) Perimeter linear sediment controls per CASQA SE-1 and/or SE-5,
         2) Drain inlet protection per CASQA SE-10,
         3) Trackout controls per CASQA TC-1 and/or TC-02,
         4) Pavement sweeping per CASQA TC-7,

5) Preserve vegetation per CASQA EC-2,
6) Wind erosion control per CASQA WE-1.

b. Installation, implementation, and maintenance of BMPs for prohibition of unauthorized non-stormwater discharges including the following:
1) Proper material use per CASQA WM-1 and WM-2,
2) Spill prevention and control per CASQA WM-4,
3) Concrete waste management per CASQA WM-8,
4) Sanitary septic waste management per CASQA-9.

c. Ensure that all subcontractors and agents are trained to understand and implement their relevant requirements specified by the local agency stormwater regulations, and these specifications.

d. Pay any penalties, fines, and corrective action costs resulting from failure to comply with requirements specified by the requirements specified by the CGP by complying with the Project Erosivity Waiver, and local stormwater regulations, and hold the Owner/LRP harmless from any such failures.

1.6 QUALITY ASSURANCE

A. Certified SWPPP Professionals:
1. Qualified SWPPP Developer (QSD)
a. The Owner shall retain a certified QSD.
b. The QSD's name, certification number, and contact information shall be listed within the SWPPP document.
2. Erosion Control and Stormwater Pollution Prevention Manager
a. The Contractor will designate a knowledgeable person to identify required BMPs to be implemented and required timely maintenance to BMPs to comply with requirements specified by the CGP through the project Erosivity Waiver, and local stormwater regulations.

B. Regulatory Requirements:
1. Contractor shall comply with the lawful requirements of any applicable municipality, county, drainage district, municipal storm water management program and other local agencies regarding discharges of storm water to separate storm drain system or other watercourses under their jurisdiction, including but not limited to the following:
a. EPA Environmental Protection Agency.
b. SWRCB State Water Resources Control Board.
c. RWQCB Regional Water Quality Control Board.
2. All stormwater compliance shall be in accordance with local regulations:
a. County of Madera.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Best Management Practices (BMPs):
1. The Contractor is responsible for the providing and furnishing all BMPs, products, and practices necessary to comply with the CGP by complying with the Project Erosivity Waiver and local stormwater regulations. All materials and BMPs shall follow the CASQA Construction BMP Handbook and installed as described within the fact sheets, unless otherwise instructed by a qualified professional.

2. The Contractor must provide, implement, and carry out all BMPs required to comply with the requirements specified by the CGP by complying with the Project Erosivity Waiver and local stormwater regulations.
3. Contractor shall consult with the QSD to ensure all BMPs are appropriate, feasible, effective, and correctly implemented.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Monitoring by the Contractor:
   1. Provide all material, labor, and services necessary to: comply with the CGP by complying with the Project Erosivity Waiver, and local stormwater regulations; install, maintain, and implement appropriate Best Management Practices (BMP) according to the California Stormwater Quality Association (CASQA) Construction BMP Handbook.

B. Monitoring by Owner
   1. The Owner has the right to monitor and oversee the Contractor's implementation and maintenance of the BMP to comply with the requirements specified by the CGP by complying with the Project Erosivity Waiver and local stormwater regulations.
   2. Should the Owner determine that the Contractor's efforts fail to meet the requirements specified by the CGP by complying with the Project Erosivity Waiver and local stormwater regulations, the Owner reserves the right to employ any and/or all of the following actions:
      a. Notify the SWRCB of the perceived failure of the Contractor to comply with the CGP.
      b. Notify the County of Madera of the perceived failure of the Contractor to comply with local stormwater regulations.
      c. Withhold an amount of money from the Contractor's Payment Request, equal to the Owner's estimate of the value of the work required to implement and maintain the required BMPs.

3.2 CLEANING AND REMOVAL

A. Removal of BMPs
   1. All temporary BMPs shall be completely removed from the Project Site immediately after all areas of soil disturbed by the Contractor have been stabilized with hardscape or landscaping.
   2. All permanent BMPs shall remain on the Project Site, unless directed otherwise by Owner. The Owner will be responsible for ongoing inspection and maintenance after final acceptance.

B. Under written agreement and with the approval of the Owner, the Contractor may assign maintenance and removal responsibilities of the project BMPs to a subsequent Contractor for later work phases at the Project Site.

3.3 RECORD KEEPING

A. None.

3.4 PAYMENT

A. Full compensation for all costs involved in implementing and complying with the CGP by complying with the Project Erosivity Waiver and local stormwater regulations, including

providing all labor, materials, and resources to implement and maintain the BMPs, and being fully liable for all failures to fulfill the intent of these requirements, shall be included in the cost bid for the various items of work and no additional payment will be made therefor.

END OF SECTION

SECTION 02 49 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:
   1. Section includes requirements governing execution of the work including, but not limited to, the following:
      a. Demolition and removal of selected portions of building or structure.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS
   2. ALL DIVISION 01 SPECIFICATION SECTIONS

1.2 REFERENCES

A. Standards:

B. In accordance with the latest edition of the following standards:
   1. ANSI A10.6 American National Standards Institute

1.3 DEFINITIONS

A. Remove: Detach items from existing site or building (s) and legally dispose or recycle off-site.

B. Remove and Salvage to Owner: Carefully detach from existing site or building (s), in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing site or building (s), prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing item(s) within project site that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
   1. Shop Drawings:
      a. Proposed Protection Measures - Submit report and drawings that indicates the measures proposed for protecting individuals and property for dust and noise control.
         1) Indicate proposed locations and construction of barriers.
         2) Indicate occupant paths of egress and travel.
         3) Indicate how long utility services will be interrupted.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
1. In accordance with Specification Section - REGULATORY REQUIREMENTS and the following:
a. CARB Materials and equipment used for this project shall comply with the current applicable regulations of the California Air Resources Board and the Environmental Protection Agency (EPA), in the area where the project is located.
b. CAL/OSHA California Division of Occupational Safety and Health Administration.
c. CM County of Madera, codes and ordinances
d. EPA Environmental Protection Agency

B. Meetings:
1. Pre- Demolition: Schedule prior to the start of work.
a. Coordinate the work with other work being performed.
b. Review requirements of work performed by others that rely on substrates exposed by selective demolition work.
c. Identify any potential problems that may impede planned progress and proper demolition of work.
d. Review structural load limitations of existing structure.
e. Review areas where existing construction is to remain and requires protection.
f. Review demolition waste disposal and material recycling procedures.
2. Progress: Scheduled by the Contractor during the performance of the work.
a. Review for proper work progress.
b. Identify any problems and acceptable corrective measures.
c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.
a. Inspect and identify any problems.
b. Establish method and procedures to maintain protections while progressing to project completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Waste Management and Disposal:
1. Disposal of all selective demolition items shall be per Specification Section - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

1.7 PROJECT CONDITIONS

A. Environmental requirements:
1. Dust control - perform site, exterior, and interior work in a manner as to minimize the spread of dust and flying particles.
a. Thoroughly moisten appropriate surfaces as required to prevent dust from being a nuisance to the occupants, public, and neighbors.
2. Noise control - perform work in a manner as to minimize construction noise.
a. When a certain level of noise is unavoidable and is objectionable to the occupants of the adjacent spaces, buildings, or premises, coordinate with Owner and make arrangements to perform such work at the most appropriate time periods of the day.

B. Existing conditions:

1. Examine project site and building(s) and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
2. Conduct work so as not to interfere unnecessarily with adjacent buildings, roads, streets, drives, and walks.
    a. Do not close or obstruct streets, alleys, walks, or passageways without permission from authorities having jurisdiction and coordinating same with immediate neighbors whose business operation may be affected.
    b. Safety measures shall be taken to insure an uninterrupted flow of traffic around the site as required by local Police and Fire Departments
3. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
4. Maintain existing utilities indicated to remain in service and protect against damage during selective demolition work.
    a. Maintain fire-protection facilities in service during the work.
5. Demolition waste becomes the property of the Contractor.
6. Storage or sale of removed items on-site is not permitted.
7. It is not expected that hazardous materials will be encountered in the Work.
    a. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Furnish all materials, tools, equipment, facilities, and services as required for performing the selective demolition and removal work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of conditions:
    1. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
    2. Execution of work under this specification section shall constitute acceptance of existing conditions.
    3. Obtain all necessary permits and authorizations by regulatory agencies required to perform the Work under this Section.
    4. Verify that utilities have been disconnected and capped before starting selective demolition operations.

3.2 PREPARATION

A. Coordination:
    1. Before proceeding, verify plans match existing conditions.
    2. Review documents of existing construction provided by Owner against existing conditions.

3. If conflicts are encountered, report it to the Architect. Then prepare recommendation(s) for correction and submit to Architect for review.
4. Coordinate work under this specification section with work specified under other sections.
5. Coordinate any utility and HVAC unit shut-down with owner 48 hours in advance of the anticipated shut-down.
    a. Do not interrupt utilities and HVAC units serving occupied or used facilities, except when authorized in writing by the Owner.
    b. Provide temporary service during interruptions to existing facilities, as may be required by the Owner to maintain essential services.

B. Protection:
1. Structure and Property:
    a. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings, landscape, and facilities to remain.
    b. All damage inflicted on public and private property and the property of the Owner shall be repaired or restored to the original condition prior to the start of this Work. All repair or replacement work shall be done at no additional cost to the owner.
    c. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building and site.
    d. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and other weather damage to building envelope, structure, and interior areas.
    e. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
    f. Protect and maintain utility services and mechanical/electrical systems to remain.
    g. Cover and protect furniture, furnishings, and equipment that have not been removed.
    h. Cover all air supply and return ducts to remain before proceeding with demolition work.
    i. Cover air intake louvers before proceeding with work that will affect indoor air quality.
2. Temporary Shoring:
    a. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
        1) Strengthen or add new supports when required during progress of selective demolition.

3.3 APPLICATION

A. General:
1. Selective demolition shall include the removal of all components of the existing building and/or site described in the documents to be removed. Unless otherwise specified, the component identified for removal shall include all materials, accessories and fabrications associated with that component.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.
    a. Temporarily cover opening to remain.
    b. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. When removing structural framing members, lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
5. Locate selective demolition equipment and demolished debris so as not to impose excessive loads on supporting walls, floors, or framing.
6. Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems.

3.4 CLEANING

A. Clean in accordance with Specification Section - PROJECT CLOSEOUT:
1. Clean any soiled surfaces to remain immediately.
2. Existing substrates shall be clean and ready for the installation of any additional materials.
3. Leave site areas level and free of any ruts or debris. Appearance of earth surface shall be equal to or better than adjacent undisturbed surfaces.

END OF SECTION

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to complete all rough carpentry, accessories and other related items necessary to complete the Project as indicated by the Construction Documents unless specifically excluded.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS.
   2. ALL DIVISION 01 SPECIFICATION SECTIONS.
   3. 07 21 00 INSULATION
   4. 07 53 29 ELASTOMERIC MEMBRANE ROOFING
   5. 07 92 00 SEALANTS
   6. 09 29 00 GYPSUM BOARD
   7. 09 30 00 TILE
   8. 10 14 00 IDENTIFYING DEVICES
   9. 10 21 13 TOILET PARTITIONS
   10. 10 28 13 TOILET ACCESSORIES
   11. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.
   12. ALL SPECIFICATION SECTIONS IN THE SITE AND INFRASTRUCTURE SUBGROUP.

1.2 REFERENCES

A. Standards:
   1. In accordance with the following standards:
      a. ALSC American Lumber Standards Committee
      b. ANSI American National Standards Institute
      c. APA The Engineered Wood Association (Formerly the American Plywood Association)
      d. ASME American Society of Mechanical Engineers International
      e. AWPA American Wood Protection Association
      f. CABO Council of American Building Officials
      g. FS Federal Specification
      h. ICC International Code Council
      i. NDS National Design Specification for Wood Construction
      j. NIST National Institute of Standards and Technology
      k. PS Product Standards of the U.S. Department of Commerce
      l. RIS Redwood Inspection Service
      m. WCLIB West Coast Lumber Inspection Bureau
      n. WWPA Western Wood Products Association

1.3 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
   1. Product Data:

a. Submit manufacturer's data for Wood-Preservative Treatment.
b. Submit manufacturer's data for Fire-Retardant Treatment.
c. Submit manufacturer's data for power driven fasteners, metal-framing connectors, and metal framing anchors.

2. Quality Assurance/Control Submittals:
a. Material Certificates: Submit Material Certificates of Compliance to Standards and Regulatory Requirements.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Installer Qualifications:
a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this Project.

B. Regulatory Requirements:
1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.

C. Meetings:
1. Pre-Installation: Scheduled by the Contractor prior to the start of work.
a. Coordinate the work with other work being performed.
b. Identify any potential problems that may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
2. Progress: Scheduled by the Contractor during the performance of the work.
a. Review for proper installation of work progress.
b. Identify any installation problems and acceptable corrective measures.
c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.
a. Inspect and identify any problems that may impede issuance of warranties or guaranties.
b. Maintaining installed work until the Notice of Substantial Completion has been executed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver undamaged products to project site in manufacturer's sealed containers or bundles with tags and labels intact.

B. Storage and Protection:
1. Products shall be stored above ground on level platforms, six (6) inches above ground, allowing air circulation under stacked units.
2. Cover materials with protective waterproof covering providing for adequate air circulation and ventilation.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Dust Control: Perform work in a manner as to minimize the spread of dust and flying particles.
2. Burning: No burning will be allowed on-site.
3. Rain: Work under this section shall not be started or maintained under threat of rain unless the work is not affected by the rain.

B. Existing Conditions:
1. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.

1.7 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
1. In accordance with manufacturer's written standard warranty:
a. Warranty Period One (1) Year.

C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES
a. Warranty Period One (1) Year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Power Driven Fastener specified product manufacturer:
a. HILTI FASTENING SYSTEMS.
2. Metal Framing Anchor specified product manufacturer:
a. SIMPSON STRONG-TIE COMPANY.
b. Acceptable alternative manufacturers:
1) Manufacturers of Alternative Metal Framing Anchors shall have Model Code Research Evaluation Reports and Published allowable design loads that are determined from empirical data, or by rational engineering analysis, that are demonstrated by comprehensive testing performed by a qualified testing agency acceptable by the Architect or its Designated Design Consultant, and DSA.
3. Metal Timber Framing Connector specified product manufacturer:
a. SIMPSON STRONG-TIE COMPANY.
b. Acceptable alternative manufacturers:

1) Do not substitute connectors manufactured by others than SIMPSON STRONG-TIE COMPANY without prior written review by the Architect or its Designated Design Consultant, and DSA.

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. Wood:

1. Douglas Fir - Larch:
   a. Standards and Requirements: In accordance with WCLIB "Standard Grading and Dressing Rules" No. 17, latest edition, and WWPA "Western Lumber Grading Rules• ," latest edition.
      1) All wood shall be "DRY" and having a moisture content of less than 19 percent at the time of installation, in accordance with WWPA.
      2) Provide wood of S4S unless otherwise noted.
      3) Factory mark each piece of wood with the grade stamp of the grading agency.
   b. Grading and Use Requirements:

Item	Sizes	Grade	Maximum Moisture Content at Initial Use (Installation)
Studs	2x	No. 1	19%
Studs	3x, 4x, 6x	No. 1	19%
Sills & Plates	2x	No. 1	19%
Sills & Plates	3x, 4x, 6x	No. 1	19%
Beams	4x, 6x	No. 1	19%
Joists	2x	No. 1	19%
Posts	4x, 6x, 8x	No. 1	19%
Ledgers	2x	No. 1	19%
Ledgers	3x, 4x, 6x	No. 1	19%
Blocking	2x, 3x, 4x, 6x	No. 1	19%
Sheathing and Stripping	Up to 1-1/2" thick 2" width and wider	No. 1	19%
Stripping	2x, 3x, 4x, 6x	Construction	19%
Nailers & Grounds	2x, 3x, 4x, 6x	Construction	19%
Furring	2x, 3x, 4x, 6x	Construction	19%
T & G Decking	2x	Select Dex	15%

      1) Initial use shall be that point at which screws or other fasteners or the holes for said fasteners are installed into the wood.
      2) The Contractor shall use whatever means necessary, including site drying to ensure that the moisture contents listed above are not exceeded.

B. Plywood:

1. Soft Plywood:
   a. Standards and Requirements: In accordance with PS1-09, Group 1 Douglas-Fir and PS2-10.
      1) Factory mark each piece of plywood with the APA Grade Stamp.
      2) Maximum Moisture Content at Initial Use (Installation) shall be 15 percent.
   b. Grading and Use Requirements:

1) Wall, Roof, and Parapet Sheathing:
   a) APA Rated Sheathing - Structural 1.
   b) Span Rating as required to suit stud or joist spacing.
   c) Exposure Durability Classification - Exposure 1.
   d) Species Group 1.
   e) Grade C-C 3 ply for 1/4 inch thickness and C-D 5 ply for 1/2 and 5/8 inch thickness.
2) Subflooring, Floor Sheathing as underlayment, Equipment Platform Sheathing:
   a) APA Rated "Sturdi-Floor."
   b) Span Rating as required to suit joist spacing.
   c) Exposure Durability Classification - Exposure 1.
   d) Species Group 1.
   e) Grade C-C plugged.
3) Backing panels for Electrical Equipment.
   a) APA Rated Sheathing - Structural 2.
   b) Exposure Durability Classification - Exterior.
   c) Species Group 1.
   d) Grade C-C.
   e) Shall be 3/4 inch minimum thickness.
4) Backing panels for Telecommunication Equipment:
   a) APA Rated Sheathing - Structural 2.
   b) Exposure Durability Classification - Exterior.
   c) Species Group 1.
   d) Grade A-B.
   e) Shall be 3/4 inch minimum thickness.

2.3 FINISHES

A. Preservative Treatment:
   1. Pressure Treat Wood and Plywood, with CARB Complying, EPA Registered, preservatives in accordance with AWPA Standards "U," "T," and "P."
      a. Do not use material that does not comply with the requirements for untreated material.
      b. After treatment, kiln-dry wood to a maximum moisture content of 19 percent.
      c. After treatment, dry plywood to a maximum moisture content of 15 percent.
      d. Factory mark each treated item with the treatment quality mark of an Independent Inspection Agency approved by the ALSC Treated Wood Program.
   2. Non-pressure treat Wood and Plywood, with CARB Complying, EPA Registered preservatives in accordance with AWPA Standards "U• ,""T,""P," • and "N."

B. Fire Retardant Treatment:
   1. Fire Retardant Treat Wood and Plywood with pressure treatment materials that comply with performance requirements of CBC 2303.2.
      a. Use Exterior Type.
      b. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures when tested by a qualified independent testing agency and is acceptable to Fire and Life Safety authorities.
      c. Use treatment that does not promote corrosion of metal fasteners.
      d. After treatment, kiln-dry wood to a maximum moisture content of 19 percent.
      e. After treatment, dry plywood to a maximum moisture content of 15 percent.
      f. Factory mark each treated item with the treatment quality mark of an Independent Inspection Agency.

2.4 ACCESSORIES

A. Fasteners: All types shall comply with standards and dimensions of the latest edition of NDS. All types of fasteners exposed to wet or exterior conditions, in-ground contact, in pressure or preservative treated woods, in concrete or masonry, or in an area of high relative humidity shall be hot-dipped galvanized in accordance with ASTM A 153 "Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware."
   1. Nails: Common wire nails or spikes complying with ASTM F 1667 "Specification for Driven Fasteners: Nails, Spikes, and Staples," and CBC Section 2304.10. Box nails and sinker nails are not permitted. Vinyl coating is permitted on common nails.
   2. Bolts: Steel bolts complying with ASTM A 307 "Specification for Carbon Steel Bolts and Standards, 60,000 PSI Tensile Strength," Grade A, hex head.
      a. Provide hex head nuts complying with ASTM A 307 "Specification for Carbon Steel Bolts and Standards, 60,000 PSI Tensile Strength," and standard flat washers complying with ANSI/ASME B18.22.1, Type A, Wide pattern.
   3. Lag Bolts: Shall comply with ANSI/ASME B18.2.1, hex head.
      a. Provide standard flat washers complying with ANSI/ASME B18.22.1, Type A, Wide pattern.
   4. Wood Screws: Shall comply with ANSI/ASME B18.6.1.
      a. Screws for fastening wood to Metal Framing shall comply with ASTM C 954 "Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness."
   5. Power Driven Fasteners: Tempered Steel pins with corrosive resistant plating or coating complying with ICC ESR-1539.

B. Metal Framing Anchors: All anchors shall comply with ASTM A 653 "Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process," G60 Coating Designation for hot-dipped zinc-coated steel sheet. Provide structural, commercial, or lock-forming quality as standard with manufacturer for type of anchor indicated.

C. Metal Timber Framing Connectors: All connectors shall have specific ICC Approval and be fabricated from hot-dipped galvanized steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site verification of conditions:
   1. Prior to the execution of the work under this specification section, inspect the installed work executed under other sections of this Project Manual, which affect the execution of work under this specification section.
   2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
   3. Execution of work under this specification section shall constitute acceptance of existing conditions.
   4. Verify that work under this Section may be performed in strict accordance with the original design and all pertinent codes and regulations.

3.2 PREPARATION

A. Coordination:
1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.

B. Protection:
1. Protect all materials from damage occurring from work called for under this specification section.

C. Preservative Treatment:
1. Members requiring pressure treatment:
   a. Sills, Plates, Ledgers, Studs, Joists, Blocking, Nailers and Furring attached or resting on or against concrete or masonry construction.
   b. Pressure treated members cut in the field shall have the cut ends painted with preservative until the wood or plywood absorbs no more preservative.
2. Members requiring field treatment:
   a. All wood and plywood members at exterior walls within two feet of the ground surface.
   b. Treat all surfaces of the member.
   c. Treat by dipping the required portion of the member into preservative for 15 minutes or paint until the wood or plywood absorbs no more preservative. Wait a minimum of two hours after dipping or painting is complete to incorporate member into project.
   d. Test treat items for compatibility where additional finish coats (stain or paint) may occur.

D. Fire Retardant Treatment:
1. All wood and plywood members as indicated.
2. All plywood panels for Telecommunication Equipment.

3.3 INSTALLATION

A. General:
1. In accordance with manufacturer's instructions and recommendations unless specifically noted otherwise.
2. In accordance with approved submittals.
3. In accordance with Regulatory Requirements.
4. Selection of wood and plywood pieces:
   a. Carefully select all members.
   b. Select individual pieces so that knots and obvious defects will not interfere with placing bolts, proper nailing, and making proper connections.
   c. Cut out and discard all defects which will render a piece unable to serve its intended function.
   d. Wood and plywood may be rejected by the Architect or its Designated Design Consultant, and DSA whether or not it has been installed for excessive warp, twist, bow, crook, mildew, fungus, or mold as well as for improper cutting, fitting and treatment when required.
5. All wood and plywood shall be accurately cut to lengths required.
6. All work shall produce joints true, tight, level, plumb, and all members are securely anchored.
   a. Do not shim any framing member.

B. Layout:
1. Lines shall be straight and true.

C. Fastening:
1. Nails:
   a. All nailing shall be as required by CBC Table 2304.10.1 "Fastening Schedule."
   b. Machine nailing may be approved subject to the approval of the Architect or its Designated Design Consultant, and DSA.
      1) The use of machine nailing is subject to a satisfactory job site demonstration for each project. The approval is subject to continued satisfactory performance.
      2) In plywood, if the nail heads penetrate beyond flush with the surface of the sheathing, or if minimum allowable edge distances are not maintained, the performance will be deemed unsatisfactory.
      3) Machine nailing will not be accepted in 5/16" plywood.
   c. Penetration of nails or spikes shall be one-half the length of the nail or spike into the piece receiving the point.
   d. 16d nails shall be used to connect pieces 2" in thickness unless otherwise indicated.
   e. Clinch nails protruding through members.
   f. Bore holes for nails where necessary to prevent splitting.
   g. Use Finish or Casing Nails for finish work.
2. Lag Bolts:
   a. Lag Bolts shall be screwed into place. No driving is allowed.
   b. For the Shank portion, holes shall be bored the same depth and diameter as the shank. For threaded portion, holes shall be between 60% and 75% of the shank diameter.
   c. Malleable Iron or Steel plate washers shall be used where bolt heads bear on wood or plywood. Washers shall have an area equal to 16 times the area of the bolt.
      1) Steel plate washers shall have a thickness not less than 1/10 the length of the washer's longest side.
      2) Malleable Iron washers shall have a bearing surface for the head equal in diameter to not less that the long diameter of the head.
   d. Tighten all bolts and screws prior to concealing within structure.
3. Bolts:
   a. Holes shall be 1/16" larger than bolt diameter.
   b. Malleable Iron or Steel plate washers shall be used where bolt head and nuts bear on wood or plywood. Washers shall have an area equal to 16 times the area of the bolt.
      1) Steel plate washers shall have a thickness not less than 1/10 the length of the washer's longest side.
      2) Malleable Iron washers shall have a bearing surface for the head or nut equal in diameter to not less that the long diameter of the head or nut.
   c. Tighten all bolts prior to concealing within structure.
4. Power Driven Anchors
   a. Fastening shall be accomplished by low-velocity piston-driven power activated tool.
   b. Pins shall have guide washers to accurately control penetration.
5. Expansion Anchors (Post-Installed Concrete Anchors):
   a. Refer to Specification Section - DRILLED ANCHORS.
6. Metal Framing Anchors
   a. Use half-length nails where required or indicated.
7. Metal Timber Framing Connectors

a. Nailing shall conform to manufacturer's instructions with a nail provided for each punched hole.

D. Sills:
1. Shall be in long lengths of sizes as indicated.
2. Fasten with a minimum of two (2) anchor bolts per piece and bolt within 9", but not nearer than 6", from the end of piece.
3. Malleable iron or steel plate washers shall be placed under anchor bolt nuts bearing on wood.
4. Set Sill level and true.

E. Studs and Posts:
a. Shall be full length.
2. Cut members to provide full bearing at ends.

F. Plates:
1. Shall be in long lengths and spliced as indicated.

G. Joists and Beams:
1. Shall be in long lengths and spliced over bearings unless otherwise indicated. Do not overcut.
2. Install with crown side up.
3. Beams or headers indicated to be built-up of two or more joists shall be constructed on the project site using full length members.

H. Blocking:
1. Blocking shall be same thickness and width of studs or joists unless otherwise indicated.
2. Install blocking at all wall, floor, or roof penetrations.
a. Blocking shall provide surface for fastening applied interior or exterior flashings or flanges.
3. Install blocking at all plywood joints.
a. Install blocking at plywood edges including crickets and parapet wall bracing.
4. Shall be provided for all fixtures, equipment, casework, toilet partitions, toilet accessories, handrails, visual display boards, identifying devices, finish hardware, flashing, wall and ceiling finishes, and other items as indicated. See also Specification Section - OWNER FURNISHED ITEMS for listing of N.I.C. items that will require blocking coordination.
a. Coordinate placement of blocking and supports with manufacturer or supplier of items.
5. Fireblocking shall be provided to cut off all horizontal and vertical concealed draft openings in accordance with CBC Section 718.2.
a. Horizontal Fireblocking in walls shall be typically placed at 4'-0" above finished floor, at 8'-0" above finished floor, at mezzanine floor plane unless otherwise indicated, and at ceiling line plane.
6. Bridging shall be installed in all joist members deeper than 8 inches unless otherwise indicated.
a. Bridging shall extend the full depth of the joists.
b. Drill bridging within attics to provide ventilation as indicated.

I. Plywood Sheathing Panels:
1. For panels with different veneer face grades, the exposed face shall always be the higher grade.
2. Space panels 1/8 inch at all edge and end joints, and in accordance with APA.
3. Panels shall be applied with the long dimension (or strength axis) across the framing.

4. Fasten from the field of the panel first and then to the ends and edges to reduce stressing of the panel surfaces.
5. Center all joints over bearing supports.
6. Wall panels shall continue uninterrupted by ceilings or soffits from floor to floor or roof unless otherwise indicated.

J. Sheathing:
1. Shall be in accordance with the following:
   a. Wall Sheathing: CBC Section 2304.6 and Table 2304.6 and Table 2304.6.1.
   b. Floor and Roof Sheathing: CBC Section 2304.8.
   c. Structural Floor Sheathing: CBC Section 2304.8.1.
   d. Structural Roof Sheathing: CBC Section 2304.8.2.
   e. Lumber Decking: CBC Section 2304.9.

K. Nailers and Grounds:
1. Shall be installed as indicated and where required for attaching other work.
2. Form to shapes indicated.
3. Coordinate locations with other work involved.
4. Provide nailers at all flashing and edge terminations when required by roofing manufacturer for metal and concrete roof decks. When the roof system is required to be Class A use fire-retardant treated wood.
5. Provide permanent Grounds of dressed, pressure-preservative-treated, Key-beveled wood and of thickness required to bring face of ground to exact finish thickness of finish material. Remove temporary grounds when no longer required.

L. Furring and Stripping
1. Shall be installed as indicated and where required to provide fastening material or space for the passage of pipes, conduits, etc. not accommodated including ceiling stripping.

M. Sealant:
1. When indicated, Primer shall be in accordance with sealant manufacturer recommendations.
2. When indicated, Joint Sealer shall be in accordance with Specification Section - SEALANTS.

3.4 CONSTRUCTION

A. Draftstopping:
1. Shall be provided in floor, attic, and ceiling areas in accordance with CBC Section 718.3 and 718.4.

B. Pipes:
1. Frame to avoid cutting or drilling for passage of pipes, ducts, and conduit.
2. Follow criteria as indicated for cutting or drilling. Unusual edge distances and awkward spacing and sizes shall be brought to the Architects attention for remedy.

C. Chimneys and Flues:
1. Keep all framing 2 inches away from chimney or flues in accordance with CBC Section 2304.5.

D. Cant Strips and Crickets:
1. Shape to sizes indicated.
2. Rigidly fasten to construction.

3. Block all joints of plywood panel construction.
4. Form neat and mitered corners.

E. Temporary Enclosures:
1. Provide and maintain all barricades and enclosures required to protect the work in progress.

F. Shoring or Bracing:
1. Shore or brace for temporary support of all work as required during the construction period except any shoring and bracing specified and included under other sections of this Project Manual.

G. Wood Curbs for Equipment:
1. Construct all wood curbs for roof mounted equipment.
2. Provide all miscellaneous blocking, bracing, supports, and other wood items to complete the work.

3.5 FIELD QUALITY CONTROL

A. Site Tests:
1. As required by Regulatory Requirements.
2. Project Inspector shall verify by means of a handheld moisture content meter that all wood and plywood supplied at the time of incorporation into structure(s) has met applicable moisture content requirements.
3. Project Inspector shall test all stud cavity walls to ensure that studs are a maximum of 19 percent moisture content prior to any other construction that encloses the wall cavity.

B. Inspection:
1. As required by Regulatory Requirements.
2. Schedule inspections and notify the Architect, Project Inspector and any other regulatory agencies of the time at least 48 hours prior to the inspection.
3. No work shall be without the inspections required by Regulatory Requirements.

3.6 CLEANING

A. Removal of Debris:
1. Remove all Wood, including form lumber, chips, shavings and sawdust in or on the ground from the areas inside buildings. Do not bury debris in fill.

END OF SECTION

SECTION 07 21 00 – INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

B. Provide all material, labor, equipment and services necessary to completely install all Insulation, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. ALL DIVISION 00 SPECIFICATION SECTIONS.
2. ALL DIVISION 01 SPECIFICATION SECTIONS.
3. 06 10 00 ROUGH CARPENTRY
4. 09 29 00 GYPSUM BOARD
5. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.
6. ALL SPECIFICATION SECTIONS IN THE SITE AND INFRASTRUCTURE SUBGROUP.

1.2 REFERENCES

A. Standards:
1. In accordance with the following standards:
a. MIMA Mineral Insulation Manufacturers Association
b. NFPA National Fire Protection Association
c. TIMA Thermal Insulation Manufacturers Association

1.3 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
1. Product Data.
a. Product Data on materials and accessories.
2. Quality Assurance/Control Submittals:
a. Manufacturer's Written Instructions:
1) Submit three (3) copies of manufacturer's written instructions.
3. Closeout Submittals in accordance with the following:
a. Warranty in accordance with Specification Section - WARRANTIES.

1.4 QUALITY ASSURANCE

A. In accordance with California Quality Standards.

B. The R values for the insulation materials shall be in accordance with "The Standard Mineral Wool Building Insulation" latest Edition of the MIMA.

C. Regulatory Requirements:

1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
   a. ASTM American Society for Testing and Materials

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage of Materials:
   1. All Materials shall be delivered and stored in original unopened packages with manufacturer's name and contents legibly indicated. Materials shall be stored in a dry place, and protected from damage.

1.6 WARRANTY

A. Contractor's General Warranty:
   1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
   1. In accordance with manufacturer's written standard warranty:
      a. Warranty Period One (1) Year.

C. Installer's Warranty:
   1. In accordance with the terms of the Specification Section - WARRANTIES
      a. Warranty Period One (1) Year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
   1. Specified blanket insulation product manufacturer:
      a. OWENS CORNING
      b. Acceptable alternative manufacturers:
         1) CERTAINTEED
         2) JOHNS MANVILLE CORPORATION
   2. Specified sound blanket insulation product manufacturer:
      a. OWENS CORNING
      b. Acceptable alternative manufacturers:
         1) CERTAINTEED
         2) JOHNS MANVILLE CORPORATION
   3. Specified sound deadening board product supplier:
      a. BLUE RIDGE FIBERBOARD "SoundStop."
   4. Specified draft stop insulation product manufacturer :
      a. THERMAFIBER "Thermafiber."
   5. Specified foundation insulation product manufacturer:

a. DOW CHEMICAL COMPANY "Styrofoam."

6. Specified rigid roof board insulation product manufacturer:
   a. RMAX (a SIKA company) "Multi-Max FA-3."
   b. Acceptable Alternative Manufacturers:
      1) ATLAS.
      2) JOHNS MANVILLE CORPORATION.
      3) TREMCO.
7. Specified rigid wall board insulation product manufacturer:
   a. RMAX (a SIKA company) "ECOMAXci FR"
   b. Acceptable Alternative Manufacturers:
      1) ATLAS.
      2) JOHNS MANVILLE CORPORATION.
      3) TREMCO.
8. Specified acoustical blanket insulation product manufacturer:
   a. OWENS CORNING "Select Sound Black Acoustical Fiberglass Blanket."
9. Specified Sound Attenuation Fire Blanket (SAFB) Rock Wool Insulation product manufacturer:
   a. ROXUL AFB.
10. Specified Foamed-In-Place Insulation product manufacturer:
    a. DOW CHEMICAL "Great Stuff Pro."
11. Specified poultry netting, and FSK tape product manufacturer or approved equivalent:
    a. INSULATION MATERIALS.
12. Specified welded stud stick pins and self-locking washers product manufacturer or approved equivalent:
    a. SUNBELT STUD WELDING.

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. Thermal Blanket:
1. Construction in accordance with the following:
   a. Type I: Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with a maximum flame-spread and smoke-developed indices of 25 and 50, respectively, per ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials"; passing ASTM E 136 "Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C," for combustion characteristics.
      1) Unless otherwise noted, blankets without vapor-retarder membrane coverings, used in Interior partitions not subject to moisture.
   b. Type II: Kraft-faced, Glass-Fiber Blanket Insulation: ASTM C 665 "Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing," Type II (non-reflective faced), ASTM E 84 Class C (faced surface not rated for flame propagation); Category I (membrane is a vapor barrier).
      1) Unless otherwise noted, this type of insulation should only be used in conditions not "subject to view" (enclosed cavities) or in attics where a finished ceiling is provided and the attic is not used as a return air plenum.
   c. Type III: Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665 "Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing," Type III (reflective faced), ASTM E 84 Class A (faced surface with a foil-scrim or foil-scrim-kraft facing)

1) Unless otherwise noted, this product shall be used when the attic (although enclosed by a finished ceiling) is used as a return air plenum, or used in "exposed-to-view" exterior and interior walls and ceilings or attics subject to moisture and fire-rated conditions.

2. Thermal Resistance (R) values required (minimum) for blanket insulation, unless otherwise indicated on the drawings:
   a. Roof Blanket Insulation: R-30.
   b. Wall Blanket Insulation: R-19.
   c. Floor Blanket Insulation: R-30.
   d. Attic Spaces: All attic spaces shall have continuous insulation of the proper type and with a minimum thermal resistance "R" value of R-30 for insulation only. Where attic spaces have vertical elements above ceilings, these shall be insulated as part of the attic space to R-30 minimum.
3. Thickness: No more than will fit into the space available without compressing. Where insulation is confined between finishes, which would compress the material, high efficiency insulation shall be used to provide the required resistance value.

B. Sound Blanket:
1. Sound Attenuation Batts, unfaced, as manufactured by OWENS CORNING ECOTOUCH SOUND ATTENUATION BATTS, 2-1/2" batts for wood or metal frame construction, complying with ASTM C 665 "Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing," Type I, and ASTM E 136 "Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C."
   a. Flame Spread Index Maximum 25.
   b. Smoke Developed Index Maximum 50.

C. Sound Deadening Board: "SoundStop" 1/2 inch thick Sound Deadening Board, manufactured in accordance with ASTM C 208 "Specification for Cellulosic Fiber Insulating Board," as supplied by BLUE RIDGE FIBERBOARD.

1.	Density:	17.5 - 18 pcf.
2.	Thermal Conductivity	0.38.
3.	Tensile Strength (parallel to surface):	150 psi.
4.	Tensile Strength (perpendicular to surface):	600 psi.
5.	Water Absorption by Volume, max. percent:	2 hour immersion, 7 percent max.
6.	Expansion, 50 to 90 percent relative humidity:	0.5 percent.
7.	Vapor Permeance, grains/hr/sq.ft.in. HG 5.	
8.	Flammability (per NFPA rating):	1 or slight.
9.	R-Value	1.3.
10.	Sound Transmission Coefficient (STC):	44 - 51.

D. Draft Stop:
1. 2" minimum to 4" thick Safing Insulation, as required on the drawings. Provide manufacturer's written recommended fasteners as required for the specific installation requirements.
   a. Flame Spread and Smoke Developed Index maximum as follows in accordance with ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials":
      1) Unfaced Safing Insulation:
         a) Flame Spread Index 15
         b) Smoke Developed Index 0.
      2) Foil Faced Safing Insulation:
         a) Flame Spread Index 25
         b) Smoke Developed Index 5.

E. Foundation:
1. 3/4" thick "STYROFOAM" brand square edge, rigid board insulation as manufactured by DOW CHEMICAL COMPANY, or approved equivalent.
   a. In accordance with ASTM C578 "Specification for Rigid, Cellular Polystyrene Thermal Insulation," Type IV with an average R-Value of 5.0 per inch when tested at 75 degree F mean temperature in accordance with ASTM C518 "Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus."
   b. Provide manufacturer's written recommended fasteners and adhesive for substrate conditions.

F. Rigid Board:
1. Roof Board:
   a. In accordance with:
      1) ASTM C 1289 "Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board," Type 2, Class 1, isocyanurate with front and back glass fiber/organic mat paper-facers (balanced panel), conditioned "R" value of 8.6 per 1.5 inchs minimum, in accordance with ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials," and ASTM D 1621 "Test method for Compressive Properties of Rigid Cellular Plastics."
         a) Flame Spread Index Maximum, core: 25 or less.
         b) Smoke Density Developed Index Maximum, core: 450 or less.
         c) Compressive strength: 20 PSI.
         d) 4' x 4' or 4' x 8' panels.
2. Wall Board:
   a. Isocyanurate with front and back aluminum foil-faced (balanced panel).
   b. General: Tested to meet NFPA 285 "Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components."
   c. In accordance with:
      1) ASTM C 1289 "Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board," Type 1, Class 1.
      2) ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials," and ASTM D 1621 "Test method for Compressive Properties of Rigid Cellular Plastics."
   d. Properties:
      1) NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Pass.
      2) Flame Spread Index Maximum, ASTM E 84: 25 or less.
      3) Smoke Density Developed Index Maximum, ASTM E 84: 450 or less.
      4) Compressive strength: 25 PSI.
      5) 4' x 4' or 4' x 8' panels.
      6) R value per inch: 6.0.

G. Acoustical Blanket:
1. Provide 1" thick Black Fiberglass acoustical blanket complying with ASTM C 533 "Specification for Calcium Silicate Block and Pipe Thermal Insulation," Type III, and ASTM C 423 "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method."
   a. Flame Spread Index Maximum 25.
   b. Smoke Density Developed Index Maximum 50.

c. Noise Reduction Coefficient, per ASTM C423 0.70, minimum.

H. Sound Attenuation Fire Blanket Insulation (SAFB) - Rock Wool:
1. Mineral Wool batts complying with ASTM C 665, Type 1 (without membrane facings), and rated non-combustible per NFPA Standard 220 per ASTM E 136 "Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C."
a. Flame Spread and Smoke Developed Index maximum as follows in accordance with ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials":
1) Unfaced:
a) Flame Spread Index 0.
b) Smoke Developed Index 0.
b. Nominal Density 2.5 pcf.
c. "K" at 75 degrees BTU. in/hr sq. ft. degrees fahrenheit 0.27.
d. "R" Value per inch of thickness 3.7.

I. Foamed-In-Place Insulation:
1. Low Pressure Type: Semi-flexible soft, single-component polyurethane sealant, to CAN/ULC-S710.1, and having the following properties:
a. Core Density (ASTM D 1622) 1.7 pcf.
b. Fire Resistance (ASTM E 84) Flame Spread = 10, Smoke Developed = 20.
c. Color: Yellow.
d. Cure Time: Approximately 12 hours.
e. Tack Free Time: 6 - 9 minutes.
f. Applicator: Gun applied.

2.3 ACCESSORIES

A. Staples:
1. Hammer type.

B. Wire:
1. Sixteen (16) gage line wire.

C. All other materials such as fasteners (i.e. insulation netting, line wires, stick-pins), and retainers not specifically described, but required to complete the work, shall be as recommended by approved manufacturer, and installed by the Contractor. Contractor shall choose the appropriate fastener or system for the cavity space or area to be insulated without letting the insulation sag.
1. Poultry Netting: As distributed by INSULATION MATERIALS.
a. 2" hexagonal, 20 gage galvanized in rated assemblies.
2. FSK Tape: As distributed by INSULATION MATERIALS.
a. VENTURE TAPE product #1525CW.
3. Welded Stud Stick Pins: As distributed by SUNBELT STUD WELDING.
a. Provide low-carbon "mild" steel, with the following properties:
1) Tensile Strength: 60,000 psi.
2) Yield: 50,000 psi.
3) Elongation: 20% (in 2 inches).
b. Size: 12 gage.
c. Length sufficient to hold insulation to underside of decking, and extended enough to allow self-locking washers to hold insulation in place without crushing the insulation.
d. Spacing: 24 inches o.c.

1) Pins shall be placed within 3 to 5 inches of all area edges.

e. Self-Locking Washers:

1) 2 inch diameter, galvanized, compatible with welded stud stick pin size and gage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. All building(s) shall have a complete thermal envelope of thermal blanket or rigid board insulation.
   a. Do not install insulation until the construction has progressed to the point that inclement weather will not damage or wet the insulation material.
   b. Install in accordance with manufacturer's written recommendations.
   c. Insulation shall fit snugly between framing members without voids. Fully insulate all areas between all framing members, cutting and fitting as required.
   d. Attach insulation to inside face of framing members.
      1) Wood Framing: Friction fit to keep from falling down within wall cavity. Attach with Hammer Staples at 6 inches on center with minimum staple penetration of 3/8 inch when insulation has a membrane facing.
      2) Metal Framing: Friction fit to keep from falling down within the cavity and use line wire across metal studs. Omit wire and spot tape with FSK Tape when insulation has a membrane facing.
   e. Vapor-Retarder Membrane: Shall be continuous and without unnecessary joints.
      1) At roof structure and exterior walls, after securing the insulation facing flanges, provide FSK Tape over all of the insulation facing butt joints and all overlapping facing flanges, so as to create a continuous vapor-retarder membrane at underside of the roof deck and inside of walls.
      2) Patch all tears, rips and holes in the vapor-retarder membrane.
   f. Cut and fit insulation material around pipes, conduits and outlet boxes, as necessary to maintain the full integrity of the insulation.

B. At Roof Framing:

1. Install thermal roof blanket Insulation between all exterior roof framing members.
   a. Wood Framing: Attach wire to framing with staples with minimum staple penetration of 5/8 inch.
   b. Metal framing: Attach with line wires perpendicular to framing at 12 inches on center.

C. At Wall Framing: Install thermal wall blanket insulation between all exterior wall framing members.

D. At Floor Framing: Install thermal floor blanket insulation between all exterior floor framing members.

E. Sound Insulation:

1. Install sound attenuation batts between all interior wall framing members.
2. Install sound attenuation batts between all floor framing members.
3. Install sound deadening board over interior wall framing members.

F. Draft Stop Insulation:

1. Install Draft Stop Insulation where required.

G. Rigid Board Insulation:
   1. Install per manufacturer's written recommendations.
   2. Wall Board: Tape all edges as part of the rigid board system.

H. Acoustical Blanket:
   1. Install Acoustical Blanket where indicated and per manufacturer's written recommendations.

I. Sound Attenuation Fire Blanket (SAFB):
   1. Interior Stud Cavity: Friction fit SAFB's securely between studs. Butt ends of blankets closely together and fill voids.
   2. Creased SAFB: Bow the blankets slightly to fit into stud cavity. Slit the blankets vertically 1" deep with a utility knife.

END OF SECTION

SECTION 07 92 00 – SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to completely install all joint sealant materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS.
   2. ALL DIVISION 01 SPECIFICATION SECTIONS.
   3. ALL SPECIFICATION SECTIONS IN THE FACILITY CONSTRUCTION SUBGROUP.
   4. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.
   5. ALL SPECIFICATION SECTIONS IN THE SITE AND INFRASTRUCTURE SUBGROUP.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements: It is the intention of this specification section and the drawings to form a guide for a complete and operable system. Any items not specifically noted but necessary for a complete and operable system shall be provided under this section.
   1. Provide elastomeric sealants for exterior applications that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
   2. Provide sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water-resistant and cause no staining or deterioration of joint substrates.

1.3 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
   1. Product data from manufacturers for each joint sealant product required.
   2. Shop drawings:
      a. Provide full details of all sealants and accessories proposed for use for approval by the Architect. All materials and products proposed shall be compatible with each other and with the substrates and adjacent wall colors, and shall be non-staining and non-bleeding. Submit an affidavit from the manufacturer confirming the acceptance of the use of the selected products in the manner and on the substrates proposed.
   3. Samples.
      a. Samples for initial selection purposes in form of manufacturer's bead samples, consisting of strips of actual products showing full range of colors (standard, premium and custom) available, for each product exposed to view.
         1) Provide color chips of adjacent wall surface colors; to be used in evaluating the sealant color samples.

4. Quality Assurance/Control Submittals:
   a. Provide UL Assembly Classification appropriate for each fire rated penetration.
   b. Certificates:
      1) Submit three (3) copies of certificates.
         a) Certification by each joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.
         b) Certified test reports for elastomeric sealants on aged performance as specified, including hardness stain resistance, adhesion, cohesion or tensile strength, elongation, low temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (aging, weight loss, deterioration) and heat and exposure to ozone and ultra violet light. Adhesion data shall include long-term adhesion characteristics of all adhesion surfaces including silicone, aluminum and glass coatings and long term weathering test on the silicone on contact with similar materials.
         c) Certificate of Installation: Signed by the installer and sealant manufacturer stating that sealant installed complies with specifications, and that installation methods comply with manufacturer's printed instructions for each condition of installation and use on the project. The sealant installer shall have no less that five years of continuous experience in installing the specified products. Their experience shall include similar work to this subject project. In addition, the manufacturers will provide written approval of the material installers.
   c. Manufacturer's Written Instructions:
      1) Submit three (3) copies of manufacturer's written instruction
   d. Closeout Submittals in accordance with Specification Sections in Division One:
   e. Warranty in accordance with Specification Section - WARRANTIES.

1.4 QUALITY ASSURANCE

A. Qualifications:
   1. Material Qualifications:
      a. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.
   2. Installer Qualifications:
      a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this Project.
   3. Manufacturer/Supplier Qualifications:
      a. Firm experienced in successfully producing/supplying products similar to that indicated for this Project, with sufficient production/supply capacity to produce/supply required units and colors without causing delay in the work.

B. Regulatory Requirements:
   1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
      a. AAMA American Architectural Manufacturer's Association
         1) AAMA 800-92 - "VOLUNTARY SPECIFICATIONS AND TEST METHODS FOR SEALANTS.
      b. ASTM American Society for Testing and Materials.
         1) ASTM C 1193 - "STANDARD GUIDE FOR USE OF JOINT SEALANTS."

c. CA-CHPS California High Performance Schools
d. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.
e. GANA Glass Association of North America, 1997 Edition of the Glazing Manual, and the most recent Edition of the Sealant Manual.
f. SWRI Sealant Waterproofing Restoration Institute - Types of standards as found in Chapter III "Sealants: The Professionals' Guide."

C. Meetings:
1. Pre-Installation: Scheduled by the Contractor prior to the start of work.
a. Coordinate the work with all other related work.
b. Identify any potential problems that may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
2. Progress: Scheduled by the Contractor during the performance of the work.
a. Review for proper installation of work progress.
b. Identify any installation problems and acceptable corrective measures.
c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.
a. Inspect and identify any problems that may impede issuance of warranties or guaranties.
b. Maintain installed work until the Notice of Substantial Completion has been executed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
1. Comply with the Sealant Requirements of the GANA Glazing Manual and GANA Sealant Manual.

B. Store and handle materials in compliance with manufacturer's written recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.
1. Store sealant containers in a protected location in accordance with their manufacturer's printed instructions until their use.

1.6 PROJECT CONDITIONS

A. Environmental requirements:
1. Apply materials within manufacturer's written recommended surface and ambient temperature ranges.
2. Apply materials when working joints are most likely to be normal size.
3. Do not install sealants under adverse weather conditions, or when temperatures are beyond manufacturer's written recommended limits.
a. Proceed with the installation only when forecasted weather conditions are favorable for proper sealant cure, and development of early bond strength. Allow a minimum of three days after rain.

b. Where joint width is affected by ambient temperature variations, install sealants only when temperatures are in the lower third of manufacturer's written recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at low temperatures.

1.7 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
1. In accordance with Specification Section - WARRANTIES.
2. Manufacturer shall warrant exterior joint sealant after substantial completion of work.
a. Warranty Period Ten (10) Years.

C. Installer's Warranty:
1. Sealant Contractor shall warrant sealants against defective materials and workmanship after substantial completion of work.
a. Warranty Period Five (5) Years.
b. Warranty shall further state that installed sealants are warranted against the following:
1) Water leakage through sealed joints.
2) Adhesive or cohesive failure of sealant.
3) Staining of adjacent surfaces caused by migration of primer or sealant.
4) Chalking or visible color change of the cured materials.
c. The installer shall make repairs during the warranty period at no cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Specified product manufacturer, or approved equivalent:
a. One-Part Neutral Cure Silicone Sealant:
1) PECORA "#890"
a) NOTE: For continual immersion in water conditions, provide PECORA "Dynatred".
b) If the water contains a chlorine content of 5ppm, then PECORA "Synthacalk GC2+" shall be used.
2) Acceptable alternative manufacturers for 1) only above:
a) BONDAFLEX "Sil 290"
b) DOW PERFORMANCE SILICONES "#790"
c) SONNEBORN "Sonolastic 150" or "Sonolastic 150 VLM"
b. One-Part Acid-Curing Silicone Sealant:
1) PECORA "#860"

2) Acceptable alternative manufacturers:
   a) BONDAFLEX "Sil 100 GP"
   b) DOW PERFORMANCE SILICONES "#999-A"
   c) SONNEBORN "Omniplus"

c. One-Part Mildew-Resistant Silicone Sealant:
   1) PECORA:
      a) White Color Only "#345"
      b) Available in multiple colors for selection "#898"
   2) Acceptable alternative manufacturers to 1), a), above:
      a) BONDAFLEX "Sil 100 WF"
      b) DOW PERFORMANCE SILICONES "#786"
      c) SONNEBORN "Omniplus"

d. One-Part Gun Grade Urethane Sealant:
   1) PECORA "Dynatrol I-XL"
   2) Acceptable alternative manufacturers:
      a) BONDAFLEX "Pur 25" or "Pur 25 Tex"
      b) SIKA "Sikaflex 1a" or "Sika Textured"
      c) SONNEBORN "NP1 Smooth" or "X1 Textured"
      d) VULKEM "#116"

e. Multi-Component Gun Grade Urethane Sealant:
   1) PECORA "Dynatred"
   2) Acceptable alternative manufacturers:
      a) BONDAFLEX "Pur 2 NS"
      b) SIKA "Sikaflex 2c NS"
      c) SONNEBORN "NP2"

f. Multi-Component Gun Grade Urethane Sealant (Fast Curing):
   1) PECORA "Dynatred"
   2) Acceptable alternative manufacturers:
      a) BONDAFLEX "Pur 2 NS"
      b) SIKA "Sikaflex 2c NS"
      c) SONNEBORN "NP2" with manufacturer's accelerator.
      d) VULKEM "#227"

g. One-Part or Multi-Component Gun Grade Urethane Sealant (Security Sealant) :
   1) PECORA "Dynaflex"
   2) Acceptable alternative manufacturers:
      a) BONDAFLEX "Pur 2 NS"
      b) SIKA "Sikaflex 2c NS TG"
      c) SONNEBORN "Ultra"

h. One-Part Pourable Self-Leveling Urethane Sealant:
   1) PECORA "Urexpan NR-201" or "Dynatred"
   2) Acceptable alternative manufacturers:
      a) BONDAFLEX "Pur 35 SL"
      b) SIKA "Sikaflex 1c SL"
      c) SONNEBORN "Sonolastic SL 1"
      d) VULKEM "#45"

i. Multi-Component Pourable Self-Leveling Urethane Sealant (Fast Curing):
   1) PECORA "Urexpan NR-200"
   2) Acceptable alternative manufacturers:
      a) BONDAFLEX "Pur 2 SL"
      b) SIKA "Sikaflex 2c SL"
      c) SONNEBORN "Sonolastic SL 2"
      d) VULKEM "#245/255"

j. Acrylic-Emulsion Sealant:

1) PECORA "AC-20"
2) Acceptable alternative manufacturers:
   a) BONDAFLEX "Sil-A 700"
   b) SONNEBORN "Sonolac"

k. One-Part Butyl Sealant:
1) PECORA "BC-158"
2) Acceptable alternative manufacturers:
   a) PTI (by H.B. FULLER) "#707"

l. Acoustical Sealant:
1) PECORA:
   a) Exposed and Fire Rated areas; Pecora "AC-20 FTR"
   b) Concealed areas: Pecora "AIS-919"
2) Acceptable alternative manufacturers:
   a) BONDAFLEX "Sil-A 700"
   b) OSI "GRABBER" #GSCS
   c) TREMCO INC. 834
   d) W.W. HENRY "#413"

m. Firestop Sealants: Use in designated Fire-Rated Assemblies in accordance with approved UL Classified Assemblies.
1) HILTI
2) Acceptable alternative manufacturers:
   a) 3M
   b) PECORA

n. Firestop Putty Pads: Use in Fire-Rated Assemblies where penetration holes are too large for caulk, in accordance with approved UL Classified assemblies:
1) HEVI-DUTY / NELSON "Putty Pads"

o. Glazing Tape Sealants:
1) Butyl Glazing Tape:
   a) PECORA "Extru-Seal"
   b) Acceptable alternative manufacturers:
   c) TREMCO, INC. "440 Tape"
2) Butyl Pressure Glazing Tape:
   a) PECORA "Dyna-Seal"

p. Pre-Compressed Foam Sealants:
1) EMSEAL CORP. "Emseal"

q. Sheet Caulking (Electrical Junction Box Sealers):
1) LOWRY "Electrical Box Sealer"
2) Acceptable alternative manufacturer:
   a) TREMCO INC. "Sheet Caulking"

r. EIFS preformed paintable Urethane Tape:
1) SIKA "Sikaflex PUR" Tape System

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

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

a. Colors: Provide color of exposed sealants to comply with the following:
   1) Sealant colors shall match adjacent wall color.
   2) Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

B. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants (Silicones, Urethanes, and Acrylics) that comply with ASTM C 920 "Specification for Elastomeric Joint Sealants," and other requirements indicated on each Elastomeric Joint Sealant listed, including those requirements referencing ASTM C 920 "Specification for Elastomeric Joint Sealants," classifications for Type, Grade, Class, and Uses.
   1. Additional Movement Capability: Where additional movement capability is specified in Elastomeric Joint Sealant listed, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719 "Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)," to withstand the specified percentage change in the joint width existing at time of installation.

C. Acrylic-Emulsion Sealant: Provide product complying with ASTM C 834 "Specification for Latex Sealants," that accommodates joint movement of not more than 5 percent in both extension and compression for a total of 10 percent.

D. Butyl Sealant: Manufacturer's standard one-part, non-sag, solvent-release-curing, polymerized butyl sealant complying with ASTM C 1311 "Standard Specification for Solvent Release Sealants," and formulated with minimum of 75 percent solids to be nonstaining, paintable, and have a tack-free time of 24 hours or less.

E. Acoustical Sealant: Manufacturer's non-drying, non-bleeding and non-hardening butyl sealant complying with ASTM C 834 "Specification for Latex Sealants," and the following requirements:
   1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90 "Test method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements."
   2. For fire rated conditions, use an acoustical sealant that has at least Class II Flame Spread and Smoke Developed ratings in accordance with ASTM E-84 "Test method for Surface Burning Characteristics of Building Materials," as follows:
      a. Flame Spread Rating 53.
      b. Smoke Developed Rating 117.

F. Firestop Pillows / Bags: In accordance with UL Classified systems. Reusable, heat-expanding pillows / bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

G. Firestop Sealants: In accordance with ASTM E 814 "Specification for Latex Sealants," and ANSI/UL 1479 Classified systems.
   1. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
   2. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.3 ACCESSORIES

A. Tape: Manufacturer's standard, solvent-free, butyl-based tape sealant with a solids content of 100 percent formulated to be nonstaining, paintable, and nonmigrating in contact with nonporous surfaces with or without reinforcement thread to prevent stretch and packaged on rolls with a release paper on one side.

B. Pre-compressed Foam: Manufacturer's standard preformed, pre-compressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellent agent; factory-produced in pre-compressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following requirements:
   1. Properties: Permanently elastic, mildew-resistant, nonmigratory, nonstaining, and compatible with joint substrates and other sealants.
   2. Impregnating Agent: Manufacturer's standard.
   3. Density: Manufacturer's standard.
   4. Backing: Pressure-sensitive adhesive factory applied to one side with protective wrapping.

C. Backing Rods (Joint Sealant Backing):
   1. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
   2. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
      a. Open-cell polyurethane foam.
      b. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
      c. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
      d. Any material indicated above.
   3. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
   4. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
   5. Acoustical Sheet Caulking for junction boxes: LOWRY'S Electrical Box Sealer, or TREMCO INC. sheet caulking

D. Miscellaneous Materials:
   1. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

2. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.
3. Masking Tape: Non-staining, nonabsorbent material compatible with sealants and surfaces adjacent to joints. Use the type of masking tapes available that is compatible to the substrate being masked without damaging the surface material of finish when removed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site verification of conditions:
1. Prior to the execution of the work under this specification section, inspect the installed work executed under other specification sections of this Project Manual which, affect the execution of work under this specification section.
2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
3. Execution of work under this specification section shall constitute acceptance of existing conditions.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. 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 sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of sealants.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
1. Masking Tape: Use the appropriate masking tape (type selected to the substrate so as not to mar the surface it is protecting) where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

A. General:

1. Comply with joint sealant manufacturer's written installation instructions applicable to products and applications indicated, except where more stringent requirements apply. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 "Standard Guide for Use of Joint Sealants," for use of sealants as applicable to materials, applications, and conditions indicated.
    a. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 "Practice for Use of Sealants in Acoustical Applications," as applicable to materials, applications, and conditions indicated.
    b. Use Urethane Sealants at painted joints.
    c. Use Silicone Sealants at exposed, non-painted joints.
    d. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
        1) Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability
            a) Do not leave gaps between ends of joint fillers.
            b) Do not stretch, twist, puncture, or tear joint fillers.
            c) Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
        2) Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
    e. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
        1) For normal moving joints not subject to traffic: Fill joints to a depth equal to 50% of joint width, but not less than 1/4" deep or more than 1/2" deep. In no case shall the applied sealant width exceed the sealant depth.
        2) Assure that the *bond line* surface is a minimum of 1/4" wide. Install approved backer material at a proper depth to provide sealant bead profiles as detailed on approved shop drawings. Backer material shall be of appropriate size and shape and shall be compressed between 25% and 50% when installed.
        3) Backer material may not be modified in-lieu of using the properly dimensioned material. Install, when required a polyethylene, or other approved, bond backer tape to provide sealant bead profiles as detailed on approved shop drawings.
    f. Do not allow sealants, primers, or other compounds to overflow, spill or migrate into voids of adjacent construction.
    g. Remove excess sealant spillage promptly as this work progresses. Clean adjacent surfaces by recommended means to remove sealant, but not damage the surfaces. Remove all cartons and debris from the site as the work progresses and at the end of each work day. Joints shall be prepared and sealed on the same working day.

h. Tooling of Non-sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
   1) Provide concave joint configuration per Figure 5A in ASTM C 1193 "Standard Guide for Use of Joint Sealants," unless otherwise indicated.
   2) Provide flush joint configuration, per Figure 5B in ASTM C 1193 "Standard Guide for Use of Joint Sealants," where indicated.
      a) Use masking tape to protect adjacent surfaces of recessed and tooled joints.
   3) Provide recessed joint configuration, per Figure 5C in ASTM C 1193 "Standard Guide for Use of Joint Sealants," of recess depth and at locations indicated.

i. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's written directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's written recommendations.

j. Acoustical Sealant Applications:
   1) Provide acoustical sealant to form an airtight seal at all penetrations and perimeter of sound-rated partitions, floors and ceilings. Comply with requirements of specification section titled Gypsum Board. Use backer-rod where gaps to be sealed exceed 3/8 inches.
   2) Provide sheet caulking to seal the back and sides of all junction boxes (4 gang and smaller) recessed in acoustically-rated partitions.
   3) Provide acoustical sealant as a continuous bead along gypsum board face layer at all head and sill conditions of sound-rated partitions and around the perimeter of resilient ceilings.

k. Firestop Sealants: In accordance with applicable UL Classified numbers compatible with products provided.

3.4 CLEANING

A. Clean in accordance with Specification - PROJECT CLOSEOUT.
   1. Clean any soiled surfaces immediately.
   2. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of sealants and of products in which joints occur.

3.5 PROTECTION

A. 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. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated sealants immediately so that and installations with repaired areas are indistinguishable from original work.

3.6 SCHEDULES

A. Sealant Schedule:

B. Sealants: Description of joint construction and location where sealant is typically applied
1. One-Part Neutral Cure Silicone Sealant:
    a. Exterior and interior joints in vertical surfaces of concrete and masonry.
    b. Between concrete masonry and stone.
    c. Between metal and concrete, mortar, and stone.
    d. Interior and exterior perimeter joints of metal frames in exterior walls.
    e. Exterior overhead joints.
    f. Use the applicable sealant for continual immersion in water applications, such as swimming pools, fountains and cooling towers – USDA Approved.
2. One-Part Acid-Curing Silicone Sealant:
    a. Exposed joints within glazed curtain wall framing systems, skylight framing systems, and aluminum entrance framing systems, if applicable.
3. One-Part Mildew-Resistant Silicone Sealant:
    a. White Grout Joints: Provide white silicone sealant material to match adjacent white grout joints in interior joints in vertical surfaces of ceramic tile in toilet rooms, showers, and kitchens.
    b. Colored Grout Joints: Provide colored silicone sealant material to match adjacent colored grout joints in interior joints in vertical surfaces of ceramic tile in toilet rooms, showers, and kitchens.
4. One-Part Gun Grade Urethane Sealant:
    a. Exposed joints in pre-cast, masonry, window frame perimeters and similar types of construction joints.
5. Multi-Component Gun Grade Urethane Sealant:
    a. Control joints and window and door perimeters.
6. Multi-Component Gun Grade Urethane Sealant (Fast Curing):
    a. Plaza Decks.
7. One-Part or Multi-Component Gun Grade Urethane Sealant (Security Sealant):
    a. Control joints and window and door perimeters where sealant is exposed to physical abuse.
8. One-Part Pourable Self-Leveling Urethane Sealant:
    a. Exterior and interior joints in horizontal surfaces of concrete.
    b. Exterior and interior joints in horizontal surfaces between metal and concrete, mortar, stone, and masonry surfaces.
9. Multi-Component Pourable Self-Leveling Urethane Sealant (Fast Curing):
    a. For use when walking surfaces require use within 24 hours of application without damage to joint surfaces.
    b. Exterior and interior joints in horizontal surfaces of concrete.
10. Acrylic-Emulsion Sealant:
    a. Paintable joints for the following surfaces expected to receive field painting:
        1) Interior joints in vertical and overhead surfaces at perimeter of elevator door frames and door frames (not requiring security grade sealant).
        2) Interior joints in gypsum board, plaster, concrete, and concrete masonry.
        3) All other interior field paintable joints not indicated otherwise.
11. One-Part Butyl Sealant:
    a. Primarily used for glazing seals where little or no movement is expected.
12. Acoustical Sealant:

a. Joints to control dust, air, smoke and sound transmission, including under all exterior wall sill plates placed on top of Cast-In-Place Concrete slabs.

13. Firestop Sealants:
    a. In fire-rated walls, compatible with wall ratings and in accordance with applicable penetration types in walls and floors, and in accordance with UL Classified numbers.

END OF SECTION

SECTION 09 29 00 – GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
1. Provide all material, labor, equipment and services necessary to completely install all gypsum board materials, suspension systems, furring, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
1. ALL DIVISION 00 SPECIFICATION SECTIONS.
2. ALL DIVISION 01 SPECIFICATION SECTIONS.
3. 06 10 00 ROUGH CARPENTRY
4. 07 21 00 INSULATION
5. 07 92 00 SEALANTS
6. 09 30 00 TILE
7. 09 91 00 PAINTING
8. 10 14 00 IDENTIFYING DEVICES
9. 10 21 13 TOILET PARTITIONS
10. 10 26 00 WALL AND CORNER GUARDS
11. 10 28 13 TOILET ACCESSORIES
12. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.

1.2 REFERENCES

A. Standards:
1. In accordance with the following standards:
a. CISCA Ceilings & Interior Systems Construction Association.
b. DITF Drywall Industry Trust Fund.
c. GA Gypsum Association.
d. MPI Master Painters Institute
e. PDCA Painting and Decorating Contractors of America.
f. PDSM Plaster and Drywall Systems Manual, ©1988 by BNI and McGraw-Hill, Inc., Third Edition.

1.3 SYSTEM DESCRIPTION

A. Suspension System Design Requirements: In accordance with allowable values and properties assigned and approved by CBC.
1. Lateral Load Design: ASCE 7, Chapter 13.
2. Design Weight for lateral loads: Total Weight does not exceed four (4) pounds per square foot, including air conditioning grilles and light fixtures.
3. System is not to support lateral loads from partitions.
4. Fasteners into concrete:
a. Must be capable of sustaining, without failure, a load equal to 200 lbs. tension for hangar wires and 440 lbs. tension for bracing wires.

5. Gypsum board suspended ceiling systems shall not support materials or building components other than grills, light fixtures, small electrical conduits, small ducts and the like.
    a. All such components shall be supported either directly from main runners, or by supplemental framing, which is supported by main runners.
    b. No vertical loads other than gypsum board dead load shall be applied to cross-furring.

1.4 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
1. Product Data.
    a. Gypsum board fastening schedule: Indicate type, size and spacing of fasteners for each type of framing and fire resistive condition.
    b. Manufacturer's written recommended construction instructions or handbook for all gypsum board panel products and accessories.
    c. Manufacturer's written recommended construction instructions or handbook for all suspension system products and accessories
    d. Manufacturer's data for all types of gypsum board used on this project.
2. Samples.
    a. Provide 24 inch square samples for all textures for each level of finish.
    b. Provide 4 inch lineal samples of each piece of metal trim accessory specified.
    c. Provide 12 inch lineal samples of Suspension System components for each type of system specified.
3. Quality Assurance/Control Submittals:
    a. Test Reports:
        1) Site Tests of suspended gypsum board ceiling fasteners and anchors provided by Testing Agency.
    b. Certificates:
        1) General Construction: Certificate signed by the Contractor on Contractor's letterhead.
        2) Products: Certificates signed by manufacturers of gypsum board assembly components.
4. Closeout Submittals in accordance with Specification Section -PROJECT DOCUMENTS.
    a. Warranty in accordance with Specification Section - WARRANTIES.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Material Qualifications:
    a. Where fire-rated gypsum board assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 "Test methods for Fire Tests of Building Construction and Materials," by an independent testing and inspecting agency acceptable to CSFM.
    b. Empty containers shall not be removed from site without the Project Inspector's approval.
2. Installer Qualifications:
    a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this Project.
        1) Helpers and apprentices used for such work shall be under full and constant supervision at all times by thoroughly skilled gypsum board installers.

2) In the acceptance or rejection of installed gypsum board, no allowance will be made for lack of skill on the part of installers.

B. Regulatory Requirements:
1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.
b. IR Interpretation of Regulations.

C. Certificates:
1. General Construction: Contractor to certify that work provided, meets or exceeds the requirements of this section.
2. Manufacturers of gypsum board assembly components certify that their products comply with specified requirements.
a. Certify that all adhesive and compound materials have a good shelf life longer than the construction period of this project.

D. Mockups:
1. Before starting the finishing of gypsum board surfaces, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and qualities of materials and execution.
a. Install mockups for the following applications:
1) All surfaces without finish texture.
2) All surfaces without finish texture to be painted.
3) All surfaces with finish texture to be painted.
b. Simulate finished lighting conditions for review of mockups.
c. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Meetings:
1. Pre-Installation: Scheduled by the Contractor prior to the start of work.
a. Coordinate the work with other work being performed.
b. Identify any potential problems that may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
2. Progress: Scheduled by the Contractor during the performance of the work.
a. Review for proper installation of work progress.
b. Identify any installation problems and acceptable corrective measures.
c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.
a. Inspect and identify any problems that may impede issuance of warranties or guaranties.
b. Maintain installed work until the Notice of Substantial Completion has been executed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packing, shipping, handling, and unloading:
1. Products shall be handled in such a manner as to assure that they are free from dents, scratches and other damage.

B. Acceptance at Site:
1. Products must be in manufacturer's original unopened containers with labels indicating brand name, model, and grade.
2. Damaged products will not be accepted.

C. Storage and protection:
1. Products shall be stored above ground on level platforms, six (6) inches above ground, allowing air circulation under stacked units.
a. Cover materials with protective waterproof covering providing for adequate air circulation and ventilation.

1.7 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
1. In accordance with manufacturer's written standard warranty:
a. Warranty Period One (1) Year.

C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES:
a. Warranty period One (1) Year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Specified gypsum board products manufacturer:
a. NATIONAL GYPSUM COMPANY.
1) Wallboard "REGULAR"
2) Water-Resistant "XP GYPSUM BOARD"
3) Shaftwall "SHAFTLINER"
4) Sheathing "GYPSUM SHEATHING"
5) Soffit "EXTERIOR SOFFIT BOARD"
b. Acceptable alternative manufacturers:
1) PABCO:
a) Wallboard "REGULAR" AND "TYPE X"
b) Water-Resistant "MOLD CURB PLUS"
c) Shaftwall "MOLD CURB PLUS SHAFLINER"
d) Sheathing "GLASS SHEATHING"
e) Soffit "EXTERIOR SOFFIT"
2) UNITED STATES GYPSUM COMPANY - "SHEETROCK"

a) Wallboard "SW EDGE"
b) Water-Resistant: "MOLD TOUGH"
c) Shaftwall "LINER PANEL-MOLD TOUGH"
d) Sheathing "SECUROCK GLASS-MAT SHEATHING"
e) Soffit "EXTERIOR GYPSUM CEILING BOARD"

2. Specified Impact and Abuse board products manufacturer:
   a. NATIONAL GYPSUM COMPANY
      1) Impact Board "HI-IMPACT XP"
      2) Abuse Resistant "HI-ABUSE XP"
   b. Acceptable alternative manufacturers:
      1) PABCO.
         a) Impact Board "HI-IMPACT"
         b) Abuse Resistant "ABUSE CURB"
      2) UNITED STATES GYPSUM COMPANY - Walls only.
         a) Impact Board "MOLD TOUGH VHI"
         b) Abuse Resistant "MOLD TOUGH AR"
3. Specified Roof Board board products manufacturer:
   a. G-P GYPSUM "DENS-DECK"
   b. Acceptable alternative manufacturers
      1) UNITED STATES GYPSUM COMPANY
         a) SECUROCK Roof Cover Board.
4. Specified gypsum board accessories product manufacturer:
   a. Prep. Coat (Drywall Primer):
      1) WESTPAC MATERIALS "PREP COAT"
      2) Acceptable alternative manufacturer:
         a) UNITED STATES GYPSUM - SECUROCK First Coat Primer.
   b. Primer-Surfacer: "TUFF-HIDE"
      1) UNITED STATES GYPSUM COMPANY.
   c. Other Accessories:
      1) CLARK DIETRICH BUILDING SYSTEMS, LLC (CDBS).
5. Specified revel molding products manufacturer:
   a. FRY REGLET CORPORATION.

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. Furring:
1. Metal Angles: 24 gage galvanized steel.
   a. 1-3/8 inch x 7/8 inch 190 lbs./1000 feet weight.
2. Cold Rolled Channels: 16 gage galvanized steel.
   a. For furred walls and ceilings:
      1) 3/4 inch x 1/2 inch flange: 300 lbs./1000 feet weight.
      2) 1-1/2 inch x 17/32 inch flange: 500 lbs./feet weight.
      3) 2 inch x 17/32 inch flange: 590 lbs./1000 feet weight.
3. Resilient Channels (USG's RC-1): 25 gage corrosion resistant steel.
   a. Pre-punched holes at 4 inches on center in the flange to facilitate screw attachment only into framing. For improving sound transmission loss through framed partitions and ceilings.
      1) 1/2 inch flange x 2-1/2 inch overall w/1-1/2 inch offset flange x 1/2 inch offset:

a) 200 lbs./1000 feet weight.

4. Zee Channels: 24 gage corrosion resistant steel.
   a. 1 inch thick x 7/8 inch x 1-1/4 inch — 224 lbs./1000 feet weight.
   b. 1-1/2 inch x 7/8 inch x 1-1/4 inch — 269 lbs./1000 feet weight.
   c. 2 inch x 7/8 inch x 1-1/4 inch — 313 lbs./1000 feet weight.
   d. 3 inch x 7/8 inch x 1-1/4 inch — 400 lbs./1000 feet weight.
5. Hat Channels:
   a. 7/8 inch x 2-9/16 inch — 276 lbs./1000 feet weight (25 gage).
   b. 7/8 inch x 2-9/16 inch — 515 lbs./1000 feet weight (20 gage).
6. Channel Clips:
   a. Pre-formed galvanized wire used for attaching metal furring channels to cold rolled channels and single gypsum panel systems only.
      1) 1-1/2 inch x 2-3/4 inch — 38 lbs./1000 feet weight.

B. Suspension System:
1. General: Comply with ASTM C754 "Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products," for conditions indicated.
2. Wires: ASTM A641 "Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire," Class 1 zinc coating, soft temper:
   a. Tie: 0.0625 inch diameter wire (16 gage), or double strand of 0.0475 inch diameter (18 gage) wire.
   b. Hanger: 0.162 inch diameter (8 gage).
   c. Brace: 0.106 inch diameter (12 gage).
3. Anchors:
   a. General: Fabricate from corrosion-resistant material with holes or loops for attaching hanger and brace wires.
      1) Ceiling Clips: 3/4 inch wide x 0.0934 inch galvanized sheet (13 gage).
      2) Steel Straps:
         a) 1 inch wide x length as required x 0.108 inch galvanized sheet (12 gage).
         b) 3 inches wide x 4 inches long x 0.108 inch galvanized sheet (12 gage).
4. Main Runners:
   a. Hot Rolled Channels:
      1) 1-1/2 inch web x 1/2 inch flange x 1/8 inch thick — 1,120 lbs./1000 feet weight.
5. Cross Furring:
   a. Hat Channels:
      1) 7/8 inch thick x 2-9/16 inch — 276 lbs./1000 feet weight.
6. Compression Struts (Metal angles, galvanized steel):
   a. 1/8 inch thick x 1 inch x 1 inch — 800 lbs./1000 feet weight.
   b. 3/16 inch thick x 1-1/4 inch x 1-1/4 inch — 1,480 lbs./1000 feet weight.
   c. 3/16 inch thick x 1-1/2 inch x 1-1/2 inch — 1,800 lbs./1000 feet weight.
   d. 3/16 inch thick x 1-3/4 inch x 1-3/4 inch — 2,120 lbs./1000 feet weight.
   e. 3/16 inch thick x 2 inch x 2 inch — 2,440 lbs./1000 feet weight.
   f. 3/16 inch thick x 2 inch x 2-1/2 inch — 3,070 lbs./1000 feet weight.
   g. 3/16 inch thick x 3 inch x 3 inch — 3,710 lbs./1000 feet weight.
   h. 1/4 inch thick x 3-1/2 inch x 3-1/2 inch — 5,800 lbs./1000 feet weight.
   i. 1/4 inch thick x 4 inch x 4 inch — 6,600 lbs./1000 feet weight.
   j. Alternate Compression Struts — Refer to drawings.
      1) Must be submitted to and approved by DSA.

7. Shaft Wall Framing: Shaft Wall Steel Framing listed below are manufactured by USG, or approved equivalent.
   a. CR-Runners:
      1) 2"-width 25 gage.
   b. J-Runners:
      1) 2-1/2", 4" or 6" as required 20 gage.
   c. E-Studs:
      1) 2-1/2", 4" or 6" as required 20 gage.
   d. C-H Studs:
      1) 2-1/2", 4" or 6" as required 20 gage.
   e. Jamb Studs:
      1) 2-1/2", 4" or 6" as required 20 gage.
   f. H-Studs:
      1) 2"-width 25 gage.

C. Wallboard: For interior walls and ceilings.
   1. Standard: In accordance with ASTM C 1396 "Standard Specification for Gypsum Board."
   2. Size: See drawings for specific thickness locations.
      a. 5/8 inch thick by 4 foot wide maximum by practical length to minimize joints.
         1) When curved walls are indicated on the drawings, provide multiple layers of 1/4 inch & 3/8 inch thick by 4 foot wide maximum by practical length to minimize joints.
   3. Long Edges: SW Tapered.
   4. Core Type:
      a. Non-Fire Rated: Regular.
      b. Fire Rated Type X at fire-resistive-rated assemblies.
   5. Finish: Natural-finish face paper suitable for paint, wallpaper or other decorations.

D. Water-Resistant: For interior walls subjected to, but not constant, moisture and humidity and at adhesive application of ceramic tile and wallcoverings.
   1. Standard: In accordance with ASTM C 1396 "Standard Specification for Gypsum Board."
      a. Surface Burning Characteristics: ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials":
         1) Flame Spread: 20.
         2) Smoke Developed: 0.
   2. Size - see drawings for specific thickness locations:
      a. 5/8 inch thick by 4 foot wide maximum by practical length to minimize joints.
   3. Long Edges: Tapered.
   4. Core Type:
      a. Non-Fire Rated: Regular water-resistant core all the way through.
      b. Fire Rated: Type X and water-resistant additives all the way through, at fire-resistive-rated assemblies.
   5. Finish: Multi-layered paper facings, chemically treated to resist moisture penetration.
   6. Color of the face paper is dependent on the manufacturer.

E. Impact Board: For interior walls requiring greater impact resistance.
   1. Standard: In accordance with ASTM C 1629 "Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels."

a. Surface Abrasion Resistance: ASTM D 4977 "Test method for Granule Adhesion to Mineral Surfaced Roofing by Abrasion": Level 3.
b. Indentation Resistance: ASTM D 5420 "Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a falling Weight (Gardner Impact)": Level 1.
c. Impact/Penetration Resistance, Soft Body: ASTM E 695 "Standard Method for Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading": Level 3.
d. Impact/Penetration Resistance, Hard Body: ASTM C 1629 "Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels," Annex 1: Level 3.

2. Mold/Mildew Characteristics:
   a. Mold Resistance: ASTM G 21 "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi": 0.
   b. Mold Resistance: ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber": 10.
   c. Water Absorption: ASTM C 173 "Test method for Air Content of Freshly Mixed Concrete by the Volumetric Method": less than 5 percent.
3. Surface Burning Characteristics: ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials":
   a. Flame Spread: 15.
   b. Smoke Developed: 0.
4. Size: See Drawings for specific thickness locations:
   a. 5/8 inches thick by 4 feet wide maximum by practical length to minimize joints.
5. Long Edges: Tapered.
6. Core Type:
   a. Moisture resistant core with an embedded fiberglass mesh.
   b. Non-Fire-Rated: --
   c. Fire Rated: Type X at fire-resistive-rated assemblies.
7. Finish: Abrasion and mold/mildew/moisture resistant paper on the face side, and abrasion and mold/mildew/moisture resistant paper on the back side.
   a. Color of the face paper is dependent on the manufacturer.

F. Abuse Resistant: For interior walls and ceilings requiring greater impact resistance.
1. Standard: In accordance with ASTM C 1629 "Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels."
   a. Surface Abrasion Resistance: ASTM D 4977 "Test method for Granule Adhesion to Mineral Surfaced Roofing by Abrasion": Level 3.
   b. Indentation Resistance: ASTM D 5420 "Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a falling Weight (Gardner Impact)": Level 1.
   c. Impact/Penetration Resistance, Soft Body: ASTM E 695 "Standard Method for Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading": Level 1-2.
2. Mold/Mildew Characteristics:
   a. Mold Resistance: ASTM G 21 "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi": 0.
   b. Mold Resistance: ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber": 10.
   c. Water Absorption: ASTM C 173 "Standard Test Methods for Physical Testing of Gypsum Panel Products": less than 5 percent.

3. Surface Burning Characteristics: ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials":
   a. Flame Spread: 15.
   b. Smoke Developed: 0.
4. Size: See Drawings for specific thickness locations:
   a. 5/8 inches thick by 4 feet wide maximum by practical length to minimize joints.
5. Long Edges: Tapered.
6. Core Type:
   a. Moisture resistant core.
   b. Non-Fire-Rated: --
   c. Fire Rated: Type X at fire-resistive-rated assemblies.
7. Finish: Abrasion and mold/mildew/moisture resistant paper on the face side, and abrasion and mold/mildew/moisture resistant paper on the back side.
   a. Color of the face paper is dependent on the manufacturer.

G. Shaftwall: For interior walls and ceiling at shafts, area separations, high-attenuation, floor/ceiling assemblies, etc.
1. Standard: ASTM C 1396 "Standard Specification for Gypsum Board."
2. Size:
   a. 1 inch thick by 2 foot wide maximum by practical length to minimize joints.
3. Long Edges: Beveled.
4. Core Type:
   a. Fire Rated: Type X at fire-resistive-rated assemblies.
5. Finish:
   a. Multi-layered paper facings, chemically treated to resist moisture penetration.
      1) Color of the face paper is dependent on the manufacturer.

H. Sheathing: For exterior walls.
1. Standard: ASTM C 1177 "Standard Specification for Glass-Mat Gypsum Substrate for use as Sheathing."
   a. Surface Burning Characteristics per ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials":
      1) Flame Spread: 20.
      2) Smoke Developed: 0.
2. Size:
   a. 5/8 inch thick by 4 foot wide maximum by practical length to minimize joints.
3. Long Edges: "V" Shaped T & G.
4. Core Type:
   a. Non-Fire Rated: Gypsum with Fiberglass face and back.
   b. Fire Rated : Treated Gypsum with fiberglass face and back. at fire-resistive-rated assemblies.
5. Finish Color: Manufacturer's standard.
   a. Color of the face paper is dependent on the manufacturer.

I. Soffit: For exterior soffits with indirect weather exposure.
1. Standard: ASTM C1396 "Standard Specification for Gypsum Board."
   a. Surface Burning Characteristics per ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials":
      1) Flame Spread: 20.
      2) Smoke Developed: 0.
2. Size:
   a. 5/8 inch thick by 4 foot wide maximum by practical length to minimize joints.
3. Long Edges: SW Tapered.

4. Core Type:
   a. Non-Fire Rated: Regular Gypsum with water-resistant additive treatment.
   b. Fire Rated: Type X with weather resistant additives at fire-resistive-rated assemblies.
      1) Available only in 5/8 inch thickness only.
5. Finish: Water-repellant paper facings.
   a. Color of the face paper is dependent on the manufacturer.

J. Roof Board:
1. Thickness 5/8 inch.
2. Surfacing: Glass Mat.
3. Flute Spanibility:
   a. 5/8 inch thick: 8 inches per ASTM E 661 "Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads."
4. "R" Value:
   a. 5/8 inch thick: 0.67 per ASTM C 518 "Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus."
5. Water Absorption: 10.0
   a. Per ASTM C 473 "Test methods for Physical Testing of Gypsum Panels and Products."
6. Compression Strength: 500-900 psi normal.
7. Surface Water Absorption: 2.5 grams.
   a. Nominal per ASTM C 473 "Test methods for Physical Testing of Gypsum Panels and Products."
8. Flame Spread / Smoke Developed Index: 0/0.
   a. Per ASTM E 84 "Test Method for Surface Burning Characteristics of Building Materials."
9. Mold Resistance: No Growth.
   a. Per ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber."

K. Metal Accessories:
1. Corner Beads:
   a. Outside Corner, 1-1/4 inch x 1-1/4 inch galvanized:
      1) CDBS / USG "Dur-A-Bead" #103.
2. Edge Trim:
   a. "U"-Shaped 1 inch galvanized CDBS / USG #200-A, size to fit gypsum board.
   b. "L"-Shaped 1 inch galvanized CDBS / USG #200-B, size to fit gypsum board.
      1) When "U"-Shaped molding above cannot be used.
3. Control Joint:
   a. 1-3/4" wide, 1/4" wide center channel with removable tape strip:
      1) CDBS / USG #093.
4. Reveal Moldings (Aluminum Trim): Moldings listed below are manufactured by FRY REGLETS, or approved equivalent.
   a. Reveal Molding Sized to fit gypsum board.
   b. "L" Trim Molding Sized to fit gypsum board.
   c. "F" Reveal Molding Sized to fit gypsum board.
   d. Snap-In Reveal Sized to fit gypsum board.
   e. "Z" Reveal Molding Sized to fit gypsum board.
   f. Reveal Channel Screed Sized to fit gypsum board.
   g. "F" Reveal Sized to fit gypsum board.
   h. "T" Molding Sized to fit gypsum board.

2.3 ACCESSORIES

A. Water:
1. Clean, fresh and free from deleterious amounts of foreign material.

B. Fasteners:
1. At Gypsum Board: In accordance with the manufacturer's written recommendations and the following:
   a. Nails: In accordance with CBC Chapter 7 and ASTM C 514 "Standard Specification for Nails for the Application of Gypsum Board."
   b. Screws: In accordance with CBC Chapter 7, ASTM C 1002 "Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs," type S, G, and W, and ASTM C 954 "Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness," Type S-12.
      1) Provide "Bugle Head" screws that help prevent damage to the gypsum core and face paper.
   c. Adhesives: In accordance with ASTM C 475 "Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board."
      1) Commercial adhesives bridging minor irregularities in the base or framing at "non-fire-rated" construction.
         a) In accordance with ASTM C 557 "Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing."
2. At Suspension Systems:
   a. Wood Construction:
      1) Eye screws, minimum 1/4 inch diameter, 1-1/4 inch minimum embedment.
      2) Staples, 1-1/2 inch x 0.148 inch diameter (9 gage).
      3) Nails, "STRONGHOLD-J" nails.
   b. Steel Framing:
      1) Shot-in Anchors.
      2) Metal Deck or Metal Deck without Structural Concrete:
      3) Screws, self-tapping, minimum #8 x 1/2 inch.
   c. Metal Deck with Structural Concrete or Structural Concrete:
      1) Drilled-in Anchors, 5/16 inch diameter minimum at hanger and bracing wires.
      2) Shot-in Anchors, 3/4 inch minimum penetration at hanger wires only.

C. Joint reinforcement tape and joint compounds:
1. In accordance with ASTM C 474 "Standard Test Methods for Joint Treatment Materials for Gypsum Board Construction" and C 475 "Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board," and Gypsum Board Manufacturer's written recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
   a. Joint Tapes:
      1) Paper reinforcing tape, unless otherwise indicated.
      2) Polymer-coated, open glass-fiber mesh for cementitious backer units.
   b. Setting-Type Joint compounds for gypsum board: Factory-packaged, job-mixed, chemical-hardening powder products formulated for uses indicated.
      1) When used for taping and filling only, use formulation that is compatible with other joint compounds applied over it.

2) When used for pre-filling gypsum board joints, use formulation recommended by gypsum board manufacturer for this purpose.
3) When used for filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by the gypsum board manufacturer for this purpose.
4) When used for topping compound, use sandable formulation.

D. Prep. Coat: Provide a preparation coat of the specified material to gypsum board surfaces to be decorated with all paints.

E. Primer-Surfacer: "TUFF-HIDE" • by USG, Interior White Latex High Build Spray for a smoother paint finish over all types of drywall, 9.8 to 13 mils DFT in one spray application

F. Textured Finish Coats: Gypsum Board manufacturer supplying the products to this project shall also supply the Texture Finishes to provide distinctive appearance and surface decoration to gypsum board panel walls and ceilings, and as scheduled at the end of this Specification Section.

G. Other Materials: All other miscellaneous materials, not specifically described, but required for a complete and proper installation of gypsum board, shall be as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site verification of conditions:
1. Prior to the execution of the work under this specification section, inspect the installed work executed under other sections of this Project Manual which affect the execution of work under this specification section.
2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
3. Execution of work under this specification section shall constitute acceptance of existing conditions.

3.2 PREPARATION

A. Coordination:
1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.
2. Coordinate proper placement of ceiling mounted tracks, accessories, light fixtures, HVAC, registers and other items, which are to be integrated with gypsum board ceilings.

B. Protection:
1. Do not begin work until all rooms have been protected against the weather, and the building is covered and fully enclosed. Wet gypsum board after installation shall be removed and replaced at no extra cost to the Owner.
2. Protect all adjacent surfaces from drips, spray, air pollution of surrounding environment, and other damage from work under this specification section.

C. Surface preparation:

1. Prepare surface in accordance with manufacturer's written instructions and recommendations.
2. Clean substrates of substances (oil, grease, rolling compounds, incompatible primers, loose mill scale, etc.) which could impair bond of materials specified within this section.

3.3 INSTALLATION

A. General:
1. In accordance with manufacturer's written instructions and recommendations unless specifically noted otherwise.
2. In accordance with Regulatory Requirements.
   a. DSA's IR 25-3 "Drywall Ceiling Suspension Conventional Construction-One Layer."
3. Set plumb, level, and square.

B. Layout:
1. Lines shall be straight and true.
2. Control Joints:
   a. Layout in accordance with GA-234-08 for both Non-Rated and Rated wall and ceiling conditions as follows:
      1) Provide Control Joints at in an uninterupted straight plane exceeding 30 ft. in length and total area between control joints, such that no area exceeds 900 sq.ft.

C. Suspension System Installation: In accordance with DSA's IR 25-3.
1. Hanger and Main Runner Installation:
   a. Vertical hanger wires shall be #8 gage and galvanized; use #12 gage wire in "non-accessible" ceiling areas.
   b. Hanger spacing shall be 4'-0" o.c. with 1-1/2 inch hot rolled main runners (weighing 1.12 lbs./ft.).
   c. Bracing assemblies shall not be greater than a 12' by 12' on center spacing.
      1) Provide bracing assemblies at locations not more than 1/2 the spacing given above, from each perimeter wall and at edge of vertical ceiling offsets.
      2) The slope of these wires shall not exceed 45 degrees from the plane of the ceiling and shall be taut. Splices in bracing wires are not to be permitted without special DSA approval.
      3) Ceiling grid members may be attached to not more than two (2) adjacent walls. Ceiling grid members shall be at least 1/2" free of other walls.
      4) If walls run diagonally to ceiling grid system runners, one end of main and cross runners shall be free, and a minimum of 1/2" clear of wall.
      5) Suspended ceiling systems with an area of 144 square feet or less, and fire rated ceiling systems with an area of 96 square feet or less, surrounded by walls which connect directly to the structure above, do not require bracing assemblies when attached to at least two adjacent walls.
   d. Fasten hanger wires with not less than three tight turns.
      1) Fasten bracing wires with not less than four tight turns.
      2) Make all tight turns within a distance of 1-1/2 inches.
      3) Hanger or Bracing Wire 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.
         a) Wire turns made by machine where both strands have been deformed or bent in wrapping can waive the 1-1/2" requirement, but the number of turns shall be maintained, and be as tight as possible.

4) Separate all ceiling and bracing wires at least six inches (6") from all unbraced ducts, pipes, conduit, etc. It is acceptable to attach lightweight items, such as single electrical conduit not exceeding 3/4" nominal diameter, to hanger wires using connectors acceptable to DSA.

e. Hangers shall be saddle-tied around main runners to develop the full strength of the hangers.

f. Main Runners shall be spliced by lapping and interlocking flanges 12 inches minimum and tying near each end with double loops of #16 gage wire.

g. Provide trapeze or other supplementary support members at obstructions to typical 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 countersloping wires.

h. All recessed or drop-in light fixtures, as well as ceiling mounted mechanical air terminals and services, shall be supported directly by main runners or by supplemental framing which is supported by main runners and positively attached with screws or other approved connectors.

i. Surface mounted fixtures shall be attached to a main runner with a positive clamping device made of material with a minimum of 14 gage. ROTATIONAL SPRING CLAMPS DO NOT COMPLY.

2. Cross-Furring:

a. Cross-Furring shall be 7/8 inch, 25 gage galvanized hat sections at 24 inches on center maximum.

b. Cross-Furring shall be saddle-tied to the main runners with one strand of #16 gage, or two strands of #18 gage tie wire.

c. Cross-Furring shall be spliced by lapping and interlocking the pieces eight inches minimum and tying near each end with double loops of #16 gage wire.

D. Furring Channels:

1. Attach hat channels at 16" o.c. to framing members at 24" o.c. maximum with one 1-1/2" Type "G" screw at each bearing point. Stagger screws to opposite sides at every bearing surface.

E. Gypsum Board:

1. General:

a. During Winter Weather Installation periods, follow the GA-220 GYPSUM BOARD WINTER RELATED INSTALLATION RECOMMENDATIONS.

2. Install in accordance with CBC Chapter 25, DITF and GA recommendations, gypsum board panel manufacturer's written recommendations and in accordance with fire-rated design numbers.

a. At Ceilings and Soffits:

1) At gypsum board ceilings and soffit areas, install the ceiling prior to installing the walls.

2) Float the interior ceiling angles, and where permitted by code,

b. At Sound and Acoustical Walls:

1) Set all gypsum board panels on each side of the partition in a continuous 1/4 inch bead of acoustical sealant furnished and installed in accordance with the provisions of Specification Section -- SEALANTS.

c. At Water Resistant Walls:

1) Install where scheduled and in all areas where high moisture conditions are present, or ceramic tile, or wall coverings are scheduled over gypsum board.

2) In all areas to be tiled, treat all edges, cutouts, utility holes and joints, corners and nailheads with an approved sealant material in lieu of standard taping. Joints not to be covered by tile shall be treated as regular gypsum board. Do not use standard joint compound under ceramic tile.

d. At Sheathing:
1) Screw-attach sheathing to exterior of each stud with 1" Type "S-12" corrosion resistant screws spaced 3/8" from ends and edges and approximately 8" o.c. Apply sealant around sheathing perimeter at interface with other materials and install flashing.

3. Install gypsum board panels horizontally on walls, floor to ceiling.
4. At metal frames terminate wall board panel edge inside frame. Do not terminate gypsum board panel edge against metal frame trim unless otherwise indicated.

F. Cutting:
1. Cut gypsum board panels by scoring and breaking or by sawing, working from the face side.
a. When cutting by scoring, cut through the face paper and then snap the panel back away from the cut face; then break the backpaper by snapping the panel in the reverse direction or by cutting the back paper.
2. Smooth all cut ends and edges of panels as necessary to obtain a smooth joint.
3. For cut-outs in panels for pipes, fixtures, and other small openings, make holes and cut-outs by sawing or by such other method as will not fracture the core or tear the covering and with such accuracy that plates, escutcheons, or trim will cover the edges.
4. The use of "score-and-knockout" method will not be permitted.

G. Metal Accessories:
1. Corner Beads:
a. Install at all corners with galvanized screws at nine (9) inch intervals in both flanges with fasteners placed opposite one another the full length of the corner bead. Clinch-on fastening is not allowed.
1) Fasteners shall be driven below the anticipated finished joint compound surface.
b. Install in one piece except when length of corner exceeds stock lengths – then put splice up high away from people traffic.
2. Edge Trim: Install at all exposed joints where gypsum board panels abut another material with galvanized screws at nine (9) inch intervals the full length of the edge trim. Clinch-on fastening is not allowed.
a. Fasteners shall be driven below the anticipated finished joint compound surface.
b. Provide joint sealer in accordance with Specification Section -- SEALANTS.
1) Provide fire sealant in accordance with Specification Section -- FIRSTOPPING or Specification Section -- SEALANTS, when the wall or ceiling is part of a fire-rated situation.
3. Control Joints:
a. Install at 30'-0" o.c. maximum at all interior walls or partitions with uninterrupted planes that exceed 30' in length.
1) Opening frames that are full height of wall or partition may be considered a control joint.
b. Install at 50'-0" o.c. maximum at all interior ceilings and shall not exceed 2,500 sq.ft. in total area with perimeter relief.
c. Install at 30'-0" o.c. maximum at all interior ceilings and shall not exceed 900 sq.ft. in total area without perimeter relief.

H. Fastening:
1. Properly space all fasteners in careful accordance with the manufacturer's written recommendations and code requirements, with heads driven slightly below the surface for proper cementing, but without breaking the paper face.
2. Loosely butt all joints to be taped; firmly butt all joints to be left untreated.

3. Stagger all end joints and the joints between panels to achieve a maximum of bridging and a minimum of continued joints.

I. Taping and Finishing:
   1. First Coat:
      a. Spread compound evenly over all joints, using suitable tools designed for the purpose.
      b. Fill all joint recesses and metal trim.
      c. Center the reinforcing tape on the joint and press into the fresh compound at all joints, wiping down with sufficient pressure to remove excess compound but leaving sufficient compound under the tape for proper bond.
      d. Feather all edges and leave the surface free from blisters and tape wrinkles.
      e. Apply compound to all fastener recesses, leaving flush with the adjacent surfaces.
      f. Fold reinforcing tape along its centerline and apply to all interior angles, following the same procedure as for joints.
      g. Surfaces shall be free of excess joint compound.
   2. Second Coat:
      a. Lightly sand the dry compound with fine sandpaper to remove all irregularities.
      b. Apply a second coat of compound to all joints, feathering approximately three inches beyond edges of tape.
      c. Apply second coat to all fastener recesses.
      d. Surfaces shall be free of excess joint compound.
   3. Third Coat:
      a. Lightly sand the dry compound with fine sandpaper to remove irregularities.
      b. Apply final skim coat, feathering out approximately two inches beyond second coat.
      c. Third coat all fastener recesses and metal trim, and all interior angles; allow to dry.
      d. Surfaces shall be free of excess joint compound.

J. Prep. Coat (Drywall Primer):
   1. Apply Prep. Coat material at approximately 200 sq.ft. per gallon for all painted wall surfaces. Follow manufacturer's written recommendations for proper preparation of material, mixing and installation at recommended minimum coverage rates.
      a. For smooth walls with no texture, provide airless sprayer application in accordance with manufacturer's written recommendations.
         1) Fine finish: Sand wall surface with 220 grit mesh screen after application of Prep. Coat. **Do not oversand!**
      b. For textured walls: Provide roller application with a 3/8" to 1/2" nap roller before texture application is applied in accordance with manufacturer's written recommendations.

K. Primer - Surfacer:
   1. Apply Primer - Surfacer material at manufacturer's written recommendations for proper preparation of material, mixing and installation, and at recommended minimum coverage rates.
      a. For smooth walls with no texture, provide airless sprayer application in accordance with manufacturer's written recommendations.
         1) Fine finish: Sand wall surface with 220 grit mesh screen after application of Primer - Surfacer. **Do not oversand!**
      b. For textured walls: Provide roller application with a 3/8" to 1/2" nap roller before texture application is applied in accordance with manufacturer's written recommendations.

L. Textured Finish Coats: After taping and finishing, apply Textured Finish Coats as indicated in the schedule at the end of this Specification Section.

3.4 FIELD QUALITY CONTROL

A. Site Tests:
1. Testing Agency: The Owner's Testing Laboratory Agency shall perform field tests and Inspections and prepare test reports.
   a. Testing and inspecting of completed installations of suspended gypsum board ceiling fasteners and anchors shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with installations of gypsum board ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
2. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed:
   a. Concrete Anchors:
      1) Must be capable of sustaining, without failure, a load equal to 200 lbs. tension for hanger wires and 440 lbs. tension for bracing wires by construction as determined by testing according to ASTM E 488 "Test Methods for Strength of Anchors in Concrete and Masonry Elements," by a qualified independent testing agency.
         a) Hanger Wire Anchors 1 in 10 must be field tested.
         b) Bracing Wire Anchors 1 in 2 must be field tested.
3. Remove and replace gypsum board ceiling hangers where test results indicate that they do not comply with specified requirements.
4. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
   a. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors ot previously tested until 20 pass consecutively and then will resume initial testing frequency.

B. Inspection:
1. As required by Regulatory Requirements.
2. Schedule inspections and notify the Architect, Project Inspector and any other regulatory agencies of the time at least 48 hours prior to the inspection.
3. No work shall be without the inspections required by Regulatory Requirements.

3.5 CLEANING

A. Clean in accordance with Specification Section - PROJECT CLOSEOUT.
1. Clean any soiled surfaces immediately.
2. Clean any soiled surfaces at the end of each day, minimum.
3. Finish shall be clean and ready for the application of any additional finishes.
4. In accordance with manufacturer's written instructions and recommendations.

3.6 PROTECTION

A. Protection from weather:
1. Protect newly installed work from moisture after installation.

B. Protection from traffic:
1. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, which ensures the work of this section being without damage or deterioration until the time of Substantial Completion.

3.7 SCHEDULES

A. The following textured finish coat finishes shall be applied to the board surfaces within the scope of this section prior to covering with other finish materials.
1. Refer to the Material and Finish Schedule for specific locations of each substrate finish.
2. Where no specific substrate finish is called for on the drawings, select the appropriate level of substrate finish from the descriptions below for the final finish material.
3. Where no determination can be made from the descriptions below, provide a minimum of GB-2 substrate finish.
4. Where sound, smoke control or fire-ratings are required, details of construction shall be in accordance with reports of tested assemblies meeting the requirements.

B. GB-1 - Architect's Finish Designation:
1. Level 5 - GYPSUM ASSOCIATION'S LEVEL OF GYPSUM BOARD FINISH:
a. All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.
b. Architect's Finish:
1) Uniformly smooth and ready to receive Large Format Tiles, light grade wallcoverings, or fine textured finishes, or flat, semi-gloss, or gloss paints over flat surfaces.
2) Use "Fog and Splatter" fine textured finish where walls and ceilings are scheduled to be painted, unless otherwise noted.

C. GB-2 - Architect's Finish Designation:
1. Level 4 - GYPSUM ASSOCIATION'S LEVEL OF GYSPSUM BOARD FINISH:
a. All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound surfaces shall be smooth and free of tool marks and ridges.
b. Architect's Finish:
1) Uniformly smooth and ready to receive light textures ("Spray-Splatter," "Orange Peel" (light or heavy) "Stipple" or "Skip Trowel" finishes), or medium grade wall-coverings.
2) Use "Orange Peel" light texture finish when walls and ceilings are scheduled to be painted, unless otherwise noted.

D. GB-3 - Architect's Finish Designation:
1. Level 2 - GYPSUM ASSOCIATION'S LEVEL OF GYSPSUM BOARD FINISH:

a. All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.

b. Architect's Finish:

1) Total surface must be sufficiently smooth to create a good bonding plane acceptable for installation of scheduled materials (ceramic tile, plywood, acoustical tile or similar materials).

E. GB-4 - Architect's Finish Designation:

1. Level 3 - GYPSUM ASSOCIATION'S LEVEL OF GYSPSUM BOARD FINISH:

a. All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges.

b. Architect's Finish:

1) Uniformly smooth and ready to receive heavy grade wallcoverings or medium heavy texture finishes (spray or hand applied).

2) Use medium textured finishes where walls and ceilings are scheduled to be painted, unless otherwise noted.

F. GB-5 - Architect's Finish Designation:

1. Level 1 - GYPSUM ASSOCIATION'S LEVEL OF GYSPSUM BOARD FINISH:

a. All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

b. Architect's Finish:

1) No applied texture. Use at areas that are above finished ceilings, in attics, in areas where the assembly would generally be concealed.

G. GB-6 - Architect's Finish Designation:

1. Level 0 - GYPSUM ASSOCIATION'S LEVEL OF GYSPSUM BOARD FINISH:

a. No taping, finishing, or accessories required.

b. Architect's Finish:

2. Intended for "Temporary Partitions" and not for permanent construction. Not suitable for Fire-resistive construction.

H. Non-rated and fire-rated wall signage:

1. Provide identification on both sides of all non-rated, fire-rated, and area separation walls with 3" high stenciled letters above ceiling line and no further than 30' from the adjacent identification symbol. Intersecting walls with different ratings shall be identified 5' from such intersection. All identification symbols shall be visible without the aid of a ladder or other similar devices. Colors listed below are from PPG/ICI's "DEV-GUARD" 4208 Series Industrial Interior Enamel line.

a. **IDENTIFICATION COLOR OF IDENTIFICATION**

b. Non-Rated Wall Semi-Gloss Black

c. 1-HR Fire Wall Fire Red

d. 1-HR Occupancy Separation Wall International Orange

e. 2-HR Fire Wall Safety Blue

f. 2-HR Occupancy Separation Wall Cobalt Blue

g. 2-HR Shaft Wall Safety Green

h. 3-HR Fire Wall Prairie Beige

i. 4-HR Fire Wall Safety Yellow

END OF SECTION

SECTION 09 30 00 - TILE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
1. Provide all material, labor, equipment and services necessary to completely install all tile materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
1. ALL DIVISION 00 SPECIFICATION SECTIONS.
2. ALL DIVISION 01 SPECIFICATION SECTIONS.
3. 06 10 00 ROUGH CARPENTRY
4. 07 92 00 SEALANTS
5. 09 29 00 GYPSUM BOARD
6. 10 21 13 TOILET PARTITIONS
7. 10 28 13 TOILET ACCESSORIES
8. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.

1.2 REFERENCES

A. Standards:
1. In accordance with the following standards:
a. ADAAG Americans with Disabilities Act Accessibilities Guidelines
b. ADAS Americans with Disabilities Act Standards
c. ANSI American National Standards Institute, Specifications for the Installation of Ceramic Tile, latest edition, unless otherwise indicated.
d. FDA Food and Drug Administration
e. TCNA Tile Council of North America "Handbook for Ceramic Tile Installation"

1.3 DEFINITIONS

A. Definitions shall comply with the latest edition of the TCNA "Handbook for Ceramic Tile Installation."
1. MOH's: Relative Measure of Hardness by scratching the surface of the tile with different minerals and subjectively assigning a "MOH's Scale Hardness" number to the glaze.

1.4 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
1. Product Data:
a. For each type of Tile indicated.
b. Manufacturer's full color range (including any standard and premium colors).
c. Design Data for components, fillers, adhesives, etc.
2. Shop Drawings:

a. Location of all movement/expansion joints.

3. Samples:
   a. 12 inch square sample of each color and pattern selected.
   b. 6 inch lineal samples of each piece of trim material specified.
4. Quality Assurance/Control Submittals:
   a. Test Reports:
      1) From Manufacturer that all floor tile complies with the slip resistance standards recommended by the ADAAG/ADAS.
   b. Certificates:
      1) Provide TCNA Master Grade Certificate.
   c. Manufacturer's Written Installation Instructions.
   d. Statement of Installer's Qualifications.
5. Closeout Submittals in accordance with the following:
   a. Maintenance Data in accordance with Specification Section - PROJECT CLOSEOUT.
   b. Warranty in accordance with this specification, and with Specification Section - WARRANTIES.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Material Qualifications:
   a. Tile Grade: Standard Grade in accordance with ANSI A 137.1x.
   b. Tile shall meet the Breaking Strength limits listed in accordance with ASTM C 648 "Test Method for Breaking Strength of Ceramic Tile."
   c. Tile shall meet the Scratch Hardness limits in accordance with MOH's
   d. TCNA Master Grade Certificate signed by tile manufacturer and tile installer.
2. Installer Qualifications:
   a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this Project.

B. Regulatory Requirements:
1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
   a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.
   b. CBC California Building Code (CBC 804.1)

C. Meetings:
1. Pre-Installation: Scheduled by the Contractor prior to the start of work.
   a. Coordinate the work with other work being performed.
   b. Identify any potential problems that may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
   c. Review delivery, storage, and handling procedures.
   d. Review Project Conditions.
   e. Review subfloor preparation procedures.
2. Progress: Scheduled by the Contractor during the performance of the work.
   a. Review for proper installation of work progress.
   b. Identify any installation problems and acceptable corrective measures.
   c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.

a. Inspect and identify any problems that may impede issuance of warranties or guaranties.
b. Maintain installed work until the Notice of Substantial Completion has been executed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packing, shipping, handling, and unloading:
1. Products shall be handled in such a manner as to assure that they are free from dents, chips, scratches and other damage.

B. Acceptance at Site:
1. Products must be in manufacturer's original unopened containers with labels indicating brand name, model, and grade.
2. Damaged products will not be accepted.

C. Storage and protection:
1. Products shall be stored above ground on level platforms, six (6) inches above ground, allowing air circulation under stacked units.
a. Cover materials with protective waterproof covering providing for adequate air circulation and ventilation.

1.7 PROJECT CONDITIONS

A. Environmental requirements:
1. Temperature:
a. Maintain temperature in space to receive ceramic tile above 50 degrees F for 3 days prior, during, and 7 days following installation.

B. Existing Conditions:
1. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
2. Field Measurements:
a. Take and be responsible for field measurements as required.
b. Report any significant differences between field dimensions and drawings to the Architect.

1.8 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
1. In accordance with manufacturer's written standard warranty,
2. Warranty Period shall be for the following:
a. Interior Ceramic Tile One (1) Year.
b. Exterior Ceramic Tile One (1) Year.
c. Quarry Tile One (1) Year.
d. Stone Tile One (1) Year.

e. Glass Tile One (1) Year.

C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES:
a. Warranty period: One (1) Year.

1.9 MAINTENANCE

A. Extra Materials:
1. Maintenance Material:
a. In accordance with Specification Section - PROJECT CLOSEOUT.
b. Supply 2 square feet of tile and 3 lineal feet of trim for each color and pattern of tile

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Interior Ceramic Tile manufacturer:
a. DALTILE.
b. Acceptable alternative manufacturers:
1) CROSSVILLE CERAMICS.
2) INTERCERAMIC.
2. Grout Materials manufacturer:
a. MAPEI.
b. Acceptable alternative manufacturers:
1) CUSTOM BUILDING PRODUCTS, INC.
2) LATICRETE.
3. Mortar Materials manufacturer:
a. MAPEI.
b. Acceptable alternative manufacturers:
1) CUSTOM BUILDING PRODUCTS, INC.
2) LATICRETE.
4. Admixture manufacturer:
a. MAPEI "Plancrete AC."
5. Membranes manufacturer:
a. THE NOBLE COMPANY.
b. Acceptable alternative manufacturers:
1) DALTILE.
2) INTERCERAMIC
6. Cementitious Backer Units manufacturer:
a. USG CORPORATION "DUROCK Cement Board"
b. Acceptable alternative manufacturers:
1) C-CURE "C-Cure Board 990"

2) CUSTOM BUILDING PRODUCTS "Wonderboard"
3) FINPAN, INC. "Util-A-Crete Concrete Backer Board"

7. Sealer manufacturer:
   a. CUSTOM BUILDING PRODUCTS Tile Lab "Surface Gard Penetrating Sealer"
      1) Acceptable alternative manufacturers:
         a) C-CURE "Penetrating Sealer #978"

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. General:
   1. Slip Resistance:
      a. Level Surfaces:
         1) Static Coefficient of Friction (SCOF): Tile installed on level walkway surfaces shall be slip resistant by achieving a minimum 0.6 or greater static coefficient of friction as recommended in Appendix A4.5 of the ADAAG by testing per ASTM C 1028 "Test method for Static Coefficient of Friction of Ceramic Tile and Like Surfaces by the Horizontal Dynometer Pull Meter Method."
         2) Dynamic Coefficient of Friction (DCOF): Tile installed on level walkway surfaces shall be slip resistant by achieving a minimum 0.42 or greater dynamic coefficient of friction as recommended in ADAS per TCNA technical bulletin "Coefficient of Friction and the DCOF AcuTest," by testing per ANSI A 137.1 "American National Standard Specifications for Ceramic Tile," section 9.6 "Procedure for Dynamic Coefficient of Friction (DCOF) Testing."
   2. Colors and patterns shall be selected from manufacturer's standard line (including premium), except as noted otherwise.

B. Ceramic:
   1. Interior Floor Tile **CT-1.**
      a. Manufacturer: DALTILE.
         1) "Keystones" unglazed mosaics, Groups 1,2,3,4 and S.
         2) Trim to match.
            a) Tile Trim Units: Provide tile trim units (i.e. "bullnoses," "thin-set bullnoses," "coves," "thin-lip bases," "round top bases," "beads," and "countertop edge trims" as is appropriate to tile types) to match characteristics of adjoining flat tile.
      b. Design: 2" x 2" x 1/4" thick.
      c. Pattern: Any combination thereof of the sizes listed above, to be back/edge mounted on manufacturers strong, flexible 2' x 1' sheets.
      d. Grout joint width: 1/8".
      e. Color: Shall be selected in any combination thereof from manufacturer's full range of color.
      f. Material: Unglazed Porcelain Ceramic Mosaics.
         1) Water Absorption: less than 0.5 percent.
         2) Breaking Strength: greater than 364 lbs.
         3) Chemical Resistance: Resistant.
         4) Bond Strength: greater than 65 psi.
         5) Coefficient of Friction: greater than or equal to 0.60.

2. Interior Wall Tile: **CT-2.**
   a. Manufacturer: DALTILE.
      1) Color Wheel Classics Collection, Group 1 .
      2) Trim to match.
         a) Tile Trim Units: Provide tile trim units (i.e. "bullnoses", "thin-set bullnoses," "coves," "thin-lip bases," "round top bases," "beads," and "countertop edge trims" as is appropriate to tile types) to match characteristics of adjoining flat tile.
   b. Design: 3" x 6" x 5/16" thick.
   c. Pattern: Single size tile pattern.
   d. Grout joint width: 1/16".
   e. Color: Shall be selected in any combination thereof from manufacturer's full range of colors.
   f. Material: Interior Glazed Ceramic.
      1) Water Absorption: less than 16.0 percent.
      2) Scratch Hardness: 4.
      3) Chemical Resistance: Resistant.
   g. Base:
      1) 3" x 6" coved based including inside and outside corner trims.
      2) Pattern to match wall tile.
3. Interior "Accent" Wall Tile: **CT-3.**
   a. Manufacturer: DALTILE.
      1) Color Wheel Classics Collection, Group 2.
      2) Trim to match.
         a) Tile Trim Units: Provide tile trim units (i.e. "bullnoses", "thin-set bullnoses," "coves," "thin-lip bases," "round top bases," "beads," and "countertop edge trims" as is appropriate to tile types) to match characteristics of adjoining flat tile.
   b. Design: 3" x 6" x 5/16" thick.
   c. Pattern: Single size tile pattern.
      1) Grout joint width: 1/16".
   d. Color: Shall be selected in any combination thereof from manufacturer's full range of colors.
   e. Material: Interior Glazed Ceramic.
      1) Water Absorption: less than 16.0 percent.
      2) Scratch Hardness: 4.
      3) Chemical Resistance: Resistant.

C. Setting Bed:
   1. Thick-Set:
      a. Portland Cement: In accordance with ASTM C 150 " Specification for Portland Cement• ," Type 1.
      b. Sand (Aggregate): In accordance with ASTM C 144 " Standard Specification for Aggregate for Masonry Mortar."
      c. Hydrated Lime: In accordance with ASTM C 207 "Specification for Hydrated Lime for Masonry Purposes.," Type S.
      d. Admixture: Shall be Mortar Latex Admix "Planicrete AC" as manufactured by MAPEI, or approved equivalent.
         1) This Admixture serves as a replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
   2. Thin-Set:
      a. Dry-Set Portland Cement Mortar: In accordance with ANSI A 118.1-1999.

1) Shall be "Kerabond" by MAPEI, or approved equivalent for floor and wall surfaces.
   a) For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

b. Modified Dry-Set Cement Mortar: In accordance with A118.4TE, A118.15TE and A118.11
   1) Shall be "Large Floor Tile Mortar" by MAPEI, or approved equivalent.
      a) Approved Equivalent: 'ProLite Premium Large Format Tile Mortar' by CUSTOM BUILDING PRODUCTS.
   2) For floor applications in which the long edge of tile exceeds 8" (large format tiles).

c. Latex-Portland Cement Mortar: In accordance with ANSI A 118.4-1999.
   1) Shall be "Keralastic" + "Kerabond" by MAPEI, or approved equivalent for floor and wall masonry or floor and wall concrete surfaces.
      a) For wall applications, provide non-sagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.

D. Grout:
1. Cement:
   a. ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.
2. Commercial Cement:
   a. ANSI A118.6, composed of Standard Sanded Cement Grout, color as indicated.
3. Silicone-Rubber:
   a. One-part, chemically curing, silicone-rubber-based elastomeric sealants used for factory-grouted joints within pre-grouted sheets of glazed wall tile and for field-grouted joints between the same pre-grouted sheet
      1) Silicone-Rubber grout shall not be used on kitchen countertops or other food preparation surfaces unless it meets the requirements of FDA Regulation No. 21, CFE 177.2600.
4. Dry-Set:
   a. ANSI A 108.5-1999 and ANSI A 118.1-1999, a mixture of Portland Cement with sand and additives, color as indicated.
5. Epoxy:
   a. ANSI A118.3-1999, Chemical-Resistant, Water-Cleanable, Ceramic Tile-Setting and Grouting Epoxy, color as indicated.

2.3 ACCESSORIES

A. Membranes:
1. Wall:
   a. Polyethylene, 4 mil sheet with 6 inch laps at wet areas.
   b. Polyethylene, 6 mil sheet with 6 inch laps at shower areas adjacent to concrete or masonry wall areas.
2. Floor:
   a. Mortar bed: Nonplasticized, chlorinated polyethylene sheet faced on both sides with nonwoven polyester fabric; 0.040 inch nominal thickness, water vapor transmission rate 0.040 perms per ASTM E 96 "Test Methods for Water Transmission of Materials," Procedure E.
      1) "Chloraloy" by THE NOBLE COMPANY.

b. Thin-Set: Nonplasticized, chlorinated polyethylene sheet faced on both sides with nonwoven polyester fabric; 0.030 inch nominal thickness, water vapor transmission rate 0.15 perms per ASTM E 96 "Test Methods for Water Transmission of Materials," Procedure E.
   1) "Nobleseal TS" by THE NOBLE COMPANY.
   2) Approved equivalent: "Dal-Seal CIS" by DALTILE over a skim coat of "Keralastic" + "Kerabond" by MAPEI.

B. Cementitious Backer Units:
   1. Provide cementitious backer units complying with ANSI A118.9-1999, in maximum lengths available to minimize end-to-end butt joints.
      a. Thickness: Manufacturer's standard thickness, but not less than 1/2 inch unless otherwise noted.
      b. Width: Manufacturer's standard width, but not less than 32 inches, unless otherwise noted.

C. Miscellaneous Materials:
   1. Provide miscellaneous guides, shims, spacers, rust resistant fasteners, etc., applicable to substrates and finish materials necessary for flat and true surfaces that minimize cracks, bulges and uneven surfaces.

D. Cleaners:
   1. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Sealers:
   1. Grout and Tile Sealer: Manufacturer's standard product for sealing grout joints and tile surfaces that does not change color or appearance of grout or tile.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
   2. Verify that concrete substrates for tile floors comply with surface finish requirements in ANSI A108.01 for installations indicated.
      a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
      b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
   3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
   4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.

C. Execution of work under this specification section shall constitute acceptance of existing conditions.

3.2 PREPARATION

A. Coordination:
   1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.
   2. Prior to installation of Tile, inspect the installed work executed under other Sections which affect the installation of Tile.
      a. Prepare masonry surfaces with a parge coat and cure so that all surfaces are flat prior to the installation of tile.

B. Protection:
   1. Protect all adjacent surfaces from drips, spray, air pollution of surrounding environment, and other damage from work under this specification section.

C. Surface preparation:
   1. Prepare surface in accordance with manufacturer's written instructions and recommendations.
   2. Clean substrates of substances (oil, grease, rolling compounds, incompatible primers, loose mill scale, etc.) which could impair bond of materials specified within this section.
   3. Fill cracks, holes, and depressions in concrete substrates for tile floors with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
   4. Maximum backing surface variations shall be as follows:
      a. Mortar Bed at Floors: 1/4 inch in 10 feet from required plane.

D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION

A. General:
   1. In accordance with manufacturer's written instructions and recommendations unless specifically noted otherwise.
   2. In accordance with approved submittals.
   3. In accordance with Regulatory Requirements.
   4. Set plumb, level, and square.
   5. Determine location of all movement/expansion joints before starting tile work.
   6. Install Cementitious Backer Units in accordance with Cementitious Backer Unit Board Manufacturer's recommendations.
      a. Shim Cementitious Backer Unit Boards as required for a flat and true surface plane with no bulges or uneven or flared surfaces.
      b. Set shims at fasteners.
      c. Fasten with corrosion resistant, waferhead, self-drilling screws with countersinking ribs, min. 8 gauge. Set flush with Board's surface. Fasten thru shims.

7. Determine location of all toilet accessories before starting tile work.

B. Layout:
1. Lines shall be straight and true.
2. Refer to Wall and Floor Pattern Drawing(s) in the Interior and Exterior Color Schedules for layout of patterns.
3. Lay out all tile work to minimize cuts less than one-half in size.
4. Lay out tile wainscots to next full tile beyond dimension shown.

C. Joints
1. General: Movement/Expansion Joints shall be placed in accordance with the TCNA recommendations for placement.
2. Align all wall joints to give straight uniform grout lines, plumb and level.
3. Align all floor joints to give straight uniform grout lines, parallel with walls.
4. All joints shall be uniform in width.
5. Locate expansion joints in the tilework:
   a. Over construction or expansion joints in the backing.
   b. Where backing materials change or change directions.
   c. At wall/floor intersections.
   d. Exterior work:
      1) Not more than 8 - 12 feet in each direction.
   e. Interior work:
      1) Not more than 20 - 25 feet in each direction.
         a) Interior tilework exposed to direct sunlight or moisture: 8 to 12 feet in each direction.
         b) Above ground concrete slab substrate: 8 to 12 feet in each direction.
6. Movement/expansion joint width sizes:
   a. Working Butt Joints 1/4 inch minimum.
   b. Working Lap Joints 1/8 inch minimum.

D. Flatness and Lippage:
1. Maximum lippage between adjacent units: 1/32 inch.

E. Tile System Installations:

1. Interior Floor:
   a. System IFA: Concrete Sub-Floor, thin-set installation: **SYS-IFA.**
      1) Use: Dry or Limited water exposure.
      2) Method: Dry-set Mortar or Latex-Portland Cement Mortar.
      3) Detail Standard: TCNA F113-, 3/32" thin-set Dry-set or Latex-Portland Cement Mortar, Bond Coat, Tile, Grout.
      4) Installation Standard:
         a) Tile: ANSI A 108.5.
         b) Grout: ANSI A 108.10.
   b. System IFB: Concrete Sub-Floor, mortar bed installation **SYS-IFB.**
      1) Use: Dry or Wet (Kitchens and Toilets).
      2) Method: Cement Mortar.
      3) Detail Standard: TCNA F114 - Cleavage Membrane, Reinforcing, 1-1/4" to 2"- Mortar Bed, Bond Coat, Tile, Epoxy Grout.
      4) Flush Grout with tile surface at kitchen floors only.
      5) Installation Standard:
         a) Tile: ANSI A 108.1B.
         b) Epoxy Grout: ANSI A 108.6.

c. System IFC: Concrete Sub-Floor, shower receptor mortar bed installation: **SYS-IFC.**
   1) Use: Wet Exposure (Showers).
   2) Method: Cement Mortar.
   3) Detail Standard: TCNA B414 - Tile or Stone, Shower Membrane, 1" to 1-3/4" Reinforced Mortar Bed, Bond Coat Tile, Grout.
   4) Installation Standard:
      a) Tile: ANSI A 108.1B.
      b) Grout: ANSI A 108.10.
      c) Shower Pan Membrane ANSI A108.01-3.6

d. System IFD: Concrete Sub-Floor, Cementitious Backer Installation **SYS-IFD**.
   1) Use: Wet Exposure (Showers).
   2) Method: Latex Portland Cement Mortar.
   3) Detail Standard: TCNA B 415 – shower floor membrane, cementitous backer unit over Wood or Metal studs or fiber cement underlayment, reinforced mortar bed, tile.
   4) Installation Standard:
      a) Tile: ANSI A 108.5.
      b) Grout: ANSI A 108.10.
      c) Shower Pan Membrane ANSI A108.01-3.6.

2. Interior Wall:

a. System IWA: Masonry or Concrete Walls, thin-set installation **SYS-IWA**.
   1) Use: Dry or Limited Water Exposure (Toilets).
   2) Method: Cement Mortar.
   3) Detail Standard: TCNA W202I - 3/32" Thin-Set Mortar Bed Bond Coat, Tile, Epoxy Grout.
   4) Installation Standard:
      a) Tile ANSI A 108.5.
      b) Epoxy Grout ANSI A 108.6.

b. System IWB: Masonry or Concrete Walls, mortar bed installation **SYS-IWB.**
   1) Use: Dry or Limited Water Exposure (Toilets).
   2) Method: Cement Mortar, Bonded.
   3) Detail Standard: TCNA W211 - 3/8" to 3/4" Mortar Bed, Bond Coat, Tile, Grout.
   4) Installation Standard:
      a) Tile ANSI A 108.1A, 1B, or 1C.
      b) Grout ANSI A 108.10.

c. System IWC: Masonry or Concrete Walls, Mortar bed installation **SYS-IWC.**
   1) Use: Wet Exposure (Showers)
   2) Method: Cement Mortar.
   3) Detail Standard: TCNA W221 - Membrane, Metal Lath, 3/4" to 1 1/2" Scratch Coat and Epoxy Mortar Bed, Bond Coat, Tile, Epoxy Grout.
   4) Installation Standard:
      a) Tile ANSI A 108.1B.
      b) Epoxy Grout ANSI A 108.6.
      c) Waterproof membrane ANSI A108.13.

d. System IWD: Gypsum Board Wall, thin-set installation **SYS-IWD**.
   1) Use: Dry Exposure.
   2) Method: Dry-Set or Latex-Portland Cement Mortar.
   3) Detail Standard: TCNA W243 - Water Resistant Gypsum Board, 3/32" Thin-Set Dry-Set or Latex-Portland Cement Mortar, Bond Coat, Tile, Grout.
   4) Installation Standard:

a) Tile ANSI A 108.5.
b) Grout ANSI A 108.10.

e. System IWE: Wood Stud Walls, mortar bed installation **SYS-IWE.**
1) Use: Dry or Wet Exposures (Kitchen, Toilets and Showers).
2) Method: Cement Mortar.
3) Detail Standard: TCNA W231 - Cleavage Membrane, Metal Lath, 3/4" to 1-1/2" Scratch Coat and Mortar Bed, Bond Coat, Tile, Grout.
4) Installation Standard:
a) Tile ANSI A 108.1B.
b) Grout ANSI A 108.10.
c) Waterproof membrane ANSI A108.13.

f. System IWF: Metal Stud Walls, mortar bed installation **SYS-IWF**.
1) Use: Dry or Wet Exposure (Kitchen, Toilets and Showers).
2) Method: Cement Mortar.
3) Detail Standard: TCNA W241 - Cleavage Membrane, Metal Lath, 3/4" to 1" Scratch Coat and Mortar Bed, Bond Coat, Tile, Grout.
4) Installation Standard:
a) Waterproof membrane ANSI A108.13.
b) Cured Mortar Bed.
c) Tile ANSI A 108.1B.
d) Grout ANSI A 108.10.

3. Exterior Wall:

a. System EWA: Masonry or Concrete Walls, 3/4" to 1" mortar bed installation **SYS-EWA.**
1) Use: Dry or Wet Exposure.
2) Method: Cement Mortar.
3) Detail Standard: TCNA W201 - Wall Membrane, Metal Lath, 3/4" To 1" Scratch Coat/Mortar Bed, Bond Coat, Tile, Grout.
4) Installation Standard:
a) Waterproof Membrane ANSI A108.13.
b) Tile ANSI A 108.1B.
c) Grout ANSI A 108.10.

b. System EWB: Solid Backing Walls, 3/8" to 3/4" reinforced mortar bed **SYS-EWB**.
1) Use: Dry or Wet Exposure.
2) Method: Cement Mortar.
3) Detail Standard: TCNA W221 - Wall Membrane, Metal Lath, 3/8" To 3/4" Scratch Coat/Mortar Bed, Bond Coat, Tile, Grout.
4) Installation Standard:
a) Waterproof Membrane ANSI A108.13.
b) Tile ANSI A 108.1A, 1B, or 1C A108.1B is required if waterproof membrane or epoxy bond coat is to be used.
c) Grout ANSI A 108.10.

c. System EWC: Metal Stud Walls, 3/4" to 1" mortar bed, exterior walls **SYS-EWC**.
1) Use: Dry or Wet Exposure.
2) Method: Cement Mortar.
3) Detail Standard: TCNA W241 - Wall Membrane, Metal Lath, 3/4" To 1" Scratch Coat/Mortar Bed.
a) At exterior Tile locations include: Bond Coat, Tile, Grout.
4) Installation Standard:
a) Waterproof Membrane ANSI A108.13.

b) Tile ANSI A 108.1A, 1B, or 1C A108.1B is required if waterproof membrane or epoxy bond coat is to be used.
c) Grout ANSI A 108.10.

4. Sealer Application:
   a. For tile and grout sealers, follow manufacturer's written recommendations and procedures, at application rates recommended by the label on the material container.
   b. Apply penetrating grout sealer and cure in accordance with tile manufacturer's written recommendations for the resistance of moisture penetration into the grout surface.
   c. For Stone Tile and Stone Grout sealers, apply at a rate of 500 to 1,500 sq. ft. per coat per gallon, depending on type of stone (slate), porosity and texture of the surface, temperature, humidity and method of application.
   d. For exterior Stone Tile applications, provide two coats of sealer per manufacturer's written recommended rate of application, allowing the proper time between coats for curing (30 minutes) as recommended by the manufacturer.
      1) Protect newly coated surface from traffic and moisture for a period of twelve hours.

F. Curing:
1. Apply Curing Sheet over all tiled surfaces.
   a. Lap sheets 4 inches minimum and seal against escape of moisture.
   b. Leave Curing Sheets in place a minimum of 3 days.

3.4 CLEANING

A. Clean in accordance with Specification Section - PROJECT CLOSEOUT.
1. Clean any soiled surfaces immediately.
2. Finish shall be clean and ready for the application of any additional finishes.
3. In accordance with manufacturer's written instructions and recommendations.
4. Wash down cured tile work with cleaner mixed and applied in accordance with manufacturer's written instructions.
5. Rinse tile-work thoroughly, with clean water, and polish with soft-cloth.

3.5 PROTECTION

A. Protection from weather:
1. Protect newly installed work from freezing for 24 hours after erection, installation or application.

B. Protection from traffic:
1. Prohibit all foot and wheel traffic from using newly tiled floor for at least 3 days.
2. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, which ensures the work of this section being without damage or deterioration until the time of Substantial Completion.

END OF SECTION

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to furnish and install Painting, accessories and other related items necessary to complete the Project as indicated by the Contract Documents unless specifically excluded.
      a. Material and Equipment to be Painted: Paint all piping, unwrapped ductwork, electric conduits exposed to view. Prime and paint all factory finished mechanical and electrical equipment and accessories exposed to view.
      b. Material and Equipment not to be Painted: Do not paint piping, ductwork, equipment and machinery located in attic spaces, above furred or suspended ceilings, in furred pipe or duct spaces. Do not paint factory finished equipment or machinery located in mechanical rooms or mechanical buildings, attics, furred or suspended ceilings.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS.
   2. ALL DIVISION 01 SPECIFICATION SECTIONS.
   3. 07 92 00 SEALANTS
   4. 09 29 00 GYPSUM BOARD
   5. 10 21 13 TOILET PARTITIONS
   6. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.

1.2 REFERENCES

A. Standards:
   1. In accordance with the following standards:
      a. CA-CHPS California High Performance Schools
         1) 2011-CA-CHPS Addendum.
      b. MPI Master Painters Institute
         1) MPI - Architectural Painting Specification Manual.
         2) MPI – Maintenance Repainting Manual.
            a) MPI RSP Master Painters Institute Repaint Surface Preparation Standards, Chapter 6, Section 2.
         3) MPI – Glossary.
      c. PDCA Painting and Decorating Contractors of America, latest edition of the Architectural Specification Manual, as prepared by Specification Services, Inc., Washington State Council of the PDCA.

1.3 DEFINITIONS

A. The following definitions are just some of the more important definitions used within this section, and were taken from the MPI Glossary Manual, or used to simplify language used by the Architect. These definitions and others stated within the Manual apply for this Specification Section.

1. Acrylic Latex An aqueous dispersion of acrylic resins.
2. Acrylic Resin A/R - Synthetic resins made by polymerizing esters of acrylic acid.
3. A/U Aliphatic Urethane
4. A/A/U Aliphatic Acrylic Urethane
5. Blocking Sticking or bonding together of two painted surfaces that are in direct contact. Most often caused by stacking painted articles before dry or reaching a "block free" (or "non-blocking") stage.
6. DFT Dry Film Thickness – the depth or thickness of a coating in the dry state. Expressed in mils (1/1000 inch) or microns.
7. DRY FALL A Fog Paint designed to be applied by spray and dries fast enough that the overspray will be a dry powder after falling a certain distance. The dust can then be swept or vacuumed up.
8. ODFT "Overall Dry Film Thickness" – the depth or thickness of a complete coating system in the dry state. Expressed in mils (1/1000 inch) or microns.

1.4 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
   1. Product Data.
      a. Submit manufacturer's full color range (including any standard, premium and custom colors) for selection by the Architect.
      b. Material Safety Data Sheets will be turned over to the Owner in compliance with local rules and regulations, but will not be reviewed.
      c. Materials Lists:
         1) Format in accordance with Article in this section titled "Paint Finish Schedule".
      d. Additional submittals to substantiate proposed equivalent systems.
   2. Samples.
      a. Brushouts: In accordance with Specification Section - SUBMITTAL PROCEDURES.
      b. For each color and finish selected provide paint brushouts showing color tint graduation of each coat to and including the final color coat.
         1) Selected colors and finishes:
            a) Size: 8 1/2" x 11" boards.
            b) Quantity: 3 boards of each color and finish.
            c) Board material wherever possible and for transparent finishes shall be same as material to be finished. Opaque finishes may be on heavy card stock.
   3. Closeout Submittals in accordance with the following:
      a. Maintenance Data in accordance with Specification Section - PROJECT CLOSEOUT.
      b. Project Documents in accordance with Specification Section - PROJECT DOCUMENTS.
      c. Warranty in accordance with Specification Section - WARRANTIES.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Material Qualifications:
      a. Where possible (except for specified materials), paint materials shall be products of only one manufacturer.

b. All materials, preparation and workmanship shall conform to requirements of the specified edition of the Architectural Painting Specification Manual by the Master Painters Institute (hereafter referred to as the MPI Painting Manual), unless otherwise indicated.

c. Flame Spread Ratings in accordance with ASTM E 84 "Standard Test Method for Surface Burning Characteristics of Building Materials":
   1) Paint finishes in required exit stairways, corridors and exitways must meet flame spread ratings as required by regulatory agencies.
   2) Class A - Tunnel Test 0-25 for enclosed required exit stairways and other exit ways.
   3) No interior paint or wall finish will be permitted having a tunnel test in excess of 200. All paint materials must be certified that materials meet these requirements.

d. Manufacturer's Written Instructions - One for the Architect, Contractor and the Owner:
   1) Submit three (3) copies of manufacturer's written instructions.

e. Compatibility:
   1) Paint materials and equipment shall be compatible in use.
   2) Finish coats shall be compatible with prime coat.
   3) Prime coats shall be compatible with surface to be coated.
   4) Tools and materials shall be compatible with coating to be applied.

f. Air Quality:
   1) Paint materials and equipment used for application will comply with CARB Air Quality Control Standards in effect at the Project Site and at the time of application.

2. Installer Qualifications:
   a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this Project.
      1) Only qualified journeypersons, as defined by local jurisdiction, shall be engaged in painting and decorating work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyperson in accordance with trade regulations.

3. Manufacturer/Supplier Qualifications:
   a. Firm experienced in successfully producing/supplying products similar to that indicated for this Project, with sufficient production/supply capacity to produce/supply required units without causing delay in the work.

B. Regulatory Requirements:
   1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
      a. CAL/OSHA California/Occupational Safety and Health Act
      b. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.
      c. CBC California Building Code (CBC 803.1.1)

C. Mockups: Provide a full-coat benchmark finish sample for each type of coating and substrate required for Architect's review. Duplicate finish of approved sample Submittals.
   1. Wall Finishes shall be at least 100 sq. ft., suitably marked "MOCKUPS" and protected for the duration of the construction Project.
   2. Small areas and items can be selected by the Contractor, suitably marked "MOCKUPS" and protected for the duration of the construction Project.

3. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
4. Approved mockups (wall areas and small areas or items) may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Meetings:
1. Pre-Installation: Scheduled by the Contractor prior to the start of work.
   a. Coordinate the work with all other related work.
   b. Identify any potential problems that may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.
2. Progress: Scheduled by the Contractor during the performance of the work.
   a. Review for proper installation of work progress.
   b. Identify any installation problems and acceptable corrective measures.
   c. Identify any measures to maintain or regain project schedule if necessary.
3. Completion: Scheduled by the Contractor upon proper completion of the work.
   a. Inspect and identify any problems that may impede issuance of warranties and guaranties.
   b. Maintain installed work until the Notice of Substantial Completion has been executed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site:
1. Products must be in manufacturer's original unopened containers with labels indicating brand name, model, and grade.
2. Damaged products will not be accepted.

B. Storage and protection:
1. Products shall be stored above ground on level platforms, six (6) inches above ground, allowing air circulation under stacked units, in a locked, clean and neat, well ventilated area.
   a. All receiving, opening and mixing shall be done in this area.
   b. Oily rags and waste shall be removed from area each night and all other precautions shall be taken to avoid danger of fire.
   c. Empty containers shall not be removed from site, unless otherwise approved by the Architect.
   d. Cover materials with protective waterproof covering providing for adequate air circulation and ventilation.

1.7 PROJECT CONDITIONS

A. Environmental requirements:
1. Rain or Fog:
   a. No work under this section shall be started or maintained under threat of rain.
   b. Surfaces shall be painted only when they are free from moisture.
   c. No painting of exterior surfaces shall be done less than 72 hours of actual drying weather after a rain or during periods of dew or fog.
   d. Perform no painting or decorating work when the maximum moisture content of the substrate exceeds:
      1) 12 percent for concrete and masonry (clay and concrete brick / block).
      2) 15 percent for wood.

3) 12 percent for plaster and gypsum board.

e. Perform no painting or decorating work when the relative humidity is above 85 percent or when the dew point is less than 5 degrees F variance between the air / substrate temperature.

2. Temperature: No painting shall be done when ambient air and substrate temperatures are below 50 degrees F.
3. Alkalinity: An alkali level of between 7.0 and 8.5 pH is suitable for painting. Any reading above that level, then the surface shall be neutralized as required for the surface to be painted.
   a. Methods shall be consistent with MPI - Architectural Painting Specification Manual, and shall not result in any adverse condition causing inadequate adhesion, improper curing and drying, or durability of paint system.
4. No exterior painting shall be done during winds or dusty conditions.
5. Perform no exterior painting and decorating work unless environmental conditions are within MPI and paint manufacturer's requirements or until adequate weather protection is provided.
   a. Where required to meet project schedules, suitable weatherproof covering and sufficient heating facilities shall be in place to maintain minimum ambient air and substrate temperatures for 24 hours before, during and after paint application.
6. Perform no interior painting or decorating work unless adequate continuous ventilation and sufficient heating facilities are in place to maintain minimum ambient air and substrate temperatures above minimum requirements for 24 hours before, during and after paint application.
   a. Where required to meet project schedules, provide supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

B. Existing Conditions:
1. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
2. Concrete and masonry surfaces shall be installed at least 28 days prior to painting and decorating work and shall be visually dry on both sides.
3. Conduct all moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple cover patch test.
4. Test concrete, masonry and plaster surfaces for alkalinity as required.
5. Contractor shall provide a minimum lighting level of 323 Lux (30 foot candles) on surfaces to be painted or decorated.

1.8 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.
   a. Original adherence of all materials and no evidence of any surface defect shall be maintained during warranty period.
   b. Color at end of warranty period shall remain free from serious fading and any discernible variations shall be uniform.

B. Manufacturer's Warranty:
1. In accordance with manufacturer's written standard warranty:

2. Provide Paint Manufacturer's special ten (10) year Material Warranty co-endorsed by the installer for exterior paint application of cement plaster surfaces.
   a. Warranty period: Ten (10) Years.
3. Provide Water-Repellent Manufacturer's special Weatherproofing Warranty co-endorsed by the installer for exterior sealer application of concrete or concrete block surfaces.
   a. Warranty period: Ten (10) Years.

C. Installer's Warranty:
1. Paint Installer's Warranty:
   a. Installer will certify that a Paint Manufacturer's Representative tested the substrate according to Paint Manufacturer's standard procedures and have submitted project information and test patch forms.
   b. Installer shall certify that Paint Manufacturer's products were installed on the structure in accordance with manufacturer's specification requirements.
   c. Installer further agrees that if installer fails to fulfill their obligation under this certification statement within 30 days notice of the complaint, Paint Manufacturer may proceed with the investigation and repairs and shall pay the entire material cost, providing it wasn't the installer's responsibility.
2. Water-Repellent Installer's Warranty:
   a. Warranty period: Two (2) Years.
   b. Installer will certify that a Water-Repellent Manufacturer's Representative tested the substrate according to Water-Repellent Manufacturer's standard procedures and have submitted project information and test patch forms.
   c. Installer shall certify that Water-Repellent Manufacturer's products were installed on the structure in accordance with manufacturer's specification requirements.
   d. Installer agrees:
      1) Investigate all complaints of leakage and/or water absorption on surfaces to which Water-Repellent Manufacturer's weatherproofing products were applied and provide a written report of the cause to Water-Repellent Manufacturer within thirty (30) days of the complaint.
      2) Re-apply Water-Repellent Manufacturer's weatherproofing products according to Water-Repellent Manufacturer's standard procedures at installer's cost for labor and material if the leakage and/or water absorption is due to improper surface preparation, application and/or improper use of material.
      3) Request authority from Water-Repellent Manufacturer to re-apply Water-Repellent Manufacturer's weatherproofing products at Water-Repellent Manufacturer's expense to areas, which were not rendered hydrophobic due to imperfect weatherproofing materials.
   e. Installer further agrees that if installer fails to fulfill their obligation under this certification statement within 30 days notice of the complaint, Water-Repellant Manufacturer may proceed with the investigation and repairs and shall pay the entire cost, providing it wasn't the installer's responsibility.

1.9 MAINTENANCE

A. Extra Materials:
1. Quantity: 10 percent of quantity needed to paint Project, but not to exceed one gallon, of each type and color of finish coat used.
2. Identification: At project completion, provide an itemized list complete with manufacturer, paint type and color coding for all colors used, and locations within the Project for Owner's later use in maintenance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
   1. Specified paint coating product manufacturer, or approved equivalent:
      a. PPG PAINTS.
         1) Composed of the following companies: AMERITONE PAINT, DECRATREND, DEFT, DEVOE COATINGS, DEVOE PAINT, FLOOD WOOD CARE, FULLER O'BRIEN, GLIDDEN, and SINCLAIR PAINT.
      b. Also specified: GEMINI and MONOPOLE.
      c. Acceptable alternative manufacturers:
         1) DUNN EDWARDS, KELLY MOORE PAINTS, SHERWIN WILLIAMS, BENJAMIN MOORE and VISTA PAINT. Submittals by these manufacturers, subject to specification requirements, must be in accordance with Section - SUBMITTAL PROCEDURES.
            a) Paint material quality and systems shall be equal to numbers and systems listed in Paint Finish Schedule at the end of this section.
            b) If submitted paint numbers differ from Darden Architects, Inc. Paint Equivalency List, additionally submit explanation of difference and certification letter from the installer attesting that the different product is equal to or better than specified; i.e. equivalent or better percentage of solids, system ODFT, and VOC compliant. Paint Equivalency List published by Darden Architects, Inc. is available only for this project at written request.
   2. Specified water-borne Alkyltrialkoxy Silane water repellent product manufacturer, or approved equivalent:
      a. EVONIK DEGUSSA CORPORATION.
   3. Specified Graffiti coating manufacturer, or approved equivalent:
      a. Sacrificial:
         1) VISUAL POLLUTION TECH, INC.
      b. Non-sacrificial:
         1) BASF HYDROZO.
         2) EVONIK DEGUSSA CORPORATION.
         3) THIS STUFF WORKS - TSW
   4. Specified Intumescent Paint Manufacturer, or approved equivalent:
      a. ISOLATEK INTERNATIONAL
   5. Specified High Gloss Epoxy Pool Paint and Primer Manufacturer, or approved equivalent:
      a. RAMUC.

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   1. Shop Primers or Coil-Coated Primers: It shall be assumed that all Shop Primed or Coil-Coated primed metals do not meet the requirements for primer material and mil thickness as defined herein. As such, all Shop Primed or Coil-Coated primed metals shall be field primed as indicated in the schedule.

B. Material Quality: Provide manufacturer's best-quality coating material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
   1. All materials used shall be lead and mercury free and shall have low VOC content to meet the applicable CARB standards in the area where the Project is located.
   2. All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes, sags, air entrapment, etc.
   3. All Water-Repellant Coatings shall comply with the following:
      a. Provide Alkyltrialkoxy Silane combination with a ratio concentration and application procedure as recommended by the manufacturer with the ability to cover in one or more applications for a ten year warranty in accordance with the following substrates:
         1) Thin Brick.
         2) Concrete.
         3) Concrete Masonry Units
         4) Split-Faced Concrete Masonry Units.
      b. Color: Clear.
      c. Active Substance: Alkyltrialkoxy Silane.
      d. Active Content: 100 percent.
      e. Solvent: Water.
      f. Flash Point (Concentrate): 93 degrees F.
      g. Flash Point (Mixed): 200 degrees F.
      h. Density: 7.77 lbs./gallon.
      i. VOC (19:1): 50 g/liter (Maximum).
      j. VOC (9:1): 100 g/liter (Maximum).
      k. VOC (6:1): 200 g/liter (Maximum).
   4. All Bituminous Paint:
      a. Shall comply with Cold-Applied Asphalt-Mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos, formulated for 30-mil thickness per coat.

2.3 MIXES

A. Mixing and Tinting:
   1. Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted at the factory. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.
   2. Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

3. Where thinner is used, addition shall not exceed paint manufacturer's written recommendations.
4. Do not use kerosene or any such organic solvents to thin water-based paints.
5. Thin paint for spraying in strict accordance with paint manufacturer's written instructions. If directions are not on the container, obtain instructions in writing from the manufacturer and provide one copy of instructions to the Project Inspector.

2.4 FINISHES

A. Finish Colors:
1. Unless otherwise specified herein, all painting work shall be in accordance with MPI Premium Grade finish requirements as a minimum.
2. Determined by Architect prior to or as work progresses.
   a. Colors to be selected from paint manufacturer's full color systems, including standard, premium and custom colors.
3. When deep or 'Ultra colors' are selected, submit to Architect proposed revision to specified system product numbers, according to manufacturer's written recommendations.
   a. When deep or ultra colors are selected for use on walls or special color treatments such as graphics or many color changes are desired, the areas and extent of use will be clarified upon request of the Contractor.
4. Gloss standards, in accordance with MPI standards, using the ASTM D 523 "Test for Specular Gloss", are as follows:

Gloss Level	**Description**	**Units at 60 degrees**	**Units at 85 degrees**
G1	Matte or Flat Finish	0 to 5	10 max.
G2	Velvet Finish	0 to 10	10 to 35
G3	Eggshell Finish	10 to 25	10 to 35
G4	Low Sheen or Satin Finish	20 to 35	35 min.
G5	Semi-Gloss Finish	35 to 70	
G6	Gloss Finish	70 to 85	
G7	High-Gloss Finish	Greater than 85	

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site verification of conditions:
1. Prior to the execution of the work under this specification section, inspect the installed work executed under other sections of this Project Manual that affects the execution of work under this specification section.
   a. Thoroughly examine (and test as required, if necessary) all conditions and surfaces to be painted and report in writing to the Contractor and the Architect any conditions or surfaces that will adversely affect the work of this section.
   b. The Installer is responsible for verifying the compatibility of items primed by others and the finish coat or coats required by the Contract Documents. Should an incompatibility occur, the Installer (along with the manufacturer's technical representative) will recommend compatible alternatives for the Architect's approval.
2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.

3. Execution of work under this specification section shall constitute acceptance of existing conditions.

3.2 PREPARATION

A. Protection before Application:
   1. Protect all adjacent surfaces from drips, spray, air pollution of surrounding environment, and other damage from work under this specification section.
   2. Removal of Hardware and Miscellaneous Items:
      a. Coordinate the work with other trades so that they remove electrical outlet and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings, fastenings, and the like prior to starting work under this Section.
      b. Store during painting work. Coordinate cleaning and reinstallation after painting work is finished.
      c. Do not use solvent or cleaning agents detrimental to permanent finishes.
      d. Remove doors before painting to paint bottom and top edges, and then re-hang.
   3. Protect adjacent surfaces against damage from painting operations. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
      a. Protective means include: Drop cloths, shields, masking templates, etc.
      b. Exterior surfaces include: landscaping, walks, drives, adjacent building surfaces, glazing, aluminum surfaces, etc.
      c. Interior surfaces include: rating and instruction labels on doors, frames, equipment, piping, etc.

B. Surface preparation:
   1. General:
      a. In accordance with MPI Standards.
      b. Surfaces to be finished shall be clean, dry and free of dirt, passivators, oils, loose paint and any other contamination that would adversely affect adhesion, protective properties or appearance of the coating.
      c. All oil, grease, dirt or other foreign matter shall be removed by washing with a solution of cleaner and water, rinse and allow to dry.
      d. If efflorescence, alkali or glazed surfaces exist, neutralize with acid wash followed by thorough water rinsing.
         1) Protect all adjacent substrates or materials that could be affected by acid washing or water rinsing. Collect all washing & rinsing residue and dispose of away from structures.
   2. Wood Substrates - (New and Repaint Surfaces):
      a. Interior Surfaces: MPI Interior Surface Preparation, Chapter 3, Section 3.
      b. Exterior Surfaces: MPI Exterior Surface Preparation, Chapter 2, Section 3.
      c. Fill holes and other imperfections with putty or plastic wood to match natural finish before and after application of prime or seal coat.
      d. Provide necessary extra treatment over knots, pitch pockets, sappy portions and other defects to produce a proper base for painting.
      e. Sand down raised grain or rough surfaces.
      f. Clean surfaces free of dust, soil and other foreign material.
   3. Gypsum Board Substrates - (New and Repaint Surfaces):
      a. Interior Surfaces: MPI Interior Surface Preparation, Chapter 3, Section 3.
      b. Clean surfaces of dirt, laitance, excess mortar and foreign matter.
      c. Do all necessary minor sanding.
      d. Fill minor cracks, scratches, holes and nail heads.
   4. Plaster Substrates - (New and Repaint Surfaces):

a. Interior Surfaces: MPI Interior Surface Preparation, Chapter 3, Section 3.
b. Exterior Surfaces: MPI Exterior Surface Preparation, Chapter 2, Section 3.
c. Clean surfaces of dirt, laitance, excess mortar and foreign matter.
d. Neatly patch, flush and smooth, minor cracks, holes, pits and other imperfections in plaster or concrete surfaces.

5. Concrete Substrates - (New and Repaint Surfaces):
   a. Interior Surfaces: MPI Interior Surface Preparation, Chapter 3, Section 3.
   b. Exterior Surfaces: MPI Exterior Surface Preparation, Chapter 2, Section 3.
   c. Clean surfaces of dirt, laitance, excess mortar and foreign matter.
   d. Neatly patch, flush and smooth, minor cracks, holes, pits and other imperfections in plaster or concrete surfaces.
6. Metal Substrates - (New and Repaint Surfaces):
   a. Interior Surfaces: MPI Interior Surface Preparation, Chapter 3, Section 3.
   b. Exterior Surfaces: MPI Exterior Surface Preparation, Chapter 2, Section 3.
   c. Shop Primed or Factory Primed Surfaces:
      1) Shop Primed or Factory Primed Surfaces are considered "un-primed" due to their mil thicknesses provided, and common incompatibility issues with specified coating system; and are suitable only for protection during transit (shipment and storage) until incorporated into the Project.
      2) Remove dust, oil and rust.
      3) Sand surface lightly.
      4) Touch up imperfections, scratches, surface damage, etc. with the appropriate primer.
      5) Field connection welds, soldered joints, burned and abraded portions shall be spot primed with the appropriate primer.
   d. Coil-Coated Product Surfaces:
      1) Coil-Coated Product Surfaces are considered "un-primed" due to their mil thicknesses provided, and the common incompatibility issues with specified coating system; and are suitable only for protection during shipment and storage until incorporated into the Project.
      2) Remove dust, oil and rust.
      3) Touch up imperfections, scratches, surface damage, etc. with the appropriate primer.
      4) Field connection welds, burned and abraded portions shall be spot primed with the appropriate primer.
      5) Field apply manufacturer's written recommended primer coat over entire surface compatible with substrate finish and finish coats indicated on the paint schedule.
   e. Un-primed Surfaces:
      1) Remove dust, rust, mill scale, grease and foreign matter by sand blasting or wire brushing.
      2) Surfaces to be smooth and ready to receive coatings.
   f. Non-Ferrous Metal, Galvanized, Aluminum, and Copper Surfaces:
      1) Metal Etch and Solvent Clean per SSPC-SP 1 or clean with TSP or other appropriate cleaner followed by thorough water rinsing.
      2) Brush Blast to standards of SSPC-SP 16, or if blasting is not feasible, sand thoroughly, wipe clean and apply a test patch for the coating specified.
      3) Allow system to cure at least one week, then test adhesion per ASTM D 3359 "Standard Test Methods for Measuring Adhesion by Tape Test."
7. Concrete Block Surfaces - (New and Repaint Surfaces):
   a. Interior Surfaces: MPI Interior Surface Preparation, Chapter 3, Section 3.
   b. Exterior Surfaces: MPI Exterior Surface Preparation, Chapter 2, Section 3.
   c. Clean and free of all dirt, dust, rust, oil and free from all foreign matter.
   d. Test for moisture content.

1) Do not coat if moisture is present.
2) Concrete Blocks to be thoroughly dry and cured prior to coating.

e. Do not coat Masonry wall if joints are not properly pointed, has excessive mortar drippings cracked units or shows signs of excessive efflorescence.
1) Notify Architect promptly through General Contractor.
2) Do not coat until unsatisfactory and unacceptable Concrete Block surfaces are corrected suitable for coating.

f. Do not apply opaque finishes to Concrete Block with airless sprayer unless "backrolled."

3.3 APPLICATION

A. Standards:
1. In accordance with MPI Painting Manual.
2. In accordance with manufacturer's specifications.

B. Method:
1. Apply by brush, roller or spray in accordance with MPI Painting Manual and the coating manufacturer's written recommendations except where specified otherwise in Schedule of Paint Finishes.
2. Painting of doors by rollers shall only be allowed only if the applicator uses a 1/4 inch nap or less roller.

C. Coatings:
1. All coatings shall be applied without reduction except as specifically required by label directions, or required to be reduced by this Specification. In such cases, reduction shall be the minimum permitted and shall not exceed VOC limits.
2. Apply each coat evenly and allow each coat to dry prior to applying succeeding coats. Each coat to have enough consistency to conceal work to which it is applied.
a. Follow manufacturer's recommendations for recoat windows when using high performance coatings, epoxys, and urethanes.
3. Cut into a true line and leave smooth and clean without overlapping. Coat doors and windows in open position.
4. Sand finishes on smooth surfaces to assure proper adhesion of subsequent coats.
5. Tint each undercoat a lighter shade to facilitate identification of each coat, if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
6. Apply coating systems so as to obtain not less than the dry film mil thickness recommended by the manufacturer.
7. Sand metal work only as necessary to provide for the complete bonding of coats.
8. Project Inspector to inspect and approve each coat and operation before succeeding coats are applied.
9. Finish work to be free from runs, sags, defective application and improper workmanship.
10. Back prime all woodwork and casework coming in contact with plaster, masonry or concrete immediately upon delivery to project.
11. Post sign promptly following application of coatings.

3.4 FIELD QUALITY CONTROL

A. All surfaces, preparation and paint applications shall be inspected by the Project Inspector:
1. Painted exterior and interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Painting Inspection by the Project Inspector:

a. Brush / Roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
b. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
c. Damage due to touching before paint is sufficiently dry or any other contributory cause.
d. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
e. Damage and / or contamination of paint due to blown contaminants (dust, spray paint, etc.).

2. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:
a. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
b. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
c. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
d. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.

3. Painted surfaces rejected by the Project Inspector shall be made good at the expense of the Contractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.5 CLEANING

A. Clean in accordance with Specification Section - TEMPORARY FACILITIES AND CONTROLS and PROJECT CLOSEOUT.
1. Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
2. Keep work area free from unnecessary accumulation of tools, equipment, surplus materials and debris.
3. Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
4. Clean equipment and dispose of wash water / solvents as well as all other cleaning and protective materials (e.g., rags, drop cloths, masking papers, etc.), paints, thinners, paint removers / strippers in accordance with the safety requirements of authorities having jurisdiction in the place where the Project is located.
5. Protect and safeguard work of other trades.

3.6 PROTECTION

A. Protection from Weather:
1. Protect newly installed work from moisture for a period of time as recommended by the manufacturer after application.

B. Protection from Traffic:
1. Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, which ensures the work of this section being without damage or deterioration until the time of Substantial Completion.

3.7 SCHEDULES

A. Refer to Exterior and Interior Finish Schedules on Drawings for applicable finishes used. This is a guide only and paint sub-contractor is responsible to check all drawings and be responsible for all paint work required to cover the complete painting and finishing of the interior and exterior including specialty items.

B. It is the intent of the specifications and drawings to cover the complete painting and finishing of the Project whether or not it is specifically called for in the Specifications, Schedule of Paint Finishes, or indicated on the Drawings. Surfaces not specified in Paint Finishes Schedule shall be in accordance with manufacturer's written recommendations.
   a. The following schedule was compliant with CARB Air Quality Standards at press time.
      1) Inform the Architect of any changes caused by stricter Air Quality Standards as part of the submittal process.
      2) Provide products compliant with CARB Air Quality Standards and Local Air Quality Control District requirements at the time of installation.

C. Exception: When the Project involves remodel work, the scope of work is limited to the remodel area and adjacent existing substrates to minimize visible color incompatibility.

D. Provide coating system minimum ODFT specified.
   1. Provide ODFT per system specified.
      a. Do not apply thicker coats than specified to achieve ODFT. Apply additional coats if necessary for unifrom color.
   2. "Ultra Color" Note: A fourth and/or fifth coat may be required to achieve uniform chromatic hue without ghosting from undercoat or substrate.
      a. The Contractor shall consider all Metal Paint Finishes noted "Ultra-color" as requiring as many as five (5) total coats.

E. INTERIOR PAINT FINISHES:
   1. INTERIOR WOODWORK
      a. W-1 Flat Latex Minimum ODFT 4.2 MILS.
         1) 1st Coat SPEEDHIDE ZERO (SPH-0) Primer 6-4900XI
         2) 2nd Coat Flat 0 VOC (SPH-0) 6-4110XI
         3) 3rd Coat Flat 0 VOC (SPH-0) 6-4110XI
      b. W-2 Semi-Gloss Acrylic Non-Blocking Enamel Minimum ODFT 4.0 MILS.
         1) 1st Coat SPEEDHIDE ZERO (SPH-0) Primer 6-4900XI
         2) 2nd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI
         3) 3rd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI
      c. W-3 Gloss Waterborne Acrylic Non-Blocking Enamel Minimum ODFT 9.4 MILS.
         1) 1st Coat SPEEDHIDE ZERO (SPH-0) Primer 6-4900XI
         2) 2nd Coat Gloss Acrylic PITT-TECH PLUS 90-1310
         3) 3rd Coat Gloss Acrylic PITT-TECH PLUS 90-1310
      d. W-4 Semi-Transparent Resin Stain Minimum ODFT 1.9 MILS.
         1) 1st Coat Resin Wiping Stain DEFT Int. Stain
         2) 2nd Coat Clear Acrylic DEFT Clear Wood
      e. W-5 Semi-Transparent Resin Stain Minimum ODFT 3.3 MILS.

1) 1st Coat Resin Wiping Stain DEFT Int. Stain
2) 2nd Coat Clear Acrylic DEFT Clear Wood
3) 3rd Coat Clear Acrylic DEFT Clear Wood

f. W-6 Stained and Water Clear Lacquer Minimum ODFT 3.8 MILS.
1) 1st Coat Resin Wiping Stain DEFT Int. Stain
2) 2nd Coat Lacq. Sanding Sealer DEFT WB Sanding Sealer
3) 3rd Coat Clear Acrylic DEFT WB 109/S
4) 4th Coat Clear Acrylic DEFT WB 109/S

g. W-7 Filled and Sealed Floor Finish Minimum ODFT 3.0 MILS.
1) 1st Coat Paste Filler As recommended by Flooring Manufacturer
2) 2nd Coat Satin Polyurethane DEFT 26
3) 3rd Coat Satin Polyurethane DEFT 26

h. W-8 Velvet Lacquered Finish Minimum ODFT 4.7 MILS.
1) 1st Coat Lacq. Sanding Sealer DEFT WB Sanding Sealer
2) 2nd Coat Clear Acrylic DEFT WB 109/S
3) 3rd Coat Clear Acrylic DEFT WB 109/S
4) 4th Coat Clear Acrylic DEFT WB 109/S

2. INTERIOR GYPSUM BOARD

a. DW-1 Flat Latex Minimum ODFT 4.2 MILS.
1) 1st Coat SPEEDHIDE ZERO (SPH-0) P/S 6-4900XI
2) 2nd Coat Flat 0 VOC (SPH-0) 6-4110XI
3) 3rd Coat Flat 0 VOC (SPH-0) 6-4110XI

b. DW-2 Eggshell Acrylic Non-Blocking Enamel Minimum ODFT 4.0 MILS.
1) 1st Coat SPEEDHIDE ZERO (SPH-0) Primer 6-4900XI
2) 2nd Coat Eggshell 0 VOC (SPH-0) 6-4310XI
3) 3rd Coat Eggshell 0 VOC (SPH-0) 6-4310XI

c. DW-3 Gloss Acrylic Non-Blocking Enamel Minimum ODFT 9.4 MILS.
1) 1st Coat SPEEDHIDE ZERO (SPH-0) Primer 6-4900XI
2) 2nd Coat Gloss Acrylic PITT-TECH PLUS 90-1310
3) 3rd Coat Gloss Acrylic PITT-TECH PLUS 90-1310

d. DW-4 Gloss Epoxy Polyamide (Corrosion Resistant) Minimum ODFT 7.6 MILS.
1) 1st Coat Acrylic Primer SEAL GRIP 17-921
2) 2nd Coat Epoxy Gloss AQUAPON WB-EP 98E-1
3) 3rd Coat Epoxy Gloss AQUAPON WB-EP 98E-1

e. DW-4 WB Semi-Gloss Epoxy (Corrosion Resistant) Minimum ODFT 4.6 MILS.
1) 1st Coat Acrylic Primer SEAL GRIP 17-921
2) 2nd Coat Epoxy Semi-Gloss PITT-GLAZE 16-510
3) 3rd Coat Epoxy Semi-Gloss PITT-GLAZE 16-510

f. DW-5 Semi-Gloss Acrylic Non-Blocking Enamel Minimum ODFT 4.0 MILS.
1) 1st Coat SPEEDHIDE ZERO (SPH-0) Primer 6-4900XI
2) 2nd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI
3) 3rd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI
4) Note: This system was previous named "DW-2".

3. INTERIOR CEMENT PLASTER, VENEER PLASTER OR GYPSUM PLASTER

a. P-1 Flat Latex Minimum ODFT 4.8 MILS.
1) 1st Coat Acrylic Primer-Sealer 3210
2) 2nd Coat Flat 0 VOC (SPH-0) 6-4110XI
3) 3rd Coat Flat 0 VOC (SPH-0) 6-4110XI

b. P-2 Semi-Gloss Acrylic Non-Blocking Enamel Minimum ODFT 4.6 MILS.
1) 1st Coat Acrylic Primer-Sealer 3210
2) 2nd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI
3) 3rd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI

c. P-3 Gloss Acrylic Non-Blocking Enamel Minimum ODFT 10.0 MILS.

1) 1st Coat Acrylic Primer-Sealer 3210
2) 2nd Coat Gloss Acrylic PITT-TECH PLUS 90-1310
3) 3rd Coat Gloss Acrylic PITT-TECH PLUS 90-1310

d. P-4 Gloss Epoxy Polyamide (Corrosion Resistant) Minimum ODFT 7.6 MILS.
1) 1st Coat Acrylic Primer SEAL GRIP 17-921
2) 2nd Coat Epoxy Gloss AQUAPON WB EP 98E-1 Series
3) 3rd Coat Epoxy Gloss AQUAPON WB EP 98E-1 Series

e. P-4 WB S/G Epoxy (Corrosion Resistant) Minimum ODFT 4.6 MILS.
1) 1st Coat Acrylic Primer SEAL GRIP 17-921
2) 2nd Coat WB Epoxy Semi-Gloss PITT-GLAZE 16-510
3) 3rd Coat WB Epoxy Semi-Gloss PITT-GLAZE 16-510

f. P-5 Semi-Gloss Acrylic Non-Blocking Enamel Minimum ODFT 4.6 MILS.
1) 1st Coat Acrylic Primer-Sealer 3210
2) 2nd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI
3) 3rd Coat Semi-Gloss 0 VOC (SPH-0) 6-4510XI

4. INTERIOR CONCRETE OR CONCRETE MASONRY UNITS

a. CB-1 Clear Water Repellent Sealer
1) One Coat Alkyltrialkoxy Silane
a) EVONIK DEGUSSA "Aqua-Trete®CONCENTRATE."
2) Follow manufacturer's recommended coverage rate and installation recommendations for type of substrate to be covered.
3) Provide manufacturer's 10 year warranty for Concrete Masonry Units and Split Faced Concrete Masonry Units.

b. CB-2 Flat Latex - Fine Texture Minimum ODFT 9.9 MILS.
1) 1st Coat Acrylic Block Filler (SPH-0) 6 - 7
a) Omit at concrete surfaces.
2) 2nd Coat Flat 0 VOC (SPH-0) 6-4110XI
3) 3rd Coat Flat 0 VOC (SPH-0) 6-4110XI

c. CB-3 Semi-Gloss Acrylic Enamel:
1) Concrete Masonry Units: Minimum ODFT 9.7 MILS.
a) 1st Coat Acrylic Block Filler (SPEEDHIDE INT/EXT BLOCK FILL)
b) 2nd Coat Flat 0 VOC (SPH-0) 6-4510XI
c) 3rd Coat Flat 0 VOC (SPH-0) 6-4510XI
2) Concrete Surfaces: Minimum ODFT 4.6 MILS.
a) 1st Coat Acrylic Primer-Sealer 3210
b) 2nd Coat Flat 0 VOC (SPH-0) 6-4510XI
c) 3rd Coat Flat 0 VOC (SPH-0) 6-4510XI

d. CB-4 Color High-Gloss Polyamide Epoxy:
1) Concrete Masonry Units: Minimum ODFT 15.6 MILS.
a) 1st Coat W/B Epoxy Block Fill SPEEDHIDE HI-FILL INT/EXT BLOCK FILL
b) 2nd Coat Acrylic Primer SEAL-GRIP 17-921
c) 3rd Coat Epoxy Gloss AQUAPON WB EP 98E-1
d) 4th Coat Epoxy Gloss AQUAPON WB EP 98E-1
2) Concrete Surfaces: Minimum ODFT 7.6 MILS.
a) 1st Coat Epoxy Primer SEAL-GRIP 17-921
b) 2nd Coat Epoxy Gloss AQUAPON WB EP 98E-1
c) 3rd Coat Epoxy Gloss AQUAPON WB EP 98E-1

e. CB-4 Color WB Semi-Gloss Epoxy:
1) Concrete Masonry Units: Minimum ODFT 15.6 MILS.
a) 1st Coat W/B Epoxy Block Fill SPEEDHIDE 6-15
b) 2nd Coat Epoxy Primer SEAL-GRIP 17-921
c) 3rd Coat Epoxy S/G PITT-GLAZE 16-510

d) 4th Coat Epoxy S/G PITT-GLAZE 16-510 DFT 3.0 mils.

2) Concrete Surfaces: Minimum ODFT 7.6 MILS.
   a) 1st Coat Epoxy Primer SEAL-GRIP 17-921
   b) 2nd Coat Epoxy S/G PITT-GLAZE 16-510
   c) 3rd Coat Epoxy S/G PITT-GLAZE 16-510

f. CB-5 Clear High-Gloss Polyamide Epoxy Minimum ODFT 5.0 MILS.
   1) 1st Coat Epoxy Gloss MONOPOLE Permashield 200
   2) 2nd Coat Epoxy Gloss MONOPOLE Permashield 200

5. INTERIOR METALS
   a. PRIMER NOTE: Metals that are shop primed shall be considered "un-primed" and shall be primed with appropriate primer and thicknesses listed below:
      1) Ferrous Metal:
         a) PPG DEVFLEX 4020 "Red" Mult-Purp. Metal Primer DFT 3.0 mils.
      2) Non-Ferrous Metal, Galvanized Metal or Aluminum:
         a) PPG DEVFLEX 4020 "White" Mult-Purp. Metal Primer DFT 3.0 mils.
   b. COIL-COATED PRODUCTS NOTE: Metal products primed with coil-coated products are to be assumed to be "un-primed" products and shall be additionally coated (or primed again) as follows:
      1) Coil-Coated Products:
         a) Field apply manufacturer's recommended primer coat and mil thickness over entire surface compatible with substrate finish and finish coats indicated on paint schedule.
   c. M-1 Flat Latex Minimum ODFT 5.8 MILS.
      1) 1st Coat Primer See primer note above.
      2) 2nd Coat Flat 0 VOC (SPH-0) 6-4110XI
      3) 3rd Coat Flat 0 VOC (SPH-0) 6-4110XI
   d. M-2 Semi-Gloss "Ultra Color" Industrial Acrylic Minimum ODFT 11.0 MILS.
      1) 1st Coat Primer See primer note above.
      2) 2nd Coat Acrylic Semi-Gloss DEVFLEX 4216
      3) 3rd Coat Acrylic Semi-Gloss DEVFLEX 4216
   e. M-3 Gloss "Ultra Color" Waterborne Acrylic Minimum ODFT 11.0 MILS.
      1) 1st Coat Primer See primer note above.
      2) 2nd Coat Gloss Acrylic PITT-TECH PLUS 90-1310
      3) 3rd Coat Gloss Acrylic PITT-TECH PLUS 90-1310
   f. M-4 Semi-Gloss Epoxy Polyamide Minimum ODFT 6.0 MILS.
      1) 1st Coat Primer See primer note above.
      2) 2nd Coat Epoxy Semi-Gloss PITT-GLAZE 16-510
      3) 3rd Coat Epoxy Semi-Gloss PITT-GLAZE 16-510
   g. M-5 Gloss Epoxy Polyamide Minimum ODFT 4.6 MILS.
      1) 1st Coat Epoxy Primer SEAL-GRIP 17-921
      2) 2nd Coat Epoxy Gloss AQUAPON WB EP 98E-1 Series
      3) 3rd Coat Epoxy Gloss AQUAPON WB EP 98E-1 Series
   h. M-5 Water Base S/G Epoxy (Corrosion Resistant) Minimum ODFT 7.6 MILS.
      1) 1st Coat Acrylic Primer SEAL GRIP 17-921
      2) 2nd Coat WB Epoxy S/G PITT-GLAZE 16-510
      3) 3rd Coat WB Epoxy S/G PITT-GLAZE 16-510
   i. M-6 Flat Waterborne Paint Minimum ODFT 4.4 MILS.
      1) 1st Coat Flat Dry Fall Prime SUPER TECH 6-726XI
      2) 2nd Coat Flat Dry Fall Finish SUPER TECH 6-726XI
   j. M-7 Semi-Gloss Waterborne Paint Minimum ODFT 4.4 MILS.
      1) 1st Coat S/G Dry Fall Primer SUPER TECH 6-724XI
      2) 2nd Coat S/G Dry Fall Finish SUPER TECH 6-724XI

6. INTERIOR ACOUSTICAL TILE

a. A-1 Matte Flat Vinyl Acrylic Minimum ODFT 1.3 MILS.
   1) 1st Coat Flat Vinyl Acrylic PRO-EV 0-VOC 12-110

F. EXTERIOR PAINT FINISHES
1. EXTERIOR WOOD
   a. EW-1 Flat 100 percent Acrylic Minimum ODFT 6.0 MILS.
      1) 1st Coat Epoxy Primer SEAL-GRIP 17-921
      2) 2nd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series
      3) 3rd Coat 100 percent Acrylic Flat 72-Series
   b. EW-2 Semi-Gloss 100 percent Acrylic Minimum ODFT 5.6 MILS.
      1) 1st Coat Epoxy Primer SEAL-GRIP 17-921
      2) 2nd Coat 100 percent Acrylic Semi-Gloss SUNPROOF SEMI-GLOSS 78-Series
      3) 3rd Coat 100 percent Acrylic Semi-Gloss SUNPROOF SEMI-GLOSS 78-Series
   c. EW-3 100 percent Acrylic Resin (A/R) Stain Minimum ODFT 3.0 MILS.
      1) 1st Coat 100 percent A/R Stain Coat FLOOD SWF
      2) 2nd Coat 100 percent A/R Stain Coat FLOOD SWF
2. EXTERIOR SOFFIT BOARD
   a. ESB-1 Lo-Sheen 100 % Acrylic Resin (A/R)-Heavy Stipple Minimum ODFT 5.8 MILS.
      1) 1st Coat Epoxy Primer SEAL-GRIP 17-921
      2) 2nd Coat 100 percent Acrylic SUNPROOF SATIN 76-Series
      3) 3rd Coat 100 percent Acrylic SUNPROOF SATIN 76-Series
      4) *Note: 2nd Coat to have medium size aggregate added to achieve heavy stipple texture.
3. EXTERIOR CEMENT PLASTER
   a. EP-1 Flat 100 percent Acrylic Minimum ODFT 7.0 MILS.
      1) 1st Coat 100 percent Acrylic Primer-Sealer 4-603XI
      2) 2nd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series
      3) 3rd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series
   b. EP-2 Semi-Gloss 100 percent Acrylic Minimum ODFT 6.6 MILS.
      1) 1st Coat 100 percent Acrylic Primer-Sealer 4-603XI
      2) 2nd Coat 100 percent Acrylic Semi-Gloss SUNPROOF SEMI-GLOSS 78-Series
      3) 3rd Coat 100 percent Acrylic Semi-Gloss SUNPROOF SEMI-GLOSS 78-Series
   c. EP-3 Gloss Styrene Acrylic Minimum ODFT 5.6 MILS.
      1) 1st Coat 100 percent Acrylic Primer-Sealer 4-603XI
      2) 2nd Coat Gloss ADVANTAGE 900 INT/EXT STYRENE ACRYLIC GLOSS
      3) 3rd Coat Gloss ADVANTAGE 900 INT/EXT STYRENE ACRYLIC GLOSS
   d. EP-4 Smooth Elastomeric, Lo Sheen Acrylic/Resin (A/R) Minimum ODFT 11.9 MILS.
      1) 1st Coat 100 percent Acrylic Primer-Sealer 4-603XI
      2) 2nd Coat Smooth Elastomeric PITT-FLEX 4-110
         a) Spray and Backroll
      3) 3rd Coat 100 percent Acrylic Resin Semi Gloss 76-Series
   e. EP-5 Satin Elastomeric, S/G Acrylic/Resin (A/R) Minimum ODFT 11.8 MILS.
      1) 1st Coat 100 percent Acrylic Primer-Sealer 4-603XI
      2) 2nd Coat Matte Flex Elastomeric PITT-FLEX 4-110
         a) Spray and Backroll

3) 3rd Coat 100 percent Acrylic semi-gloss SUNPROOF SEMI-GLOSS 78-Series

f. EP-6 Coarse Elastomeric, Satin Acrylic/Resin (A/R) Minimum ODFT 11.8 MILS.

1) 1st Coat 100 percent Acrylic Primer-Sealer 4-603XI
2) 2nd Coat Elastomeric Finish 4-110
   a) Spray and Backroll
3) 3rd Coat 100 percent Acrylic Satin SUNPROOF SATIN 76-Series

4. EXTERIOR CONCRETE OR CONCRETE MASONRY UNITS:

a. ECB-1 Clear Water Repellent Sealer:

1) One Coat Alkyltrialkoxy Silane:
   a) EVONIK DEGUSSA "Aqua-Trete®CONCENTRATE."
2) Provide manufacturer's 10 year warranty for Concrete Masonry Units and Split Faced Concrete Masonry Units.

b. ECB-2 Flat 100 percent Acrylic Minimum ODFT 11.5 MILS.

1) 1st Coat W/B Acrylic Block Filler SPEEDHIDE 6-7
   a) Omit at concrete surfaces
2) 2nd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series
3) 3rd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series

c. ECB-3 Flat 100 percent Acrylic Minimum ODFT 5.5 MILS.

1) 1st Coat 100 percent Acrylic Primer-Sealer 4-603XI
2) 2nd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series
3) 3rd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series

5. EXTERIOR METAL

a. PRIMER NOTE: Metals shop primed shall be considered “un-primed and shall be primed with appropriate primer and thicknesses listed below:

1) Ferrous Metal, Type 1 Typical:
   a) PITT TECH PLUS 4020 "Red" Multi-Purpose Metal Primer DFT 3.0 mils.
2) Ferrous Metal, Type 2 as specified in Specification Section – STEEL AND FABRICATIONS:
   a) AMERCOAT 68HS Reinforced Inorganic Zinc-Rich Urethane Metal Primer DFT 5.0 mils.
3) Ferrous Metal, Type 3 when Urethane is used as a finish:
   a) AMERLOCK 2VOC/400 VOC Epoxy Metal Primer DFT 6.0 mils.
4) Non-Ferrous Metal, Type 4 Galvanized Metal or Aluminum:
   a) PITT TECH PLUS "White" Multi- Purpose Metal Primer DFT 3.0 mils.
5) Non-Ferrous Metal, Type 5 Galvanized Metal or Aluminum, when Urethane is used as a finish.
   a) AMERLOCK 2VOC/400 VOC Epoxy Metal Primer DFT 6.0 mils.

b. COIL-COATED PRODUCTS NOTE: Metal products primed with coil-coated products are to be assumed to be unprimed products and shall be re-primed as follows:

1) Coil-Coated Products:
   a) Field apply manufacturer's recommended primer coat and mil thickness over entire surface compatible with substrate finish and finish coats indicated on paint schedule.

c. EM-1 Flat 100 percent Acrylic Minimum ODFT 7.4 MILS.

1) 1st Coat Primer See primer notes above.
2) 2nd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series
3) 3rd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series

d. EM-2 Semi-Gloss "Ultra Color" 100 percent Acrylic Minimum ODFT 7.2 MILS.

1) 1st Coat Primer See primer notes above.

2) 2nd Coat 100 percent Acrylic Semi-Gloss SUNPROOF SEMI-GLOSS 78-Series
3) 3rd Coat 100 percent Acrylic Semi-Gloss SUNPROOF SEMI-GLOSS 78-Series

e. EM-3 Gloss "Ultra Color" 100 percent Acrylic Waterborne Minimum ODFT 11.0 MILS.
1) 1st Coat Primer See primer notes above.
2) 2nd Coat Gloss Acrylic PITT-TECH PLUS 90-1310
3) 3rd Coat Gloss Acrylic PITT-TECH PLUS 90-1310

f. EM-4 Gloss "Ultra Color" Aliphatic Acrylic Urethane (A/A/U) Finish, Spray Applied, Deep Tone, Custom Color Minimum ODFT 16.0 MILS.
1) 1st Coat Primer See primer notes above.
2) 2nd Coat A/A/U Gloss Color AMERSHIELD VOC
3) 3rd Coat A/A/U Gloss Color AMERSHIELD VOC

g. EM-5 Gloss "Ultra Color" Aliphatic High Solids Finish, Spray Applied, Deep Tone, Custom Color with clear protective coats Minimum ODFT 18.0 MILS.
1) 1st Coat Primer See primer notes above
2) 2nd Coat A/A/U Gloss Color AMERSHIELD VOC
3) 3rd Coat A/A/U Gloss Color AMERSHIELD VOC
4) 4th Coat A/A/U Gloss Clear AMERSHIELD VOC
5) 5th Coat A/A/U Gloss Clear AMERSHIELD VOC

h. EM-6 Semi-Gloss "Ultra Color" Aliphatic Urethane (A/U) Finish, Spray Applied, Deep Tone, Custom Color Finish Minimum ODFT 20.0 MILS.
1) 1st Coat Primer See primer notes above.
2) 2nd Coat A/A/U Semi-Gloss AMERCOAT 240
3) 3rd Coat A/A/U Semi-Gloss AMERSHIELD VOC

G. SPECIALTY PAINT FINISHES:
1. PROVIDE SPECIALTY PAINT FINISHES AS SHOWN OR AS FOLLOWS:

a. **Finish No. X-1:** Minimum ODFT 15.0 MILS.
1) Lines on Concrete or Asphaltic Concrete Paving Exit and Entrance Signs - 10" width lines, maximum. Reflectorize as required.
2) PPG ZoneLine

b. **Finish No. X-2:** Minimum ODFT 15.0 MILS.
1) Lines on Walk Top. Colors as selected by Architect.
2) PPG ZoneLine

c. **Finish No. X-3:** Minimum ODFT 2.2 MILS.
1) Space above Vents or Grilles.
2) 1st Coat 100 percent Acrylic Flat Black 72-Series

d. **Finish No. X-4:** Minimum ODFT 7.0 MILS.
1) Piping Black Steel or Cast Iron.
2) 1st Coat Multi-Purpose Metal Primer:
a) PITT TECH PLUS 4020 "Red"
3) 2nd Coat Acrylic Gloss Finish 2406G

e. **Finish No. X-5:** Minimum ODFT 7.0 MILS.
1) Piping Galvanized.
2) 1st Coat General Purpose Metal Primer.
a) PITT TECH PLUS 4020 "White"
3) 2nd Coat Gloss Enamel Finish:
a) PITT TECH PLUS 90-1310

f. **Finish No. X-6:** Minimum ODFT 11.0 MILS.
1) Machinery and Equipment (Coil Coated Products):
2) 1st Coat General Purpose Metal Primer:
a) PITT TECH PLUS 4020 "White"

3) 2nd Coat Gloss Enamel PITT TECH PLUS 90-1310
4) 3rd Coat Gloss Enamel PITT TECH PLUS 90-1310

g. **Finish No. X-7:** Minimum ODFT 7.0 MILS.
1) Sheet Metal Ducts:
2) 1st Coat General Purpose Metal Primer:
a) PITT TECH PLUS 4020 "White"
3) 2nd Coat 100 percent Acrylic Flat:
a) PITT TECH PLUS 90-1310

h. **Finish No. X-8:** Minimum ODFT 7.0 MILS.
1) Fire Hydrants:
2) 1st Coat General Purpose Metal Primer
a) PITT TECH PLUS 4020 "White"
3) 2nd Coat 100 percent Acrylic Flat
a) PITT TECH PLUS 90-1310

i. **Finish No. X-9:** Minimum ODFT 7.4 MILS.
1) Following items listed will receive Finish No. X-9 (including, but not limited to), Louvers, Grilles, or Access Panels.
2) 1st Coat General Purpose Metal Primer:
a) PITT TECH PLUS 4020 "White"
3) 2nd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series
4) 3rd Coat 100 percent Acrylic Flat SUNPROOF FLAT 72-Series

j. **Finish No. X-10:** Minimum ODFT 1.9 MILS.
1) Striping under Acoustical Board Surrounding Structure:
2) 1st Coat 100 percent Acrylic Flat Black SUNPROOF FLAT 72-Series

k. **Finish No. X-11:** Minimum ODFT 2.2 MILS.
1) Acoustical Board and Exposed Striping and Structural:
2) 1st Coat 100 percent Acrylic Flat Black SUNPROOF FLAT 72-Series

l. **Finish No. X-12:**
1) Minimum ODFT as recommended by graffiti coating manufacturer.
2) Graffiti Coating, non-toxic, liquid, sacrificial wax-based Coating:
3) 1st Coat Graffiti Coating:
a) Graffiti-Pruf by VISUAL POLUTION TECH, INC.
4) 2nd Coat Graffiti Coating:
a) Only if recommended by manufacturer for substrate material type.
b) Graffiti-Pruf by VISUAL POLUTION TECH, INC.

m. **Finish No. X-13** (NOT APPLICABLE).

n. **Finish No. X-14** (NOT APPLICABLE).

o. **Finish No. X-15:**
1) Clear Graffiti Coating, non-toxic, liquid, multi-polymer, non-sacrificial, single component sealer by BASF, or approved equivalent: One Coat
a) **NOTE #1:** Test a small area of the existing substrate in an out-of-the-way spot, as determined by the Architect, for compatibility. Inform the Architect if an incompatibility is found for further direction. If found to be compatible, proceed as follows:
2) 1st Coat Clear, flat matte coat TAGGUARD by BASF.
a) **NOTE #2**: Follow manufacturer's recommendations for proper installation over various substrates. Applicator must be certified by the manufacturer as an approved applicator for this product over various substrate materials. Protect at least 24 hours minimum the treated surface until manufacturer's recommended curing time has been achieved against graffiti.
3) REMOVAL COAT TAGGUARD Cleaner.

a) **NOTE #3:** Provide remover in small containers equal to 8-16 oz. containers of material for the Owner's use. Instruct the designated representative of the Owner as to proper application of the remover, and all procedures for removing graffiti.

p. **Finish No. X-16:** Non-sacraficial, aqueous, silane chemistry, ready-to-use, zero VOC high performance anti-graffiti treatment for masonry, concrete and natural stone, dries clear and will not yellow.

1) Follow manufacturer's printed recommendations prior to use.
2) Do not apply to wet surfaces. If surface is wet, let dry for a minimum of 24 hours prior to application. Do not use if temperature is below 40 degrees F or above 100 degrees F.
3) Protect non-porous surface substrates from overspray. Always do a test patch to confirm the treatment before using to deterimine if there is any problems prior to full coverage of the porous surfaces.
4) Concrete shall be allowed to cure a minimum of 28 days. All pointing or re-pointing shall be completed and allowed to cure for at least 3 days prior to coverage. All patching materials, caulking, sealing materials and traffic paint shall be fully cured before application.
5) 1st Coat Clear, flat matte coat PROTECTOSIL ANTIGRAFFITI.
   a) 175 to 250 sq. ft. per gallon, diluted by 14 parts of water, using a 1" nap roller.
6) 2nd Coat Clear, flat matte coat PROTECTOSIL ANTIGRAFFITI.
   a) 175 to 250 sq. ft. per gallon, un-diluted, using a 1" nap roller.
7) 3rd Coat Clear, flat matte coat PROTECTOSIL ANTIGRAFFITI.
   a) 175 to 250 sq. ft. per gallon, un-diluted, using a 1" nap roller.
   b) 3rd Coat shall always be figured in as part of the Base Bid. 3rd Coat may be deleted if it is determined by all concerned that the two coats were sufficient to protect the surfaces. If not needed, then figure on a credit back to the Owner.
8) Most graffiti removal can be achieved with standard non-hazardous cleaners and low-pressure waterblasting. Contact manufacturer for stubborn markings for removal.

q. **Finish No. X-17:** Non-sacraficial, 100 percent active silane treatment with oleophobic additive, clear penetrating breathable VOC Compliant (400 g/L) surface treatment for use on concrete, brick masonry, concrete masonry units and natural stone.

1) For flat (horizontal) concrete walks.
   a) Manufacturer's printed recommendations for rate of coverage, and type of application method to protect porous surfaces from graffiti and for ease of walk-way clean-up.
   b) Follow manufacturer's printed recommendations prior to use.
   c) Do not apply to wet surfaces. If surface is wet, let dry for a minimu of 24 hours prior to application. Do not use if temperature is below 40 degrees F or above 100 degrees F.
   d) Protect non-porous surface substrates from overspray. Always do a test patch to confirm the treatment before using to deterimine if there is any problems prior to full coverage of the porous surfaces.
   e) Concrete surfaces shall be allowed to cure a minimum of 28 days. All pointing or re-pointing shall be completed and allowed to cure for at least 3 days prior to coverage. All patching materials, caulking, sealing materials and paint shall be fully cured before application.
2) 1st Coat Clear, flat matte coat PROTECTOSIL BHN PLUS.

r. **Finish No. X-18:** Non-sacraficial, Graffiti Coating, non-toxic, liquid, semi-permanent, acrylic based Coating - Minimum ODFT as recommended by graffiti coating manufacturer.
   1) For application on sealed surface, including but not limited to CMU scheduled to be sealed, verify compatibility with sealer manufacturer prior to application of Sealer.
      a) Only if recommended by manufacturer for substrate material type.
      b) For application on natural porous surface, thin first coat with 40 percent water. All other coats shall be full strength.
   2) 1st Coat Graffiti Coating TSW4.
   3) 2nd Coat Graffiti Coating TSW4.
   4) 3rd Coat Graffiti Coating TSW4.
   5) 4th Coat Graffiti Coating TSW4.
   6) Provide Manufacturer's recommended TSW2G Graffiti Removal Kit.

s. **Finish No. X-19:** Intumescent Paint - Minimum ODFT per fire rating required.
   1) Primer: Per manufacturer's Written Recommendations, ODFT as required.
   2) 1st Coat Water Based Polymer, ISOLATEK INTERNATIONAL "CAFCO Spray Film WB3."
   3) 2nd Coat As required if needed - no greater than 62 mils per coat.
   4) 3rd Coat As required if needed - no greater than 62 mils per coat.
   5) 4th Coat Premium Exterior Latex Semi-Gloss GL68XX in thickness as recommended by manufacturer, and in color as selected by the Architect.

t. **Finish No. X-20:** Pool Paint High Gloss Epoxy - Minimum ODFT Approximately 3.6 mils.
   1) Primer: RAMUC "Clean and Prep Solution" per manufacturer's Written Recommendations
   2) 1st Coat Pool Paint by RAMUC
   3) Finish Coat Pool Paint by RAMUC

u. **Finish No. X-21:** "Ceramic Carpet" Flooring System
   1) Fresno Unified School District Standard.
   2) Surface Preparation:
      a) Refer to Specification Section - VAPOR ALKALINITY CONTROL and manufacturer's written instructions.
      b) Provide shot-blasted or mechanically abraded surfaces (CSP-4-9).
      c) Prepare any metal substrates per SSPC-SP10 "Near White Metal."
      d) Threshold preparation: Key in material for flush transition.
   3) SHERWIN WILLIAMS / General Polymers, 1/4" Thick "Ceramic Carpet" Flooring System:
      a) 1st Coat - Primer: SHERWIN WILLIAMS GP3477 Epoxy Water Emulsion Primer / Sealer (Part A and Part B).
      b) 2nd Coat - Slurry: SHERWIN WILLIAMS Fastop Urethane Slurry 12S-GP4080 with 55lbs GP 5080 aggregate per 1.8-gallon kit. Applied at 3/16, 5900F aggregate broadcast to excess approx. 0.6 lbs. per sq. ft.
      c) 3rd Coat - Broadcast Alum Oxide: SHERWIN WILLIAMS GP 3744 applied at 100 sq ft per gallon with 5900F aggregate broadcast to excess approx. 0.6 lbs. per sq. ft.
      d) 4th Coat - Grout Coat: GP 3744 applied at 100 sq. ft per gallon.
      e) 5th Coat - Finish Coat: GP 3744 applied at 100 sq. ft per gallon
   4) Coved Bases: Extend the "Ceramic Carpet" Flooring System up the coved base, to an extent 6" minimum above the finish floor. Terminate the cove material at an existing grout joint, or at the top of the coved wall base.
   5) Flooring Transitions:

a) At transitions in the flooring, saw cut a clean joint at the transition and chip out the sub-floor to receive the resinous flooring system to a depth two times (2x) the thickness of the resinous flooring system, and extend it to a distance of 30".

b) At Floor Drains / Floor Sinks chip out the sub-floor to receive the resinous flooring system to a depth four times (4x) the thickness of the resinous flooring system, and extend it to a distance of 9".

END OF SECTION

SECTION 10 14 00 – IDENTIFYING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to completely install all Identifying Devices , , Acrylic Signs and , materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS.
   2. ALL DIVISION 01 SPECIFICATION SECTIONS.
   3. 06 10 00 ROUGH CARPENTRY
   4. 08 11 00 METAL DOORS AND FRAMES
   5. 09 29 00 GYPSUM BOARD
   6. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.
   7. ALL SPECIFICATION SECTIONS IN THE SITE AND INFRASTRUCTURE SUBGROUP.

1.2 DEFINITIONS

A. Definitions pertaining to signage are as follows:
   1. Characters Shall mean all letters, numbers, symbols or pictograms.

1.3 SYSTEM DESCRIPTION

A. Design Requirements for Tactile Signage:
   1. Characters and Graphics:
      a. Finish and Contrast: Characters and their background shall have a non-glare finish. Characters shall contrast with their background, either light characters on a dark background or dark characters on a light background – CBC Section 11B-703.5.1, 11B-703.6.2, and 11B-703.7.1.
      b. Character Type: Characters on signs shall be raised 1/32 inch (0.794 mm) minimum and letters and numbers shall be sans serif uppercase characters accompanied by contracted (Grade 2) Braille complying with CBC Section 11B-703.3 and Table 11B-703.3.1.
      c. Character Size: Raised characters (letters and numbers) shall be a minimum of 5/8 inch (15.9 mm) and a maximum of 2 inches (51 mm) high.
      d. Pictorial symbol signs (pictograms): Pictorial symbol signs (pictograms) shall be accompanied by the verbal description placed directly below the pictogram. the outside dimension of the pictogram field shall be a minimum of 6 inches (152 mm) in height.
      e. Character Placement: Characters and Braille shall be in a horizontal format. Braille shall be placed a minimum of 3/8 inch (9.5 mm) and a maximum of 1/2 inch (12.7 mm) directly below the tactile characters; flush left or centered. When tactile text is multilined, all Braille shall be placed together below all lines of tactile text.

f. Proportions: Raised characters on signs shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I." Stroke thickness of the uppercase "I" shall be 15 percent maximum of the height of the character.
   1) For Braille Text, capitalization shall conform to CBC Section 11B-703.3.1.

2. Braille:
   a. California Contracted Grade 2 Braille shall be used wherever Braille is required in other portions of these standards. Braille shall accompany all raised characters – CBC Section 11B-703.3 and Table 11B-703.3.1.
      1) Dots shall be rounded or domed.
      2) Below measured as a minimum in inches and maximum in inches:
      3) Dot Base Diameter: 0.059 (1.5 mm) to 0.063 (1.6 mm).
      4) Distance between two dots in the same cell (measured center-to-center): 0.100 (2.5 mm).
      5) Distance between corresponding dots in adjacent cells (measured center-to-center): 0.300 (7.6 mm).
      6) Dot Height: 0.025 (0.6 mm) to 0.037 (0.9 mm).
      7) Distance between corresponding dots from one cell directly below:
         a) 0.395 (10 mm) to 0.400 (10.2 mm).

3. Signs shall be installed on the wall adjacent to the latch side of the door.
   a. Where there is no space on the latch side, including at double leaf doors, signs shall be placed on the nearest adjacent wall, preferably on the right.
   b. Mounting height shall be as indicated in details on the drawings and in compliance with 11B-703.4.1 and 11B-703.4.2.

4. Inspection: Signage shall be field inspected after installation per CBC 11B-703.1.1.2.

B. Performance Requirements: It is the intention of this specification section and the drawings to form a guide for a complete, operable system signage system that is compliant with State and Federal Accessibility Regulations. Any items not specifically noted but necessary for a complete, operable and accessible system shall be provided under this section.

1.4 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
1. Product Data.
   a. Submit manufacturer's full color range (including any standard, premium and custom colors) for selection by the Architect within thirty days of receipt of the NOTICE TO PROCEED.
      1) Provide actual 2-inch x 2-inch sample colors and patterns available from the manufacturers for color selection.
2. Shop Drawings.
   a. Submit shop drawings showing fabrication and installation of the work of this section including plans, elevations, sections, details of components, and attachments to other units of work, including accessibility dimensions for mounting heights.
   b. Submit drawings indicating Room numbers shown on the Contract Documents coordinated with Owner's Room Numbers.
3. Samples.
   a. Provide actual 2-inch x 2-inch sample of each sign type specified.
4. Quality Assurance/Control Submittals:
   a. Certificates:
      1) Submit four (4) copies of certificates.

2) Upon completion of the installation, submit a Certificate from the Contractor (on the Contractor's Letterhead) and co-endorsed by the manufacturer/supplier, sub-contractor/installer that the signage supplied for this project requiring braille complies with the California Contracted Grade 2 Braille and the CBC Section 11B-703.3.
   a) Those attesting to the compliance certificate above shall also acknowledge that they are aware of the Submission Under Penalty Of Perjury per California Government Code Section 12650, et seq, pertaining to false claims, and further know and understand that submission of certification of a false claim may lead to fines, imprisonment and/or other severe legal consequences.

b. Manufacturer's Instructions:
   1) Submit three (3) copies of manufacturer's instructions.

5. Closeout Submittals in accordance with the following:
   a. Maintenance Data in accordance with Specification Section - PROJECT CLOSEOUT.
   b. Record Documents in accordance with Specification Section - RECORD DOCUMENTS.
   c. Warranty in accordance with Specification Section - WARRANTIES and this section.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Installer Qualifications:
   a. Engage an experienced Installer who has been approved by the manufacturer.
2. Manufacturer's/Supplier's Qualifications:
   a. Firm's experienced in successfully producing/supplying products similar to those indicated for this Project, with sufficient production/supply capacity to produce/supply required units without causing delay in the work.

B. Regulatory Requirements:
1. In accordance with Specification Section - Regulatory Requirements, and the following:
   a. ADA Americans with Disabilities Act of 1990.
   b. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA), in the area where the project is located.
   c. CBC California Building Code - California Contracted Grade 2 Braille when required.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packing, shipping, handling, and unloading:
1. Products shall be handled in such a manner as to assure that they are free from dents, scratches and other damage.

B. Acceptance at Site:
1. Products must be in manufacturer's original unopened containers with labels indicating brand name, model, and grade.
2. Damaged products will not be accepted.

C. Storage and protection:
1. Products shall be stored in a dry, protected area.
2. Products shall be stored in locked storage building.
3. Products shall be stored above ground on level platforms, six (6) inches above ground, allowing air circulation under stacked units.
a. Cover materials and protect against wetting prior to use.
b. Cover materials with protective waterproof covering providing for adequate air circulation and ventilation.

1.7 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
1. In accordance with manufacturer's written standard warranty:
a. Warranty Period One (1) Year.

C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES:
a. Warranty period One (1) Year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Acrylic Signs:
a. SIGNS OF SUCCESS, INC.
1) (805) 925-7545 or www.signsofsuccess.net.

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. Acrylic Signs:
1. Frameless, Profile Material bonded to Substrate Backup Material.
a. All signs shall be made of exterior acrylic materials regardless of location (exterior or interior) within the Project.
b. Profile Material:
1) GRAVO-TAC "Exterior," modified acrylic material, 1-ply, 1/32 inch, matte finish, integral color as selected by the Architect.
c. Substrate Material:

1) 1/4 inch clear cast acrylic backup sheet.

2.3 ACCESSORIES

A. Fasteners:
1. Exposed Attachment – provide appropriate tamper resistant, flathead countersunk stainless steel screws with grommet finish washers for the substrate backing in which the sign is to be applied.
2. Adhesive: "Silastic Adhesive."
3. Foam Tape: SCOTCH MOUNT FOAM TAPE.

2.4 FABRICATION

A. Shop Assembly:
1. Braille Compliance:
a. See Part 1 of this specification – SYSTEM DESCRIPTION, and comply with the "Design Requirements for Tactile Signage" • that requires California Contracted Grade 2 Braille.
2. Acrylic Signs:
a. Manufacturer's standard Profile Material, computer engineered, adhesive backed, raised graphics, complying with the latest CBC and ADA Accessibility Chapters and Sections, and ANSI A 117.1.
1) Pictograms: All symbols shall match as closely as possible the published "International" symbols. Other interpretations will not be deemed acceptable. All symbols shall be approved prior to fabrication.
2) Do not exceed the depth of profiling as recommended by the manufacturer for the thickness of the material to be profiled.

2.5 FINISHES

A. Acrylic Signs:
1. Finish: Non-glare, face and core as selected by the Architect from the manufacturer’s full color line, including any custom colors complying with the requirements for contrasting colors of field to Symbols and Braille Text.
2. Allow for two-color application – one color for the field, and one color for the characters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site verification of conditions:
1. Prior to the execution of the work under this specification section, inspect the installed work executed under other specification sections of this Project Manual which affect the execution of work under this specification section.
2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
3. Execution of work under this specification section shall constitute acceptance of existing conditions.

3.2 PREPARATION

A. Coordination:
1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work specified under this specification section.
2. Contractor to provide internal wall blocking for all attached identifying devices.

B. Protection:
1. Protect all adjacent surfaces from drips, spray, air pollution of surrounding environment, and other damage from work under this specification section.

C. Surface preparation:
1. Prepare surface in accordance with manufacturer's written instructions and recommendations.
2. Clean substrates of substances (oil, grease, rolling compounds, incompatible primers, loose mill scale, etc.) which could impair bond of materials specified within this section.

3.3 INSTALLATION

A. General:
1. In accordance with manufacturer's written instruction and recommendations unless specifically noted otherwise.
2. In accordance with approved Submittals.
3. In accordance with Regulatory Requirements.
4. Set plumb, level, and square.

B. Layout:
1. Lines of all signs shall be straight and true.
2. Set plumb, level, and square.
3. Temporary positioning with foam tape.

C. Acrylic Signs:
1. "Blind" screw the back-up plate with four (4) flathead countersunk screws (minimum) so as not to interfere with face plate. Tape attachment is not allowed.
2. Anchor face plate to back-up plate with Silastic Adhesive for permanent attachment.
   a. Tape attachment is not allowed.
3. Seal all exposed edges at exterior conditions with compatible sealant, same color as sign substrate backup plate.

D. Mounting Conditions:
1. Wood Stud Framed Wall: Provide solid wood backing, attached to studs, adequate for fastening at all corners of sign.
2. Door: Fasten to door with tamper resistant flathead countersunk screws, minimum three (3) stainless steel screws with grommet finish washers per sign.

3.4 FIELD QUALITY CONTROL

A. Site Tests:
1. As required by Regulatory Requirements.

3.5 CLEANING

A. Clean in accordance with Specification Sections - TEMPORARY FACILITIES AND CONTROLS and PROJECT CLOSEOUT.
   1. Leave area level and free of any ruts or debris. Appearance of earth surface shall be equal to or better than adjacent undisturbed surfaces.
   2. Clean any soiled surfaces at the end of each day, minimum.
   3. Finish shall be clean and ready for the application of any additional finishes.
   4. In accordance with manufacturer's written instructions and recommendations.

3.6 PROTECTION

A. Protection from traffic:
   1. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, which ensures the work of this section being without damage or deterioration until the time of Substantial Completion.

3.7 SCHEDULES

A. General:
   1. All signs with text shall have California Contracted Grade 2 Braille unless otherwise noted.
   2. Refer to Plumbing drawings for number and approximate location for "Gas Valve" signs. Signs shall be mounted +2" above Finished Floor.
   3. Refer to drawings for various backing requirements.

B. Sign Material:
   1. EM = Exterior Metal.
   2. IM = Interior Metal.
   3. EP = Exterior Plastic.
   4. IP = Interior Plastic.
   5. A = Acrylic
   6. D = Decal.

C. Mounting Condition:
   1. 2 = Wood Stud Framed Wall.
   2. 5 = Door Mounted.

D. Mounting Location
   1. Strike side adjacent (S-1).
      a. Strike side adjacent reverse swing (SR-1).
   2. Strike side away (S-2).
      a. Strike side away reverse swing (SR-2).
   3. Strike side adjacent wall reverse swing (SR-3).
      a. Strike side adjacent wall (S-3).
   4. Hinge side adjacent (H-1).
      a. Hinge side adjacent reverse swing (HR-1)
   5. Hinge side away (H-2).
      a. Hinge side away reverse swing (HR-2).
   6. Hinge side adjacent wall (H-3).

a. Hinge side adjacent wall reverse swing (HR-3).

7. Door mounted (D-1).
   a. Door mounted reverse swing (DR-1).

E. Sign Types:
   1. Sign Type 2 - Toilet Room:
      a. 3.5" H x 7" L nominal rectangular shape.
         1) 3/4" high Tactile Text.
            a) "XXXXXX" and "RESTROOM".
         2) Braille required.
      b. 12" diameter nominal circular shape ("FEMALE").
         1) No Text or Braille required.
      c. Equilateral triangle shape edges 12" L with vertex upward ("MALE").
         1) No Text or Braille required.
      d. Equilateral triangle shape, superimposed within 12" diameter nominal circular shape ("UNISEX").
         1) No Text or Braille required.
   2. Sign Type 6 - Tactile Identification:
      a. 3-1/2"H x 7"L nominal rectangular shape.
         1) 3/4" high Tactile Text required.
         2) Braille required.
      b. 3-1/2"H x 15"L nominal rectangular shape.
         1) 3/4" high Tactile Text required.
         2) Braille required.
      c. 7"H x 7"L nominal square shape.
         1) 3/4" high Tactile Text required.
         2) Braille required.
      d. 7"H x 15"L nominal rectangular shape.
         1) 3/4" high Tactile Text required.
         2) Braille required.

END OF SECTION

SECTION 10 21 13 – TOILET PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to completely install all Toilet Partition materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.
      a. Solid Color Reinforced Composite (SCRC) Toilet Partition Systems.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS.
   2. ALL DIVISION 01 SPECIFICATION SECTIONS.
   3. 06 10 00 ROUGH CARPENTRY
   4. 09 29 00 GYPSUM BOARD
   5. 09 30 13 TILE
   6. 09 91 00 PAINTING
   7. 10 28 13 TOILET ACCESSORIES
   8. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.

1.2 REFERENCES

A. In accordance with the following:
   1. AWS American Welding Society

1.3 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
   1. Product Data:
      a. Submit manufacturer's full color range (including any standard and premium colors) for selection by the Architect.
      b. Submit manufacturer's technical data.
   2. Shop Drawings:
      a. Submit shop drawings showing fabrication and installation of the work of this section including plans, elevations, sections, details of components, and attachment to other units of work.
   3. Samples:
      a. Provide two (2) 4 inch square samples of each color selected.
      b. Provide hardware samples on request.
   4. Certificates:
      a. Provide third party certification that all products comply with NFPA 286.
   5. Closeout Submittals in accordance with the following:
      a. Maintenance Data in accordance with Specification Section - PROJECT CLOSEOUT.
      b. Project Documents in accordance with Specification Section - PROJECT DOCUMENTS.

c. Warranty in accordance with Specification Section - WARRANTIES and the article in this section titled "Special Warranty."

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Installer Qualifications:
a. Engage an experienced Installer who is certified in writing by the manufacturer listed herein as qualified to install manufacturer's product in accordance with manufacturer's warranty requirements.
2. Manufacturer Qualifications:
a. Firm experienced in successfully producing products similar to that indicated for this Project, with sufficient production capacity to supply required units without causing delay in the work.

B. Regulatory Requirements:
1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
a. CARB Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB)and the Environmental Protection Agency (EPA), in the area where the project is located.
b. CBC Chapter 11B Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing:
1) Furnish Door Hardware for each accessible stall to comply with ANSI A 117.1 and the CBC Section 11B.
2) Toe Clearance Requirements:
a) Toe Clearance shall be in accordance with CBC Section 11B-604.8.1.4 - at least one side partition shall provide a toe clearance of 9 inches (229 mm) minimum above the finish floor and 6 inches (152 mm) deep minimum beyond the compartment-side face of the partition, exclusive of partition support members. Partition components at the clearances shall be smooth without sharp edges or abrasive surfaces.
c. CBC Section 1209.2.2, Interior Environment, Toilet and Bathroom Requirements

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, shipping, handling, and unloading:
1. Products shall be individually wrapped.
2. Products shall be handled in such a manner as to assure that they are free from dents, scratches and other damage.

B. Acceptance at Site:
1. Products must be in manufacturer's original unopened containers with labels indicating brand name and model.
2. Damaged products will not be accepted.

C. Storage and protection:
1. Products shall be stored in a locked, dry and protected area.

1.6 PROJECT CONDITIONS

A. Existing Conditions:
1. Examine the project and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.

1.7 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
1. In accordance with manufacturer's written standard warranty:
a. Warranty Period for Solid Color Reinforced Composite Twenty-five (25) Years.
b. Upon project completion and acceptance, the subcontractor shall issue Owner a warranty against defective workmanship and materials.

C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES:
a. Warranty period One (1) Year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. These products listed herein establish the size, pattern, color range and function selected by the Architect for this Project. Manufacturers that are listed as acceptable alternative manufacturers and substitutions must still comply with the requirements of this project and the products listed in order to be approved as an equivalent during the Submittal Process. If the acceptable alternative manufacturers listed or substitutions are not approved during the Submittal Process due to non-compliance with the contract documents, then the Contractor shall submit product specified.
1. Specified Solid Color Reinforced Composite (SCRC) Toilet Partition product manufacturer:
a. BOBRICK WASHROOM EQUIPMENT, INC. "Sierra Series XX.67P."

B. Products from other manufacturers not listed must submit in accordance with Specification Section - SUBSTITUTION PROCEDURES.

2.2 MATERIALS

A. Solid Color Reinforced Composite: all edges eased, tested in accordance with CBC 803.1.2, 803.12 and ASTM standards as follows:
1. ASTM E 84 "Standard Test Method for Surface Burning Characteristics of Building Materials."
a. Flame Spread: 69.

b. Smoke Density: 93.

2. Heat Sinc: Provide continuous aluminum edging strips fastened to the bottom edge at full width of doors, screens and panels.
3. Provide concealed mounting-- no exposed screw heads on exterior.
   a. Model Number suffix .67.

2.3 COMPONENTS

A. Unless otherwise stated below, all materials shall be Stainless Steel.

B. Hardware:
1. General:
   a. Provide manufacturer's standard stainless steel, ASTM A 666 "Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar," Type 302 or 304, 18 gage minimum, #4 finish, unless otherwise noted.
   b. Provide Extruded Aluminum, 6063 T-5 parts with a minimum 0.125 inch wall thickness, at Head Rails and Head Rail Endcaps.
2. Hinges: Integral type consisting of :
   a. Top Pin: 4 inch long, 1/2 inch diameter nylon.
   b. Lower Pin: "Cam Action" nylon assembly that provides "self-closing feature" for the door with 3/16 inch diameter stainless steel pin inserted in upper cam in accordance with CBC Section 11B-604.8.1.2.
3. Door Strike and Keeper:
   a. Provide surface-mounted door strike and latch keeper for appropriate edge condition and coordinate with latch.
4. Latch:
   a. Provide surface-mounted, stainless steel slide latch conforming to accessibility requirements and pilaster and door conditions.
5. Door Bumper and Hook:
   a. At in-swinging stall doors provide surface-mounted combination hook and rubber-tipped door bumper sized to prevent door hitting mounted accessories.
   b. At out-swinging stall doors provide surface-mounted rubber-tipped door bumper sized to prevent door hitting mounted accessories.
   c. All hooks shall be mounted at +48" maximum AFF.
6. Door Pull in accordance with CBC Section 11B-404.2.7:
   a. At stalls that are not identified as accessible, provide manufacturer's standard door pulls.
   b. At stalls that are identified as accessible, provide pull (or latch assembly) equipped with a loop or "U" Shaped door pull immediately below the latch on both sides of the door conforming to the Americans with Disabilities Act. The latch shall be the sliding, or other hardware not requiring the user to grasp, twist or pinch.
7. Wall Bumper:
   a. At out-swinging stall doors provide wall bumper with a rubber face.
8. Pilaster Shoes and Sleeves (Caps): 3-inches high, finished to match hardware.
   a. Furnish galvanized steel supports and leveling bolts at pilasters as recommended in writing by manufacturer to suit floor conditions. Make provisions for setting and securing continuous, extruded aluminum, antigrip, overhead bracing at top of each pilaster with a single crown to prevent the hiding of contraband. Provide shoe at each pilaster to conceal anchorage.
9. Wall Brackets - provide continuous length of panel, one-ear brackets and two-ear brackets as required.
10. Panel to Pilaster Brackets - provide continuous length of panel, "U" Shaped brackets.

11. Stirrup Brackets- provide one-ear brackets, two-ear brackets, and "U" Shaped brackets as required.
12. Head Rails - provide aluminum, anti-grip profile.
13. Head Rail Brackets - provide aluminum brackets compatible with Head Rail design.
14. Head Rail Endcaps - provide aluminum endcaps compatible with Head Rail design.

2.4 ACCESSORIES

A. Fasteners:
1. Provide manufacturer's standard stainless steel exposed fasteners finished to match hardware, with theft-resistant heads and nuts. For concealed anchors, use hot-dip galvanized, or other rust-resistant protective coated steel.

2.5 FABRICATION

A. Toilet Partition Design shall be as follows:
1. Floor-Anchored and Overhead-Braced.
2. Ceiling-Hung.
3. Floor-Anchored.
4. Floor-Anchored and Ceiling-Hung.
5. Wall-Hung.

B. Furnish standard doors, panels, screens, and pilasters fabricated for toilet partition system. Units shall be furnished with cutouts, drilled holes, and reinforcement to receive partition-mounted hardware, accessories, and grab bars, as indicated on the drawings. Coordinate with Specification Section - TOILET ACCESSORIES, and schedule reinforcements for products actually provided for this project.
1. Doors, panels, and screens shall be 55 inches high and mounted 12 inches above finished floor.
2. Pilasters shall be 82 inches high.
3. Unless otherwise indicated, furnish 24 inch wide in-swinging doors for non-accessible stalls, and 34 inch wide out-swinging doors for front opening accessible stalls.
   a. 36 inch for side opening accessible stalls.
4. Furnish galvanized steel supports and leveling bolts at pilasters as recommended in writing by manufacturer to suit floor conditions. Provide Pilaster Shoes to conceal anchorage.
5. Secure floor-anchored-overhead braced pilasters by providing continuous Head Rails with Head Rail brackets, and Head Rail Endcaps.
6. All floor anchoring requires a solid two inches thick of solid flooring for proper anchorage.

C. Urinal Screens: "Floor-Anchored and Overhead-Braced" of the same construction and finish as toilet partitions.

2.6 FINISHES

A. Color shall be selected from the manufacturer's full color range including standard and premium colors.

B. One color will be selected per room.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site verification of conditions:
   1. Prior to the execution of the work under this specification section, inspect the installed work executed under other sections of this Project Manual which affect the execution of work under this specification section.
   2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
   3. Execution of work under this specification section shall constitute acceptance of existing conditions.

3.2 PREPARATION

A. Coordination:
   1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.
   2. Coordinate the blocking required in all walls with approved shop drawings.

B. Protection:
   1. Protect all adjacent surfaces from drips, spray, air pollution of surrounding environment, and other damage from work under this specification section.

C. Surface preparation:
   1. Prepare surface in accordance with manufacturer's written instructions and recommendations.
   2. Clean substrates of substances (oil, grease, rolling compounds, incompatible primers, loose mill scale, etc.) that could impair bond of materials specified within this section.

3.3 INSTALLATION

A. General:
   1. In accordance with manufacturer's written instructions and recommendations unless specifically noted otherwise.
   2. In accordance with approved submittals.
   3. In accordance with Regulatory Requirements.
   4. Set plumb, level, and square.
   5. Structurally reinforce and anchor work as required.
   6. Panels that contain patched holes not utilized for attachment to walls and pilasters will be rejected by the Architect.

B. Layout:
   1. Lines shall be straight and true.
   2. Stalls:
      a. Provide clearances of not less than 1/2 inch between pilasters and panels, and not more than 1 inch between pilasters/panels and walls.
      b. Secure panels to walls with continuous brackets.
      c. Secure panels to pilasters with continuous brackets. Brackets are to align with continuous brackets at walls.

d. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints.
e. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall.
f. Secure panels in position with manufacturer's written recommended anchoring devices.
g. Secure pilasters to floor and level and plumb, and tighten installation with devices furnished.
h. Secure head rails to each pilaster with not less than two fasteners.
i. Hang doors and adjust so that tops of doors are parallel with head rail when doors are in a closed position. Clearance at vertical edge of doors shall be uniform top and bottom and shall not exceed 1/4 inch.
j. When wainscoting prevents the uninterrupted use of a continuous bracket, secure panels to walls with a continuous bracket to the top of the wainscoting and secure the top of the panels to the wall with a stirrup bracket.

3. Screens:
a. Secure panels to walls with continuous brackets.
b. Provide clearances of not more than 1 inch between panels and walls.
c. Secure panels in position with manufacturer’s written recommended anchoring devices to suit supporting structure.
d. Set units to provide support and to resist lateral impact.

3.4 ADJUSTING

A. Adjust and lubricate for proper operation.

B. Doors:
1. Adjust and set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched.
2. Adjust and set hinges on out-swinging doors (and entrance swinging doors) to return fully closed positions.
3. Adjust and set hinges on doors at accessible stalls to return to fully closed positions.

3.5 CLEANING

A. Clean in accordance with Specification Section - PROJECT CLOSEOUT.
1. Clean exposed surfaces using materials and methods recommended in writing by manufacturer.
2. Protect as necessary to prevent damage during the remainder of the construction period.

END OF SECTION

SECTION 10 28 13 – TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Furnish all material, labor, equipment and services necessary to furnish Toilet Accessories and other related items necessary to complete the Project as indicated by the Contract Documents unless specifically excluded.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS.
   2. ALL DIVISION 01 SPECIFICATION SECTIONS.
   3. 04 22 00 CONCRETE MASONRY UNITS
   4. 06 10 00 ROUGH CARPENTRY
   5. 08 80 00 GLASS
   6. 09 24 00 CEMENT PLASTER
   7. 09 29 00 GYPSUM BOARD
   8. 09 30 13 TILE
   9. 09 72 00 WALL COVERINGS
   10. 10 21 13 TOILET PARTITIONS
   11. ALL SPECIFICATION SECTIONS IN THE FACILITY SERVICES SUBGROUP.

1.2 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
   1. Product Data.
   2. Shop Drawings.
      a. Submit shop drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, loading, required clearances, method of field assembly, components, and location (including ADA & CBC Required dimensions for mounting locations), and size of each field connection.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
      a. ADA American's with Disabilities Act 1990.
      b. CBC California Building Code).

1.4 WARRANTY

A. Contractor's General Warranty:
   1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer's Warranty:
   1. In accordance with manufacturer's written standard warranty:

a. Warranty Period One (1) Year.

C. Installer's Warranty:
1. In accordance with the terms of the Specification Section - WARRANTIES:
a. Warranty period One (1) Year.

PART 2 - PRODUCTS

A. See Schedule in Part 3.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All Toilet Room Accessories shall be furnished and installed by the Contractor, in accordance with manufacturer's written recommendations, and in accordance with accessibility mounting height.

B. Install in accordance with ANSI A117.1 Specification and CBC.

3.2 SCHEDULES

A. All devices listed herein shall be installed where shown, complete, and ready for use in full compliance with all applicable codes and standards. The manufacturers listed are acceptable as approved suppliers to the suppliers to the Owner. Substitution of manufacturers other than those listed, must be approved by the Owner.
1. Hand Dryers (All Boys and Girls Restrooms):
a. Push button 208 V/11 amps, surface mounted, cast iron cover with white enamel finish, fixed nozzle in down position.
1) Acceptable manufacturers:
a) DYSON AIRBLADE V (White).
2. Paper Towel Dispenser: Staff restrooms, Classroom sinks, Nurse's Room & Janitor Room (Not at dryer locations):
a. Mechanical touch -free dispensing method. Tumbler lock.
1) Acceptable manufacturers:
a) BOBRICK B-2860.
3. Toilet Tissue Dispenser (All Student Restrooms):
a. Surface mounted single jumbo-roll toilet paper dispenser. Heavy gage, rust proof, type 304 stainless steel with no moving parts. Accepts 9" diameter roll. Tissue supply viewing slot. Tumbler lock.
1) Acceptable manufacturer:
a) BOBRICK B-2890.
b) BRADLEY 5424.
c) ASI 0042.
4. Toilet Tissue Dispenser (Staff Restrooms):
a. Accessible Stalls: Surface mounted single jumbo-roll toilet paper dispenser. Heavy gage, rust proof, type 304 stainless steel with no moving parts. Accepts 9" diameter roll. Tissue supply viewing slot. Tumbler lock.
1) Acceptable manufacturer:
a) BOBRICK B-2890.

b) BRADLEY 5424.
c) ASI 0042.

b. Non-Accessible Stalls: Surface mounted double jumbo-roll toilet paper dispenser. Heavy gage, rust proof, type 304 stainless steel with no moving parts. Accepts 9" diameter roll. Tissue supply viewing slot. Tumbler lock.
1) Acceptable manufacturer:
a) BOBRICK B-2892.
b) BRADLEY 5425.
c) ASI 0039.

5. Soap Dispenser:
a. OWNER FURNISHED, CONTRACTOR INSTALLED.
6. Sanitary Napkins-Tampon Dispenser (All Girls and Women's Restrooms and Nurse's Stations):
a. Recess mounted, stainless steel, double coin - 25 cents each.
1) Acceptable manufacturers:
a) BOBRICK B-37063-25.
7. Sanitary Napkin Disposal: (Same locations as dispensers.
a. Surface mounted stainless steel.
1) Acceptable manufacturers:
a) ASI 0852.
b) BOBRICK B-270.
c) BRADLEY 4781-15.
8. Grab Bars:
a. 1-1/2" diameter, 18 gage seamless, stainless safety-grip finish, exposed mounting, vandal resistant screws, in configuration as required.
1) Acceptable manufacturers:
a) ASI 3501-P.
b) BOBRICK B-6806-99.
c) BRADLEY 812-2.
9. Mirrors:
a. One piece channel frame, galvanized steel back, wall mounted for accessibility as detailed on the drawings, 1/4" tempered glass, size as shown.
1) Acceptable manufacturers:
a) ASI 0620.
b) BOBRICK B-165 Series.
c) BRADLEY 781.
10. Waste Receptacles:
a. OWNER PROVIDED, CONTRACTOR INSTALLED.
11. SEAT COVER DISPENSER (All Men and Women's Restrooms):
a. Stainless steel, surface mounted.
1) Acceptable manufacturers:
a) ASI 0477-SM.
b) BOBRICK B-221.
c) BRADLEY 5831.

END OF SECTION

SECTION 31 00 00 – OFFSITE DEVELOPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to completely install all materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.
      a. Street improvements include, but are not limited to, demolition, clearing and grubbing, pavement removal, relocating or reconstructing interfering existing utilities, setting manholes and utility boxes to finished grade, constructing permanent pavement, concrete curb and gutter, concrete sidewalks, valley gutter, traffic signal, and traffic signs all as indicated on the Plans, in these Specifications, and in conformance with the Local Governing Authority City's or County's Standard Plans and Specifications.
      b. Utility improvements include, but are not limited to, demolition, clearing and grubbing, pavement removal, relocating or reconstructing interfering existing utilities, setting manholes and utility boxes to finished grade, trench resurfacing, installing water line, sewer lines, manholes, fire hydrants, valves, and all related appurtenances as indicated on the Plans, in these Specifications, and in conformance with the Local Governing Authority City's or County's Standard Plans and Specifications.
      c. The Contractor is responsible for all coordination and project scheduling with Gas and Electric Companies, Telephone Company, and Cable Television Company regarding their work of relocating and/or under-grounding their facilities within the street right of ways adjacent to the project site. Such responsibility shall include, but not necessarily be limited to:
         1) The Contractor establishing and maintaining communication.
   2. Construct and install street improvements to the Local Governing City's or County's standards.

B. Related Sections: The following Project Manual Sections contain requirements that relate to this section:
   1. ALL DIVISION 00 SPECIFICATION SECTIONS.
   2. ALL DIVISION 01 SPECIFICATION SECTIONS.
   3. MADERA COUNTY STANDARD SPECIFICATIONS AND DRAWINGS (Not included in the Project Manual but available on the County's website)

1.2 SUBMITTALS

A. Submit in accordance with Specification Section - SUBMITTAL PROCEDURES:
   1. Submittals:
      a. Submit product information for all components of construction, including but not limited to, asphalt pavement, aggregate base, concrete mix design, striping paint, water pipe, water valves, fire hydrants, water meters, backflow preventers, valve boxes, sewer pipe, sewer manhole materials, reinforced concrete pipe, storm drain manhole materials, storm drain inlets, traffic signal components, crosswalk components, and landscaping and irrigation materials.
   2. Coordination Drawings:
      a. Submit installer's coordination drawings indicating the work of this section with that of related work of other sections for proper interface of the completed work of this section. Installer shall coordinate and obtain approvals from the work of other related sections prior to submitting to the Civil Engineer.
   3. Quality Assurance/Control Submittals:
      a. Test Reports:
         1) Submit five (5) copies of reports required by Regulatory Requirements.
         2) Submit five (5) copies of testing laboratory's report.
   4. Closeout Submittals in accordance with Specification Sections in Division One:
      a. Project Record Documents in accordance with Specification Section – PROJECT DOCUMENTS.
   5. Itemization of Construction Costs Form:
      a. Contractor shall complete the Itemization of Construction Costs form attached as Appendix A for the off-site work that is eligible for reimbursement by the City and/or Fresno Metropolitan Flood Control District.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. In accordance with Specification Section - REGULATORY REQUIREMENTS, and the following:
      a. CAL/OSHA — All work shall comply with the rules and regulations of the California Division of Occupational Safety and Health (formally the Division of Industrial Safety), and all other local, state and federal agencies having jurisdiction. Nothing contained herein shall be construed as permitting work that is contrary to such rules, regulations and codes.
         1) Full compensation for all costs involved in worker protection from caving ground in excavating shall be included in the lump sum price bid for the work under this contract.
      b. CARB — Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board (CARB)and the Environmental Protection Agency (EPA), in the area where the project is located.
      c. MC — Madera County (MC), Standard Drawings and Specifications, latest edition.

B. Surveying and preservation of existing monuments:
   1. Surveying for offsite improvements shall be secured and paid for by the Contractor. The Contractor shall be responsible to contract for, coordinate and pay for all such services by a Civil Engineer or Land Surveyor registered in California and acceptable to the Architect.
   2. Carefully preserve all data and monuments set by the Owner's Civil Engineer and, if displaced or lost, the Contractor's Engineer shall immediately replace such monuments to the satisfaction of the MC and at no additional cost to the Owner.

C. Monitoring of construction site:
   1. The Contractor shall monitor the construction site on a regular basis during non-working hours, including weekends and holidays to ensure that no situations arising, relating to the condition of the work site, which could pose a threat to public safety. In addition the contractor shall furnish to the Owner and to the Local Governing City's or County's Construction Management Division, prior to the issuance of the "Notice to Proceed", a list of persons, together with their addresses and home telephone numbers, who are authorized to act on behalf of the Contractor in an emergency arising out of conditions at the work site after normal working hours.
   2. Safe pedestrian crossings shall be maintained at all existing crosswalks and intersections.
      a. The Contractor shall secure the site of work at all times. Children shall not be allowed in or along the excavation, on spoil piles or at other undesirable locations within the work. The Contractor shall provide suitable traffic and pedestrian warning devices and signs necessary at or near the work as required by safety considerations and/or jurisdictional authorities. Convenient pedestrian detours and/or flagmen and/or safe temporary bridges over excavations, complete with adequate safety rails, shall be provided as necessary.

D. Compaction and compaction tests:
   1. The Contractor shall be fully responsible for timely compaction and suitability of material for compaction. Where necessary, wet and pumping material shall be removed from the trench or excavation by the Contractor and replaced with suitable approved material as necessary to complete operations within the times allowed.
   2. Compaction requirements for all excavations within public streets, shall be in accordance with MC Encroachment Permit and in accordance with MC Standard Specifications.
   3. Initial compaction testing shall be provided by the Owner. The Contractor shall file adequate notice to the Architect when he desires compaction testing. All required compaction re-testing of backfill because of failure to pass original test shall be at the expense of the Contractor.
   4. Full compensation for all costs involved in meeting and satisfying the above requirements shall be included in the amount bid for the various items of work and no separate payment will be made therefore.

1.4 PROJECT CONDITIONS

A. Existing Conditions:

1. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
2. Conduct work so as not to interfere unnecessarily with adjacent roads, streets, drives and walks.
3. Before commencing excavation, the Contractor shall notify all utility authorities or utility companies having possible interest in the work of the Contractor's intention to excavate proximate to existing facilities and Contractor shall verify the location of any utilities within the work area.
4. The Civil Engineer has made a diligent attempt to show on the Construction Drawings all pertinent intersecting utilities which may affect the work. Utilities shown in profile view are shown at their most probable locations, based upon available as-built drawings and known construction custom. The Contractor shall exercise caution while performing excavation for this project and shall protect existing utilities from damage, inasmuch as their exact location is unknown until exposed by the excavation.
5. Because of the close proximity of certain existing parallel or intersecting utilities and the depth of the proposed facilities, it may be necessary for the Contractor to provide special protection for the existing utility, and/or provide for its temporary and/or permanent relocation in order to construct the facilities shown on the Plans. Bracing of power poles may be necessary. The Contractor shall coordinate said work and shall be responsible for complying with the requirements of the utility authority involved. Full compensation for all costs involved in such special protection and/or relocation, including all appurtenances and incidentals, shall be included in the amount bid for the various bid items, and no separate payment shall be made therefor.
6. All existing utility mains and service lines shall be kept in constant service during the construction of this project. Hand excavating shall be employed where necessary to safely expose existing utilities.
7. Full compensation for all costs involved in locating, verifying, protecting, exposing, relocating, reconstruction and otherwise providing for utilities shall be included in the amount bid for the various items of work and no separate payment shall be made therefor.

B. Dust Control:
1. The Contractor shall maintain dust control about the site of the work, including any haul roads to or from the site, by whatever means are necessary, such as watering, sweeping or oiling, so as to cause the least possible dust nuisance to the public. Any dust control measure ordered by the Architect shall be promptly and immediately carried out.
2. If the Contractor fails to provide dust control measures so ordered within a period of 2 hours from the time ordered by the Architect, the Contractor shall pay to the Owner a penalty of Fifteen (15) Dollars for each one half (1/2) hour, or portion thereof, that elapses beyond the 2 hour warning period, until dust control measures ordered by the Architect are completely carried out and the dust nuisance eliminated or prevented.
3. Such penalty shall be deducted from any monies owed the Contractor. In addition to the penalty as specified above, if conditions warrant, the Architect may employ other forces to eliminate or prevent the dust nuisance. The full cost thereof, in addition to the penalty as herein provided, shall be deducted from any monies owed the Contractor.
4. Full compensation for dust control shall be included in the amount bid for the various items of work and no separate payment will be made therefore.

C. Traffic Control:

1. Traffic control measures shall be fully and completely carried out at all times to the satisfaction of MC. If the Contractor fails to provide satisfactory traffic control the Owner may obtain services from other sources and deduct from the contract the cost thereof.
2. Through traffic shall be provided for during non-working hours including, but not limited to, weekends, holidays and at night.
3. The Contractor shall comply with all requirements of MC Street Encroachment Permit.
4. Full compensation for traffic control shall be included in the amount bid for the various items of work and no separate payment will be made therefore.

D. Protective measures:
1. Furnish, place, and maintain all supports, shoring, and sheet piling which may be required for the sides of excavation or for protection of adjacent existing improvements. The adequacy of such systems shall be the complete responsibility of the Contractor.
2. Maintain all benchmarks, monuments and other reference points. If disturbed or destroyed, replace as directed.
3. Forty-eight (48) hours prior to beginning construction, the Contractor shall notify the owners of all properties adjacent to the proposed construction. The Contractor shall also provide the property owners with an estimate of the length of time that their properties will be affected by his construction activities.

E. Permits:
1. The Owner shall pay for all permits required for work under this contract including, but not limited to, MC encroachment permit, the MC's water and sewer permit, and any other incidental permits. The Contractor shall be responsible for providing any and all required information, such as Certificates of Insurance, Workmen's Compensation forms, etc, to MC for the issuance of the respective permits. Full compensation for providing said information shall be included in the price bid for the various items of work and no separate payment will be made therefor. Contractor shall comply with all conditions of any permits issued for the project.
2. The Owner shall pay all inspection fees required by governmental agencies.
3. The Contractor shall obtain a permit from the Division of Occupational Safety and Health of the State of California prior to the commencement of construction. Full compensation for said permit shall be included in the price bid for the various items of work and no separate payment will be made therefor.

1.5 WARRANTY

A. Contractor's General Warranty:
1. In accordance with Specification Section - WARRANTIES.

B. Manufacturer’s Warranty:
   1. In accordance with manufacturer's written standard warranty:
      a. Warranty Period One (1) Year.

C. Installer's Warranty:
   1. In accordance with the terms of the Specification Section - WARRANTIES:
      a. Warranty period One (1) Year.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials incorporated in street and utility construction shall conform with MC Standard Plans and Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site verification of conditions:
   1. Prior to the execution of the work under this specification section, inspect the installed work executed under other specification sections of this Project Manual which affect the execution of work under this specification section.
   2. Report unacceptable conditions to the Architect. Do not begin work until unacceptable conditions have been corrected.
   3. Execution of work under this specification section shall constitute acceptance of existing conditions.

3.2 PREPARATION

A. Coordination:
   1. Coordinate work under this specification section with work specified under other specification sections to ensure proper and adequate interface of work specified under this specification section.

B. Surface preparation:
   1. Prepare surface in accordance with manufacturer's written instructions and recommendations.

3.3 CONSTRUCTION

A. Interface with other work:
   1. Construction of street and utility facilities shall be performed in accordance with MC Standard Plans and Specifications.
   2. The Contractor shall be responsible to protect all other existing and proposed utilities and improvements affected by his work.

3. The Contractor shall cooperate with all other contractors on the job to insure that his activities do not delay or hinder the construction activities of others.
4. Upon approval, excess earth from trenching and off-site grading may be deposited within the boundaries of the school site at a location specified by the Owner for incorporation in site grading activities. All such earth shall be free of organic material, large rocks, concrete, hardpan, asphalt paving and other deleterious materials.
5. The Contractor shall be aware that the work of this contract is a portion of the total work required for the construction of the project site. The Contractor shall coordinate his work and his schedule fully with other forces performing work relating to the construction of the above stated project. Included in these "other forces" are Gas and Electric, Telephone, the forces constructing on-site improvements for the above stated project and any other forces performing work within the project area which requires coordination with the work of this contract.
6. The Contractor shall coordinate his efforts with other forces performing on-site work such that said forces are provided with adequate access to the site.

3.4 FIELD QUALITY CONTROL

A. Site Tests:
   1. As required by Regulatory Requirements.

B. Inspection:
   1. As required by Regulatory Requirements.
   2. Schedule inspections and notify the Architect, Owner’s Inspector and any other regulatory agencies of the time at least 48 hours prior to the inspection.
   3. No work shall be without the inspections required by Regulatory Requirements.

END OF SECTION

SECTION 311100 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This Section includes the following:

1. Provide all material, labor, equipment and services necessary to completely clear and demolish all materials, accessories and other related items necessary to complete the Project as indicated by the Contract Documents.

B. RELATED SECTIONS:

1. Contract General Conditions and Division 1, General Requirements
2. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading
3. Section 31 22 22 – Soil Materials
4. Section 31 23 33 – Trench Excavation and Backfill

1.3 SUBMITTALS

(NOT APPLICABLE)

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:

1. In accordance with Specification Section GENERAL REQUIREMENTS, and the following:

a. Materials and equipment used for this project shall comply with the current applicable regulations of the California Air Resources Board [CARB] and the Environmental Protection Agency [EPA].

B. Meetings:

1. Minimum agenda shall be to discuss coordination of upcoming work, review the work progress, discuss field observations, identification of any potential problems which may impede planned progress; corrective measures to regain projected schedule; and maintenance of quality and work standards.
2. Meetings shall include Pre-Clearing and Demolition Meetings.

3. Participants (or designated representative of) invited to attend each of the above meetings shall be as follows:

    a. Contractor.
    b. Owner.
    c. Architect.
    d. Testing Laboratory.
    e. Local Governing Authorities as applicable.
    f. Utility Representatives as applicable.
    g. Owner's Inspector.
    h. Clearing and Demolition Subcontractor.
    i. Other subcontractors, as appropriate (including any accessory subcontractors).

1.5 PROJECT CONDITIONS OR SITE CONDITIONS

A. Dust Control

1. Contractor shall comply with all requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for construction activity related to this project.
2. A Dust Control Plan, as required by the SJVAPCD, may be required for this project. Contractor shall be responsible for preparing said Dust Control Plan, submitting to the SJVAPCD for review and approval, and paying all SJVAPCD review and permitting fees related to the Dust Control Plan.
3. No construction activity related to this project may begin until Contractor has secured an approved Dust Control Plan, if one is required.
4. Contractor shall be solely responsible to implement all requirements of the Dust Control Plan throughout the life of this contract.
5. Should fines or fees be levied against the Project for violations of the Dust Control Plan and/or related SJVAPCD regulations, Contractor shall be responsible to pay all said fines or fees and to implement all mitigation measures required by SJVAPCD in order to bring the construction activity into compliance with SJVAPCD regulations. The costs for any such fines or fees shall be included in the lump sum price bid for work under this contract and no additional payment will be made therefor.

B. Existing Conditions:

1. Examine site and compare it with the drawings and specifications. Thoroughly investigate and verify conditions under which the work is to be performed. No allowance will be made for extra work resulting from negligence or failure to be acquainted with all available information concerning conditions necessary to estimate the difficulty or cost of the work.
2. Conduct work so as not to interfere unnecessarily with adjacent roads, streets, drives, walks or occupied facilities.

    a. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and Authorities having jurisdiction.
    b. Provide alternate routes around closed or obstructed traffic ways if required by Authorities having jurisdiction.

3. Locate and identify utilities.

    a. Call a Local Utility Locator Service (USA – "Underground Service Alert" – [800] 227-2600) for the task of locating any applicable utilities in the area where the Project is located.

4. Carefully remove items indicated to be salvaged and store on Owner's premises at the Owner's direction.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordination:

1. Coordinate work under this specification section with work specified under other sections to ensure proper and adequate interface of work.

B. Protection:

1. Protect and maintain all benchmarks and survey control points from disturbance during clearing and demolition operations.
2. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties.
3. Furnish and install temporary protection/barrier fencing surrounding the limits of demolition.
4. Protect trees, plant growth, and features not specifically designated for removal. Locate and clearly flag trees and vegetation to remain or to be relocated.
5. Protect existing improvements designated to remain from damage during construction.

    a. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.2 CONSTRUCTION

A. Shrub and Weed Removal:

1. Remove weeds and rooted topsoil to a minimum four (4) inch depth and temporarily stockpile as needed for re-use in finished grading of landscape areas. Remove excess material from the site.
2. Where existing vegetation is to be replaced by new materials, remove contaminated or excess soil from the site and legally dispose of off-site.

B. Existing Site Improvements Removal:

1. Remove existing above and below grade improvements as necessary to facilitate new construction.

a. Remove concrete slabs, sidewalk, curbs, mow strips, gutters, and fence post footings.

1) Neatly saw-cut length of existing pavement to remain before removing existing pavement unless existing full-depth joints coincide with line of demolition. Saw-cut faces vertically.

b. Remove indicated utility improvements within the limits of construction.

1) Excavate for and disconnect utilities designated to be removed. Seal or cap off underground.
2) Coordinate removal and/or relocation of utilities with the appropriate utility agencies.

c. Where existing underground utilities, irrigation pipes, wells, leach fields, or underground tanks are encountered, they must be removed or moved to a point at least 5 feet horizontally outside the proposed building and 3 feet horizontally outside the concrete flatwork or pavement construction areas. All resultant cavities must be backfilled with engineered fill.

C. Existing Utilities to Remain or be Relocated:

1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

a. Notify Architect and the Owner not less than seven (7) days in advance of proposed utility interruptions.
b. Arrange to shut off indicated utilities with utility companies and Owner.

D. Disposal:

1. Legally dispose of all debris (surplus soil materials, unsuitable topsoil, obstructions, demolished materials, waste materials, trash, etc.) resulting from clearing, grubbing, demolition and from construction. Disposal of all materials shall be at a location secured by the Contractor off of the Owner’s property.

END OF SECTION

SECTION 312000 - EARTHWORK: EXCAVATION, FILLING AND GRADING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This Section includes the following:

1. Excavating soil and other material for surface improvements.
2. Placing fill.
3. Compaction of existing ground and fill.
4. Preparation of subgrade for other improvements.
5. Grading of soil.

B. RELATED SECTIONS

1. Contract General Conditions and Division 1, General Requirements
2. Section 31 11 00 – Site Clearing
3. Section 31 22 22 – Soil Materials
4. Section 31 23 33 – Trench Excavation and Backfill

1.3 REFERENCES

A. ANSI/ASTM D1557 - 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.

1.4 DEFINITIONS

A. Utility: Any buried or above ground pipe, conduit, cable, associate device or appurtenances, or substructure pertaining thereto.

1.5 SUBMITTALS

A. Product Data:
1. Information indicating the source of all import material, the fill material type and where it is to be used, and approval of the District's Inspector of Record for incorporation of import material into the Work.

B. Material Test Reports:
1. Classification of Soils.
2. Compaction Characteristics of Soils.

3. Density and Unit Weight of Soils in Place.
4. Imported fill shall be tested and approved by the Owner's Geotechnical Engineer prior to import to the site, including testing for compliance with Department of Toxic Substances Control (DTSC) guidelines. Said testing and certification documents shall be paid for by the Owner.

C. Project Closeout: In accordance with Specification Section PROJECT CLOSEOUT.
1. Drawings indicating the extent and depth of all engineered fill, and overexcavation and recompaction. This information shall be a part of the Project "As-Built" and Project "Record" Documents in accordance with the Specification Section PROJECT DOCUMENTS.

1.6 QUALITY ASSURANCE

A. Installer:

1. Qualifications:

a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this project within the past 5 years.

B. Regulatory Requirements:

1. In accordance with Specification Section REGULATORY REQUIREMENTS and the following:

a.	CARB	Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board [CARB].
b.	MC	Madera County, Codes and Ordinances
c.	EPA	Environmental Protection Agency.
d.	CAL/OSHA	Comply with all provisions of the Construction Safety Orders and the General Safety Orders of the California Division of Occupational Safety and Health, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground excavations.
e.	DTSC	Comply with all recommendations of the California Department of Toxic Substance Control (DTSC) regarding soil testing for potential contaminants.

C. Certificates:

1. Installer's certification that all Earthwork installation meets or exceeds the requirements of this specification.
2. Contractor's certification (on Contractor's letterhead paper) that the Earthwork materials and installation meets or exceeds the requirements of this specification.

D. Meetings:

1. Pre-Installation: Schedule prior to the start of work.

a. Coordinate the work with other work being performed.
b. Identify any potential problems, which may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.

2. Progress: Scheduled by the Contractor during the performance of the work.

a. Review for proper installation of work progress.
b. Identify any installation problems and acceptable corrective measures.
c. Identify any measures to maintain or regain project schedule if necessary.

3. Completion: Scheduled by the Contractor upon proper completion of the work.

a. Inspect and identify any problems which may impede issuance of warranties or guaranties.
b. Maintain installed work until the Notice of Substantial Completion has been filed.

1.7 COORDINATION

A. Coordinate work with Owner's personnel.

B. Provide required notification to the Owner and Geotechnical Engineer or the Engineer of Record so that a representative from the Owner's Geotechnical Engineering consultant can be present for all excavation, filling and grading operations to test and observe earthwork construction.

C. Verify that the location of existing utilities have been indicated at work site by utility authorities, by Owner, and as specified on the Plans.

1.8 EXISTING CONDITIONS

A. Existing Conditions:

1. Examine the site and verify conditions with the Drawings and Specifications. Contractor shall familiarize himself with existing site conditions and any changes that have occurred at the site since the preparation of the contract documents, and shall be responsible to account for any such changes in the price bid for this work.

2. Thoroughly investigate and verify conditions under which the Work is to be performed.
3. Locate and identify utilities:

a. Call a Local Utility Locator Service (USA - "Underground Service Alert" – [800] 227-2600) for the task of locating any applicable off-site and on-site utilities in the area where the Project is located.

4. No allowance for Extra Work will be granted resulting from negligence or failure to meet requirements of this Section.

B. Where subsurface work involves more than the normal depth of excavation required for the removal and/or construction of surface improvements (surface improvements such as concrete

flatwork, paving, landscaping, signs, etc.), the Engineer will have made a diligent attempt to indicate on the plans the location of all main and trunk line utility facilities which may affect the Work. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

C. Under similar circumstance, service laterals and appurtenances will have also been shown where information was available as to their location. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

D. Determine exact location of existing buried utilities by:

1. Marking on ground or pavement surface the alignment and extent of the facilities and the probable location of existing utilities using construction plans and existing surface features.
2. Requesting Underground Service Alert (USA) to indicate location of existing buried facilities (phone 1-800-227-2600). Provide USA a minimum of two (2) working days notice of request for locations, and notify Owner of said request concurrently.
3. Confirm exact location of existing utilities by hand methods of excavation, or by use of vacuum equipment.

E. At proposed work location, expose by hand methods (or vacuum equipment) all existing utilities along the route of the proposed work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand (or vacuum equipment) methods to locate all existing facilities as indicated on the plans, and/or as indicated on the ground by USA or Owner's personnel.

F. Provide Field Engineering to record the location of all utilities encountered. Where locational conflicts exist between existing utilities and the planned location of facilities to be constructed under this Contract, submit detailed information to the Engineer for review and direction.

G. Maintain all existing utility mains and service lines in constant service during construction of the Work.

H. Where service disruptions are allowed, minimize the length of such disruptions by proper scheduling and diligent pursuit of the work, and coordinate the timing of any such disruptions in advance with the District.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Dust control: Perform work in a manner as to minimize the spread of dust and flying particles. Thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors and concurrent performance of other on-site work.

1. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.

2. All land clearing, demolition, grubbing, scraping, excavation, land leveling, grading, and cut and fill activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by pre-soaking.
3. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions or at least six inches of freeboard space from the top of the container shall be maintained.
4. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. The use of blower devices is expressly forbidden.
5. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/ suppressant.

    a. Contractor shall comply with all requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for construction activity related to this project.
    b. A Dust Control Plan, as required by the SJVAPCD, may be required for this project. If required, Contractor shall be responsible for preparing said Dust Control Plan, submitting to the SJVAPCD for review and approval, and paying all SJVAPCD review and permitting fees related to the Dust Control Plan.
    c. If a dust control plan is required, no construction activity related to this project may begin until Contractor has secured an approved Dust Control Plan.
    d. Contractor shall be solely responsible to implement all requirements of the Dust Control Plan throughout the life of this contract.
    e. Should fines or fees be levied against the Project for violations of the Dust Control Plan and/or related SJVAPCD regulations, Contractor shall be responsible to pay all said fines or fees and to implement all mitigation measures required by SJVAPCD in order to bring the construction activity into compliance with SJVAPCD regulations. The costs for any such fines or fees shall be included in the lump sum price bid for work under this contract and no additional payment will be made therefore

B. Burning: No burning will be allowed on-site.

C. Rain: Work under this section shall not be started or maintained under threat of rain, unless the work is not affected by the rain.

D. Do not place fill during weather conditions which will alter moisture content of fill materials sufficiently to make compaction to the specified densities difficult or impossible.

E. When reference is made to SWPPP (Storm Water Pollution Prevention Plan), if any within this Project Manual, then comply with all environmental protection requirements included therein.

F. In accordance with EPA, CARB and MC.

G. Protection:

1. Protect cut and fill areas to prevent water running into excavation. Maintain areas free of water. Remove seeping water immediately by pumps. Provide dewatering as necessary.

2. Protect cut slopes from erosion due to precipitation and other sources of runoff.
3. Protect utilities to remain within the construction area and special construction. If utility lines are uncovered (water, electric, sewer, etc.) not shown on the drawings during excavation of site, notify the Architect promptly for its review and action.
4. Do not permit access to undeveloped portions of the site, nor to areas that are outside of the limits of grading.

H. Before being brought onto the site, all import soil must be sampled, tested and approved by Owner's Geotechnical Engineer. All import material must comply with DTSC recommendations and guidelines for environmentally clean soil suitable for school construction. Import testing will be provided and paid for by the Owner.

1.10 PROJECT RECORD DOCUMENTS

A. Submit under provisions of GENERAL CONDITIONS and DIVISION 1, GENERAL REQUIREMENTS.

B. Accurately record actual locations of utilities encountered including depth and horizontal location, as measured from permanent site features.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill in Turf or Other Planting Areas: Type S2 or S3 per Division 31 Specification Section SOIL MATERIALS.

B. Fill in Non-planting Areas: Type S1, S2 or S4 per Division 31 Specification Section SOIL MATERIALS.

C. Imported material: Type S3, S4 or S5 per Division 31 Specification Section SOIL MATERIALS.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify site conditions.

3.2 PREPARATION

A. Layout of Work:

1. Contractor shall be responsible for all lines and grades. Layout shall be provided by a California registered Land Surveyor or Civil Engineer, at Contractor's expense.
2. Check all bench marks, monuments and property lines and verify locations.

3. Locate and maintain all grade stakes.
4. Monuments moved or displaced during grading operation are to be replaced by a California Registered Civil Engineer or Surveyor, at Contractor's expense.

B. Locate, identify, and protect existing above and below grade utilities from damage.

C. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.

D. Protect existing structures, fences, curbs, sidewalks, paving and other improvements to remain from damage from excavation equipment and vehicular traffic.

E. Employ equipment and methods appropriate to the work site.

F. Protect excavated areas from drainage inflow and provide for drainage of all excavated areas.

G. Comply with all provisions of the Construction Safety Orders and General Safety Orders of the California Division of Industrial Safety, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground in excavations.

3.3 SITE STRIPPING:

A. Reference is made to Division 31 Specification Section SITE CLEARING.

B. Within the areas of planned surface improvements and structures, the near surface soils containing vegetation, roots, organics, or other objectionable material must be stripped and removed from the site. Upon approval of the Geotechnical Engineer, suitable materials stripped from the site may stockpiled and incorporated into the finish fill for planting areas.

C. All areas to receive surface improvements shall be stripped to remove turf, shrubs, trees and other vegetation, along with associated root systems, concrete, wood, metal, rubbish and other unsuitable debris, and any loose, saturated or unconsolidated soil material. Minimum stripping depth is expected to be 3-inches below existing site grades. Stripping shall continue to the depth required to expose acceptable basement soils that are free from deleterious which are not suitable for Engineered Fill, as required by the Geotechnical Engineer.

3.4 EXCAVATION

A. Following clearing and stripping operations, excavate planned construction areas as specified in this Section.

B. Provide additional excavation as required to conform to the lines, grades and cross-sections shown on the plans.

C. When excavating through tree roots, perform work by hand and cut roots, where authorized, with a saw. Remove all roots 1/2" in diameter and greater.

D. Remove excess soil not to be used as fill in the Work from the site. Unless requested by Owner to be deposited at a site designated by Owner on the property, obtain a disposal site and legally dispose of said excess material, all at no additional cost to the Owner.

E. Areas disturbed by demolition must be excavated to expose undisturbed soils.

F. Excavated soils free of deleterious substances (organic matter, demolition debris, tree roots, etc.) and with less than 3% organic content by weight, may be returned to the excavations as Engineered Fill.

3.5 FILLING AND COMPACTING

A. Once clearing, stripping and over-excavation operations are complete, scarify the surface to receive fill material or improvements to a depth of 8-inches, moisture condition to at least 2% above optimum moisture content, and compact to a minimum of 90% of maximum dry density based on ASTM Test Method 1557.

B. Place and compact soil to finish subgrade of improvements to be placed thereon, or to finished surface grade where no improvements are to be placed thereon.

C. All fill required shall be placed as Engineered Fill.

D. The Contractor shall be solely responsible for securing an acceptable source of import material as required to grade the site. Reference is made to 31 20 00 1.9.H.

E. On-site soils are suitable for re-use as Engineered Fill, providing they are cleansed of excessive organics (less than 3 percent by weight, ASTM D2974), debris, and fragments larger than three (3) inches in maximum dimension and meet the requirements of soil Type S4, Division 31 Specification Section SOIL MATERIALS.

F. Engineered Fill shall be moisture conditioned to within 2% of optimum moisture, placed in uncompacted layers not exceeding eight (8) inches in thickness, and compacted as specified, based on ASTM Test Method D1557.
   1. Non-vegetative surface improvement areas (structures, pavement and site concrete improvements) - To a minimum of 92% of maximum dry density.
   2. Vegetative surface improvement areas (turf and planters) - Below top twelve (12) inches - to a minimum of 90% of maximum dry density. Top twelve (12) inches - 85% of maximum dry density.
   3. Pavement areas: to a minimum 95% of maximum dry density (relative compaction) in top twelve (12) inches.

G. Maintain optimum moisture content of fill materials to attain required compaction density.

H. Additional lifts shall not be placed if the previous lift did not meet the required dry density, or if soil conditions are not stable.

I. Conform fill to the lines, grades and cross-sections shown on the plans.

J. Fill materials to conform to Division 31 Specification Section SOIL MATERIALS.

K. Provide, at no additional cost to Owner, imported soil material conforming to the requirements of Division 31 Specification Section SOIL MATERIALS, as needed to attain finished grades of Work.

L. Utilize equipment which will not disturb or damage existing utilities and other improvements.

3.6 PREPARATION OF SUBGRADE FOR SURFACE IMPROVEMENTS

A. Where concrete, asphalt-concrete, aggregate base, or other non-vegetative surface improvements, or a layer of said surface improvements, are to be constructed on the soil surface, prepare the subgrade for said improvements in accordance with this section.

B. Scarify the soil as specified and remove and dispose of (off the project site) all rocks, hardpan chunks or otherwise unsuitable material over 3-inches in size.

C. Thoroughly moisture condition and compact as described above.

D. Prior to commencing construction of surface improvements, pass a test roller of size and weight as approved by the Owner over the subgrade to establish the extent of soft or spongy areas requiring repairs.

E. Conform finished subgrade surface to the lines, grades and cross-sections shown on the plans.

3.7 FINE GRADING

A. Fine grade all finished surfaces to the lines, grades and cross-sections shown on the plans, and to blend to hard surface improvements.

B. Rake and smooth all finished surfaces not to receive hard surface improvements.

C. Use suitable stockpiled or imported topsoil for the top 12-inches of areas to receive landscape improvements.

D. Import topsoil meeting the requirements of Division 31 Specification Section SOIL MATERIALS, as required to complete finish grading.

E. Topsoil may not be used in areas requiring Engineered Fill.

3.8 TOLERANCES

A. Top surface of Subgrade for Non-Vegetative Surface Improvements or Layers thereof: Plus or minus 0.02 foot from planned elevation.

B. Top surface of Subgrade for Vegetative Surface Improvements or for Bare Ground - Plus or minus 0.05 foot of planned elevation, or as required for finish surface to match adjacent improvements or ground.

3.9 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of GENERAL CONDITIONS and/or DIVISION 1, GENERAL REQUIREMENTS.

B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.

C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest.

D. All retesting required as a result of failure of initial test will be performed by Owner's testing agency, at the expense of the Contractor.

3.10 PROTECTION

A. Protect graded areas from traffic, freezing, erosion, and all other sources of damage. Keep free of debris and trash.

B. Repair and re-establish grades to specified tolerances where completed or partially completed work becomes eroded, rutted, settled, or where it is damaged by subsequent construction operations or weather.

C. Where settlement occurs prior to acceptance of the work, remove and replace surface improvements, excavate, replace, and re-compact in accordance with these specifications, and restore the surface improvements.

3.11 CLEANING

A. Remove all surplus or unsatisfactory soil material, trash, and debris, and legally dispose of off of the Owner's property.

END OF SECTION

SECTION 312222 - SOIL MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. SECTION INCLUDES
   1. Excavated (and re-used) materials and imported materials.

1.3 RELATED SECTIONS:

1. Section 31 20 00 – Earthwork: Excavation, Filling and Grading.
2. Section 31 23 33 – Trench Excavation and Backfill.

1.4 SUBMITTALS

A. Samples: Submit, in air-tight containers, 10 lb. sample of Type S3, S4 and S5 fill to inspector.

B. Soil Analysis: Submit for Type S3, S4 and S5 soils to be imported.

C. Materials Source: Submit location of imported materials source. Provide materials from same source throughout the work. Change of source requires approval.

D. For imported soil, obtain Geotechnical Engineer and DTSC approval prior to importing.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Soil Type S1: Excavated and re-used material, graded; free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

B. Soil Type S2: Excavated and reused material, graded; free of roots, lumps greater than one inch, rocks larger than 1/2 inch, debris, weeds and foreign matter.

C. Soil Type S3: Imported topsoil, friable loam; reasonably free of roots, rocks larger than ½ inch, debris, weeds, and foreign matter.

D. Soil Type S4: Imported borrow, suitable for purposes intended, meeting the following characteristics:

1. Maximum Particle Size: 3”
2. Percent Passing #4 Sieve: 65-100
3. Percent Passing #200 Sieve: 20-45
4. Expansion Index: <20
5. Plasticity Index: <12
6. R-Value (in paved areas): >50
7. Low Corrosion Potential:

    a. Soluble Sulfates: <1,500 mg/Kg
    b. Soluble Chlorides: <300 mg/Kg
    c. Soil Resistivity: >5,000 ohm-cm

E. Soil Type S5: Imported sand. Natural river or bank sand (sand equivalent greater than 30), washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

2.2 SOURCE QUALITY CONTROL

A. Inspection of imported soil will be performed by the Geotechnical Engineer, at source of import and prior to being delivered to the site.

PART 3 - EXECUTION

3.1 STOCKPILING

A. Stockpile excavated or imported material onsite at location designated by project inspector.

B. Stockpile excavated or imported material in sufficient quantities to meet project schedule and requirements.

3.2 STOCKPILE CLEANUP

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free standing surface water.

B. Dispose of excess material off-site.

END OF SECTION

SECTION 312333 - TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. SECTION INCLUDES
1. Excavating trenches, holes and pits for constructing the Work.
2. Backfill and compaction.
3. Providing suitable bedding and backfill material, as specified herein.

B. RELATED SECTIONS
1. Contract General Conditions and Division 1, General Requirements.
2. Section 31 11 00 – Site Clearing
3. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading
4. Section 31 22 22 – Soil Materials
5. Section 33 40 00 – Storm Drainage

1.3 REFERENCES

A. ANSI/ASTM D1557 - 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.

1.4 DEFINITIONS

A. Utility: Any buried or above ground pipe, conduit, cable, associate devices or appurtenances, or substructure pertaining hereto.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Installer:

a. Engage an experienced Installer who has successfully completed three (3) projects of similar scope and size to that indicated for this project within the past 5 years.

B. Regulatory Requirements:

1. In accordance with Specification Section REGULATORY REQUIREMENTS and the following:

a.	CARB	Materials and equipment used for this Project shall comply with the current applicable regulations of the California Air Resources Board [CARB] and the Environmental Protection Agency [EPA].
b.	MC	Madera County, Codes and Ordinances
c.	EPA	Environmental Protection Agency.
d.	CAL/OSHA	Comply with all provisions of the Construction Safety Orders and the General Safety Orders of the California Division of Occupational Safety and Health, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground excavations.

C. Certificates:

1. Installer's certification that all trench backfill installation meets or exceeds the requirements of this specification.
2. Contractor's certification (on Contractor's letterhead paper) that the trench backfill materials and installation meets or exceeds the requirements of this specification.

D. Meetings:

1. Pre-Installation: Schedule prior to the start of work.

a. Coordinate the work with other work being performed.
b. Identify any potential problems, which may impede planned progress and proper installation of work regarding quality of installation and warranty requirements.

2. Progress: Scheduled by the Contractor during the performance of the work.

a. Review for proper installation of work progress.
b. Identify any installation problems and acceptable corrective measures.
c. Identify any measures to maintain or regain project schedule if necessary.

3. Completion: Scheduled by the Contractor upon proper completion of the work.

a. Inspect and identify any problems which may impede issuance of warranties or guaranties.

4. Maintain installed work until the Notice of Substantial Completion has been filed.

1.6 COORDINATION

A. Coordinate work with Owner's personnel.

B. Verify that the location of existing utilities have been indicated at work site by utility authorities.

1.7 EXISTING UTILITIES

A. Where subsurface work involves more than the normal depth of excavation required for the removal and/or construction of surface improvements (surface improvements such as concrete work, paving, landscaping, signs, etc.), the Engineer will have made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

B. Under circumstance similar to 31 23 33/1.7A, service laterals and appurtenances will have also been shown where information was available as to their location. In many cases, however, the only available information relative to the existing location of said facilities may have been small scale undimensioned plats. The locations of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

C. Determine exact location of existing buried utilities by:

1. Marking on ground or pavement surface the alignment and extent of the proposed facilities and the probable location of existing utilities using construction plans and existing surface features.
2. Requesting Underground Service Alert (USA) to indicate location of existing buried facilities (phone 1-800-227-2600). Provide USA a minimum of two (2) working days notice of request for locations, and notify Owner of said request concurrently.
3. Locate exact location of existing utilities by hand methods of excavation, or by use of vacuum equipment.

D. At proposed work location, expose by hand methods (or vacuum equipment) all existing utilities along the route of the proposed work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand (or vacuum equipment) methods to locate all existing facilities as indicated on the plans, and/or as indicated on the ground by USA or Owner's personnel.

E. Provide Field Engineering per Contract General Conditions and Division 1 to record the location of all utilities encountered. Where locational conflicts exist between existing utilities and the planned location of facilities to be constructed under the Contract, submit detailed information to the Owner's Inspector and Engineer for review and direction.

F. Maintain all existing utility mains and service lines in constant service during construction of

the Work.

G. Where service disruptions are allowed, minimize the length of such disruptions by proper scheduling and diligent pursuit of the work.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Fill Type S1, S2, S4 and S5, as specified in Division 31 Specification Section SOIL MATERIALS.

2.2 WARNING TAPE

A. 6” wide warning tape shall be installed over all of the pipelines as shown on the details.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.

B. Protect existing structures, fences, sidewalks, curbs, and other improvements from excavation equipment and vehicular traffic.

C. Maintain and protect above and below grade utilities which are to remain.

D. Comply with all provisions of the Construction Safety Orders and General Safety Orders of the California Division of Industrial Safety, as well as all other applicable regulations as they pertain to the protection of workers from the hazard of caving ground in excavations.

3.2 EXCAVATION

A. Excavate soil required to locate existing utilities and install the work.

B. Use hand methods of excavation to locate existing utilities, and to excavate trenches, pits and holes in congested areas.

C. Employ equipment and methods appropriate to the work site. Small mechanical excavators may be used only in areas where there is sufficient space so as not to damage adjacent improvements, and where the locations of all existing utilities have been determined by hand methods of excavating.

D. Cut trenches just wide enough to enable installation and proper bedding and backfill, and to allow inspection.

E. Do not interfere with 45 degree bearing splay of foundations.

F. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose material.

G. Excavate trenches, pits or holes bottoming in hardpan to a minimum of 6 inches below the grade for the bottom of the pipe and any couplings, and then backfill to the pipe grade with Type S2, S4 or S5 material, containing sufficient moisture to allow compaction to 90% maximum dry density. No additional payment will be made for such over-excavation and refill.

H. In all trenches or excavation sites where a firm foundation is not encountered, such as soft, spongy, or otherwise unsuitable material, remove the material to a minimum of 12 inches, or to a depth determined by the Engineer, below the bottom of the proposed pipe or structure, and backfill the space with Type S2, S4 or S5 material containing sufficient moisture to allow compaction to 90% maximum dry density. No additional payment will be made for such additional excavation or backfill.

I. Excavate trenches to provide the design grade of the facility, or as directed by the Engineer.

J. Stockpile excavated material to be returned to trench adjacent thereto in location which will not be detrimental to existing improvements, or pedestrian or vehicular traffic. Remove from site all unsuitable or excess material not to be used.

K. When excavating through tree roots, perform work by hand and cut roots, where authorized, with a saw.

L. Remove excess soil not used as backfill from the work site. Obtain a disposal site off of the Owner's property and legally dispose of said excess material, all at no additional cost to the Owner.

M. If water is encountered during excavations, provide all dewatering measures necessary to construct improvements shown.

N. Contractor shall make all provisions necessary, including but not limited to, shoring or sloping back trench walls as required to address sandy soils. The cost of these provisions shall be included in the lump sum amount bid for this work and no separate payment will be made therefore.

3.3 PROTECTION OF EXCAVATIONS

A. Provide all shoring and bracing as required and those codified in local, state and federal safety regulations.

B. Prevent water, caving or sloughing ground from entering excavations.

C. Maintain excavations free of water.

3.4 BACKFILLING

A. Provide type S2 or S5 pipe bedding as required by Plans and compact to 90% maximum dry density (relative compaction). Soil Type S2 shall meet requirements of type S5.

B. After installation of pipes and appurtenances and placement of pipe bedding material, backfill trenches and excavations to finished grade, or subgrade in areas to receive surface improvements

C. Backfill trenches above pipe bedding material and to within 24 inches of finish subgrade with Type S1, S2, S4 or S5 soils, except that that top 12 inches shall be type S2, S3, S4 or S5 soils.

D. Employ a placement method that does not disturb or damage existing or proposed pipes or other Utilities or Improvements.

E. Place and compact all soil backfill in continuous layers not exceeding 8 inches in loose uncompacted thickness, moisture condition to at least 3% above optimum moisture content.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Backfill final 12-inch thickness to finish subgrade in areas to receive concrete, asphalt-concrete, aggregate base, or other non-vegetative surface improvement, with Type S2, S4 or S5 soils.

H. Backfill final 12-inch thickness to finish subgrade in areas to receive sod, other vegetation, or bare soil, with Type S2 or S3 soils.

I. Compact backfill below the top 12-inches to 90% maximum dry density.

J. In areas to receive buildings, structures, or concrete flatwork, compact the top 12-inches to 90% maximum dry density.

K. In areas to receive asphalt concrete pavement or concrete pavement subject to vehicular traffic, compact the top 12-inches to 95% maximum dry density.

L. In planting areas, compact the top 12-inches to 85% maximum dry density.

3.5 TOLERANCES

A. Top Surface of Backfill under Paved or Concrete Areas: Plus or minus 0.02 feet from required elevations.

B. Top Surface of General Backfilling: As required for finish surface to match adjacent improvements or ground.

3.6 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of General Conditions and/or Division 1.

B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.

C. If tests indicate work does not meet specified requirements, recompact, and retest. Retests required due to failure of initial tests shall be paid for by the Contractor.

3.7 PROGRESS AND PROSECUTION

A. Backfill any excavation opened in any day on that same day.

END OF SECTION

SECTION 320190- EXISTING LANDSCAPE PROTECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Section includes but is not limited to the following:
   1. Protection and maintenance of existing trees and other plants that are affected by the execution of the Work, whether temporary or new construction.
   2. Boxing, moving, maintaining and replanting existing trees scheduled to be relocated.

B. Related Work Specified Elsewhere
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections.
   2. Section 31 11 00 – Site Clearing
   3. Section 31 20 00 – Earthwork
   4. Section 31 23 33 – Trench Excavation and Backfill
   5. Section 32 84 00 – Irrigation System
   6. Section 32 90 00 – Landscape Planting

1.2 SUBMITTALS

A. Product Data: For each type of product indicated or proposed for use.

B. Qualification Data: Submit arborist's certification and/or license information. Submit qualifications and experience of the certified tree worker if not the arborist.

C. Project Certification: Provide a certification letter from the consulting arborist that trees indicated to remain have been protected during construction according to these specifications and/or the arborist's recommendations, and provide a list of any trees damaged during construction and the subsequent treatment and repair.

D. Transplanting and Maintenance Recommendations: Submit transplanting, maintenance and protection specifications from a qualified arborist for care and protection of trees during and after completion of the Work that are likely to be affected by construction operations. The tree maintenance recommendations shall be included in the Maintenance Manuals required in 329000.

E. Tree Assessment and Valuation: Prior to the start of any construction operations of any kind, submit a tree assessment including tree valuation for existing trees scheduled to remain in the area of work or in auxiliary construction areas.
   1. Tree valuation for trees species that do not have comparable and available replacement sizes shall be determined by a certified consulting arborist experienced in tree valuation using the "Guide for Establishing Values of Trees and Other Plants", current edition, published by the International Society of Arboriculture, Urbana, Illinois.
   2. Tree assessment shall include a physical description, health, condition and recommended pruning and/or mitigation measures based on the expected construction operations to minimize the negative impacts to the affected trees.

1.3 QUALITY ASSURANCE

A. Tree Service Qualifications: An experienced tree service firm that has successfully completed tree protection and/or relocation work similar to that required for this Project, and who will provide experienced, certified tree workers.

B. Arborist Qualifications: The arborist shall be certified by the International Society of Arboriculture. If the arborist is performing tree work, he/she shall be employed by a licensed contractor, or shall hold an individual license if independent.

C. Tree Pruning Standards: Comply with ANSI A300, "Trees, Shrubs, and Other Woody Plant Maintenance--Standard Practices," unless more stringent requirements are indicated or recommended by the certified arborist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, Size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

B. Topsoil: See Section 32 93 00.

C. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers, minimum 4.8 oz/sq. yd.

D. Temporary Fencing: Heavy-duty exterior rated plastic or chain link fencing, minimum four feet high with stakes at a maximum 10 feet on-center or as needed for a taut installation.

E. Wood mulch: Walk-on type chipped wood and aged greenwaste material without leaves, green wood, sticks, dirt, dust, construction materials and other debris. Particle size 1/2” to 3" in general size.

F. Coarse sand: Clean sand with greater than 95% passing a #10 seive, less than 5% passing a #30 seive, and less than 1% passing a #50 seive.

PART 3 - EXECUTION

3.1 PREPARATION

A. Temporary Fencing: Install temporary fencing located around the canopy drip line of trees (the tree protection zone [TPZ]), and around the plants scheduled to remain that are inside the construction area. The TPZ fence layout shall be reviewed for acceptance by the Owners Representative and the consulting arborist.

B. All work within the TPZ shall be reviewed and monitored by the consulting arborist.

C. Within the TPZ, install a 4 inch depth of wood mulch over a permeable filter fabric with minimum 4 inch overlaps at fabric seams. Remove the protection mulch and fabric prior to any cultivation and amendment tillage.

D. Provide a temporary dirt berm watering basin around trees and plants scheduled to remain. The berm around trees shall be a minimum diameter of six times (6x) the diameter of the tree at breast height (DBH), or not less than six feet in diameter, whichever is greater.

E. Provide temporary irrigation or a portable water source to irrigate trees and plants scheduled to remain. Irrigate at minimum once a week or more often as necessary to moisten soil to a minimum 18 inch depth for trees, and a minimum depth of 12 inches for shrubs. Reapply irrigation based on an evapotranspiration loss of 50%.

F. Protect plant/tree root systems within the protected fenced areas from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

G. Do not store construction materials, debris, or excavated material within the TPZ. Do not permit vehicles or reoccuring foot traffic within the TPZ to prevent soil compaction over root systems.

H. Do not allow fires under or adjacent to remaining trees or other plants.

3.2 EXCAVATION

A. Do not excavate within the canopy drip line of existing trees unless otherwise authorized. Any excavation within the TPZ shall be performed under the onsite monitoring by the consulting arborist.

B. Where excavation for new construction and/or utility lines are required within the canopy drip line of trees, hand clear and excavate to minimize damage to root systems. Use spading forks to comb soil or use an Air-Spade to expose roots.

C. Where utility lines are to be located within the drip line of trees, expose the existing root system to the depth of utility line installation plus the depth of any required bedding material. Place piping below and/or through the exposed roots without damage to the root system. Backfill with approved material and compact by flooding the area if allowed.

D. As an alternative to manual or Air-Spade trench excavation, utility or other below grade piping may be mechanically bored under the crown dripline with a minimum cover of 3 feet as authorized by the consulting arborist.

E. Root Pruning: Do not cut main lateral roots or taproots greater than one inch in diameter. Smaller roots less than one inch in diameter that interferes with the installation of new improvements and/or utility lines may be cut only if absolutely necessary. Only cut roots with sharp pruning instruments; do not break, tear or chop. Block out concrete footings around roots greater than one inch diameter leaving a minimum one inch clearance around roots to remain. Provide alternative footing design if main lateral roots are in conflict.

3.3 REGRADING

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by the certified arborist, unless otherwise indicated.
   1. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or taproots; cut only smaller roots less than one inch diameter. Cut roots with sharp pruning instruments; do not break or chop.

B. Minor Fill: Where existing grade is 12 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations. Do not place fill greater than 6 inches in depth within 24 inches of the trunk, and do not cover the trunk/root base flare. Do not allow standing water at the trunk.

C. Moderate Fill: Where existing grade is more than 12 inches , but less than 18 inches below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade as follows:
   1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of existing grade and extend not less than 20 inches from tree trunk on all sides up to the finish grade. Slope of the rock fill shall be a maximum 2h:1v. For balance of area within drip-line perimeter, place drainage fill a minimum 6 inches in depth.
   2. Place filter fabric over the drainage fill with edges overlapping 6 inches minimum.
   3. Place fill layer of topsoil to finish grade. Do not mechanically compact drainage fill or topsoil more than 85% relative density in planted areas. Hand grade to required finish elevations.

3.4 TREE PRUNING

A. Prune remaining trees affected by temporary and new construction only when authorized by the Landscape Architect and as recommended by the consulting arborist.

B. Prune remaining trees to compensate for root loss caused by damaging or cutting root system only when authorized by the Landscape Architect and as recommended by the consulting arborist. Provide subsequent maintenance during Contract period as recommended by the consulting arborist.

C. Pruning Standards: Prune trees according to ANSI A300 based on pruning for access clearance, to correct any defects in structure, or to remove potential conflicts with new improvements. Pruning shall only be performed by a Certified arborist or tree worker.

D. Cut branches with sharp pruning instruments; do not break or chop. Clean pruning tools with a diluted bleach solution prior to performing any pruning operations.

3.5 TREE REPAIR AND REPLACEMENT

E. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to written instructions of the arborist.

F. Remove and replace dead and/or damaged trees impacted by the construction operations that the arborist determines to be incapable of restoring to a normal growth pattern.

1. Provide new trees of the same size and species as those being replaced; plant and maintain as specified in 32 90 00.
2. When new trees of the same size and species are not available, furnish and install the largest size boxed tree that is readily available and will successfully grow in the planting area with long term health and without damage to adjacent improvements. Credit the Owner the difference between the valuation of the removed existing tree and the installed replacement tree.

B. Aerate surface soil within any existing Oak tree dripline compacted before or during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 18 inches deep at 36 inches o.c. Backfill holes with coarse sand. Manually till the top 4 inches with a spading fork, and break up clods greater than 1 inch diameter. Smooth grade prior to installing wood mulch.

3.6 TRANSPLANTING TREES FOR RELOCATION

A. Preparation

1. Follow the transplanting recommendations of the consulting arborist and these specifications. If conflicting directions are present, notify the Landscape Architect for a resolution. If no notice if given, follow the most strict and/or costly option.
2. A light thinning of the tree canopy shall be performed prior to boxing to reduce the leaf area by approximately 10 – 15 percent, and to remove any dead wood. Pruning shall be performed under the direction of a certified arborist, and shall comply with ISA Pruning Standards (ANSI 300).
3. Surrounding pavement shall be sawcut and removed as needed for boxing operations.
4. Ensure adequate soil moisture around the rootball so that no soil breaks away from the rootball during side boxing operations.

B. Boxing

1. The box dimensions shall be a square of a minimum of 6 times the diameter (caliper) of the tree trunk at 12 inches above the existing grade. In all cases, the box dimension shall not be less than 24 inches.
2. Excavate by hand around the sides of the tree for the top 12 inches of soil, or until the majority of the lateral roots have been severed. Rough excavate by machine to the required depth. Final rootball shaping shall be performed by hand. All root pruning shall be cut clean and square with pruning loppers or pruning saw. Treat all severed root ends with a antidesiccant to diminish root transpiration.
3. The box sides shall be securely fastened with horizontal metal bands, and all voids filled. Following side boxing, the tree shall remain in place a minimum of 4 weeks. Provide a minimum 3 inch depth of wood mulch on the top surface of the box. Maintain adequate soil moisture in the rootball.
4. After the acclimation period, the tree shall be undercut and bottom boxed. Securely fasten the bottom panel with vertical metal bands running on all four sides of the box. Secure the crane cable around and/or under the tree box in order to lift the tree out of the ground. The Contractor is responsible to ensure the box is constructed to withstand the weight of the watered tree and the stress of moving.

5. The relocated trees shall be moved with equipment rated for the size and weight of the boxed tree. The Contractor is responsible for all expenses related to the moving, storage, planting and maintenance of the relocated tree.
6. The void of the removed tree shall be backfilled with one of the following:
    a. Engineered fill per the Earthwork specification in a proposed hardscape area, or area underneath structures.
    b. Planting topsoil per the Landscape Planting specification in a proposed planting area.

C. Maintenance and Replanting

1. If necessary, temporarily store the tree out of the immediate construction zone but inside the construction fenced area. Provide a temporary irrigation source and a regular irrigation schedule.
2. Prepare the new planting pit and plant the tree per the approved planting detail and specifications. Maintain the watering berm for as long as possible when in a turfgrass area.

3.7 CLEAN-UP

A. Burning is not permitted.

B. Prior to Final Acceptance, remove the TPZ fence, stakes and other related materials.

C. Legally remove excess excavated material, debris, displaced trees, and greenwaste from Owner's property. Broom clean all hardscape surfaces in the area of work.

END OF SECTION

SECTION 32 11 26 - AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Provide all material, labor, equipment and services necessary to install aggregate base surfacing as indicated by the Contract Documents.

1.3 RELATED SECTIONS

1. All Division 00 Specification Sections
2. All Division 01 Specification Sections
3. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading.
4. Section 31 23 33 – Trench Excavation and Backfill.
5. Section 32 12 16 – Soil Sterilization.
6. Section 32 12 17 – Asphalt Paving.
7. Section 32 13 13 – Site Concrete Improvements.

1.4 REFERENCES

A. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials

1.5 QUALITY ASSURANCE

A. Provide and install in accordance with SSCDOT.

1.6 SUBMITTALS

A. Submit data sheets from supplier to document compliance with SSCDOT requirements.

B. Certificates of compliance for material.

C. Load tags for delivered material.

1.7 COORDINATION

A. Coordinate with other work, including subgrade preparation and soil sterilization.

B. Coordinate installation schedule with Owner's use of the premises and with other contractors working at the site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate Base: Unless specified otherwise on Plans, Class 2, 3/4 Inch Maximum per Section 26 of SSCDOT.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify quantities required.

B. Verify that subgrade has been placed and compacted per Contract Documents

C. Verify gradients and elevations of subgrade are correct.

3.2 INSTALLATION OF AGGREGATE BASE COURSE

A. Install in conformance with SSCDOT Section 26, Aggregate Bases.

B. Thickness - As shown on construction drawings.

C. Spreading and Compacting - In accordance with Section 26, SSCDOT. Base course shall be moisture conditioned to within 2% of optimum moisture, placed in uncompacted layers not exceeding six (6) inches in thickness, and compacted as specified, based on ASTM Test Method D1557. The relative compaction of each layer of compacted base material shall be not less than 95 percent.

D. The completed surface shall be thoroughly compacted, free from ruts, depressions, and irregularities, true to grade and cross-section.

E. Lines and grades for the installation of aggregate base shall be set by a California licensed Land Surveyor or Civil Engineer, at Contractor's expense.

3.3 TOLERANCES

A. Compacted thickness of aggregate base: Not less than the thickness specified on the Plans.

B. Finished Surface: Within 0.02 foot of planned grade per Section 26, SSCDOT. No more than 50% of the finish surface shall be above or below the specified grade for aggregate base.

3.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed by the Owner's inspector, under provisions of Division 01.

3.5 PROTECTION

A. Immediately after placement and compaction, protect surface from mechanical injury.

B. Protect completed surface until surfacing layers are in place.

END OF SECTION

SECTION 321216 - SOIL STERILIZATION

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 the work specified in this section.

1.2 SECTION INCLUDES

A. Furnish and install soil sterilant under all asphalt paving.

1.3 RELATED SECTIONS

1. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading
2. Section 31 23 33 – Trench Excavation and Backfill
3. Section 32 11 26 – Aggregate Base Course
4. Section 32 12 17 – Asphalt Paving
5. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

1.4 STANDARDS

A. In accordance with the following:

CCR-T21	California Code of Regulations, Title 21 Public Works.
CBC	California Building Code, California Code of Regulations, Title 24, Part 2, CCR-T24.
USDA	United States Department of Agriculture.
EPA	Environmental Protection Agency.
MC	Madera County

All applicable Environmental Regulations and Standards.

1.5 QUALITY ASSURANCE

A. Provide licensed operator to apply soil sterilant.

B. All products shall comply with the current EPA laws at time of application. Should the products listed become unavailable because of changes in the law, submit substitute products for review by the Owner.

1.6 SUBMITTALS

A. Submit in accordance with Specification Section SUBMITTAL PROCEDURES.

B. Certificates of application.

C. Certificates of compliance for material.

1.7 COORDINATION

A. Coordinate with other work, including subgrade preparation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Soil Sterilant: Bayer Oust XP, weed and grass preventer, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that site is ready for application.

3.2 PREPARATION

A. Identify installation locations.

B. Employ equipment and methods appropriate to the work site.

3.3 APPLICATION

A. Thoroughly water soak surface to be treated. Avoid excessive water runoff.

B. Apply sterilant solution over surface to receive pavement or surfacing prior to the start of pavement or surfacing installation.

C. Apply in spray form, at rate as allowable by State of California and the manufacturer's recommended application rate.

D. Take all precautions to limit soil sterilant solution to areas immediately under proposed pavement or surfacing. Use shields as necessary, and do not apply under windy conditions.

END OF SECTION

SECTION 32 12 17 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Provide all material, labor, equipment and services necessary to completely install all pavement materials, accessories and other related items as required by the Contract Documents.

1.3 RELATED SECTIONS:

1. All Division 00 Specification Sections
2. All Division 01 Specification Sections
3. Section 31 22 00 – Earthwork: Excavation, Filling, and Grading
4. Section 31 23 33 – Trench Excavation and Backfill
5. Section 32 11 26 – Aggregate Base Course.
6. Section 32 12 16 – Soil Sterilization.

1.4 REFERENCES

A. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with SSCDOT.

B. Mixing Plant: Conform to SSCDOT.

C. Installation Criteria: Asphalt concrete shall show no evidence of cracking, uneven settlement, improper drainage, or untoward junctions with adjoining or existing surfaces. Work displaying such conditions shall be corrected under the Contractor’s guarantee of all work.

1.6 SUBMITTALS

A. Submit under provisions of Division 01.

B. Mix design

C. Certificates of compliance for material.

D. Load tags for delivered material.

1.7 COORDINATION

A. Coordinate with other work, including subgrade preparation, aggregate base placement and soil sterilization.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt-concrete when atmosphere temperature is less than 50 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paint Binder: In accordance with SSCDOT Section 94, Asphaltic Emulsions.

B. Asphalt-Concrete: Type A in accordance with Section 39, SSCDOT, ½ inch or ¾ inch maximum aggregate (medium) as indicated on the Plans. The asphaltic concrete shall be compacted to an average relative compaction of 97 percent, with no single test value being below a relative compaction of 95 percent based on a 50 blow Marshall maximum density. Use asphalt binder performance grade PG 64-10.

C. Seal Coat: Asphalt based seal coat shall be "Ace Seal" as manufactured by Asphalt Coatings Engineering, Wasco, California, or approved equivalent

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify quantities required. New asphalt-concrete paving is required at all locations shown on the plans, and where existing asphalt-concrete paving to remain is removed or damaged by the Project excavation or related work.

B. Verify that subgrade or base material has been compacted to required relative compaction and is dry.

C. Verify gradients and elevations of base are correct.

D. Verify that subgrade or base material has been sterilized per Section 32 12 16 SOIL STERILIZATION.

3.2 AGGREGATE BASE

A. Where shown on the construction plans, place and compact aggregate base course per Section 32 11 26 AGGREGATE BASE COURSE.

B. Where shown on the construction plans, place asphalt on compacted earth subgrade per Section 31 20 00 EARTHWORK: EXCAVATION, FILLING AND GRADING and Section 31 23 00 TRENCH EXCAVATION AND BACKFILL.

C. A soil sterilant shall be applied over the entire area which is to be paved in accordance with Section 31 12 16 SOIL STERILIZATION

3.3 PREPARATION – PAINT BINDER

A. Apply paint binder to existing asphalt-concrete or concrete surfaces which will be in contact with asphalt-concrete surfacing.

B. Rate of application for all surfaces against which asphalt concrete is to be placed shall be no less than 0.02 and no more than 0.05 gallons per square yard. All vertical concrete surfaces which will be in contact with asphalt concrete surfacing and all areas now in place which will be covered with new surfacing materials and feathering operations shall be coated with a paint binder applied at the rate of 0.05 gallons per square yard.

3.4 INSTALLATION OF ASPHALTIC-CONCRETE

A. Install in conformance with SSCDOT Section 39, Asphalt-Concrete.

B. Thickness - As shown on construction plans. Where thickness exceeds 3 inches, place in no less than 2 layers with top layer no thicker than one inch. Asphaltic concrete shall be laid to the thickness designated on the Plans. The plan thickness is to be considered as a minimum thickness. The Contractor shall lay the asphaltic concrete to a depth required to insure that, after compaction, the in place compacted thickness is equal to or greater than the specified plan thickness.

C. The Contractor shall provide to the Engineer the truck delivery weight tags for the asphaltic concrete material. The quantity delivered shall be equal to or greater than the calculated in place quantity based on the specified thickness and area to be paved as designated on the construction plans and based on a unit density of the asphaltic concrete of 141 pounds per cubic feet.

D. Asphalt type: PG 64-10

E. Compaction Equipment - In accordance with Section 39, SSCDOT. At small difficult areas, equipment may be altered as approved by Engineer.

F. The completed surface shall be thoroughly compacted, free from ruts, depressions, and irregularities and to be true to grade and cross-section.

3.5 TOLERANCES –GENERAL

A. Finished Surface: within 0.02 foot of planned grade.

B. Flatness: Maximum variation of 1/4 inch measured with 10-foot straight edge.

C. Scheduled Compacted Thickness: Not less than specified.

3.6 INSTALLATION OF SEAL COAT

A. Immediately prior to applying the sealer, the surface shall be cleaned of all loose material which might adversely affect bonding of the sealer. Any standard cleaning method such as power sweepers and blowers may be employed. In areas where gasoline, grease, oil spots, or chemical stains have been in contact with pavement, “Poly Oil Sil” or approved equal emulsion primer shall be applied to the pavement surface per manufacturer recommendations prior to placing seal coat. In locations where the pavement has been softened by contact with oils, fuels, or other substances, remove and replace pavement as directed by the Engineer.

B. Where cracks in pre-existing pavement exceed 1/2 inch in depth or 1/4 inch in width, or both, shall be thoroughly cleaned and repaired with Type A, No. 4 maximum asphalt concrete before placing the sealer. All cracks between 1/8" and 1/4" in width shall be filled with "Flex Crax", as manufactured by Asphalt Coatings Engineering, of Wasco CA, or approved equivalent, in accordance with the manufacturer's recommendations.

C. Whether or not specifically indicated on the plans, all loose or raveling pavement, potholes and badly distorted or depressed areas, except those lying within areas designated for pavement removal and replacement, shall be properly cleaned and repaired by applying a binder coat and Type A, ⅜-inch maximum asphalt concrete patch conforming to the requirements of Section 39, SSCDOT, before placing the seal coat. Any vegetation such as, a soil sterilant per Section 32 12 16 SOIL STERILIZATION shall be applied to the area and any required pavement patching shall then be completed.

D. Except as otherwise indicated on the Plans, asphalt-based seal coat shall not be applied to new asphalt concrete pavement. Unless otherwise authorized by the Engineer, asphalt-based seal coat shall not be applied to new asphalt concrete pavement until a minimum of twenty-one (21) calendar days have elapsed since pavement placement.

E. The new seal coat shall fully cover the appearance of old pavement marking and striping. Otherwise, additional coats of seal coat shall be applied to the surface until the old pavement marking and striping is no longer visible.

F. Two coats of asphalt-based seal coat shall be applied. The first coat shall have added to it a silica sand mineral filler which has passed a 50-mesh screen. Apply at a rate of 2 to 3 pounds per 1 gallon of concentrated sealer. When the first coat is dry enough to walk on without picking the material up, a second coat shall be applied without mineral filler. If the manufacturer indicates that the product may be diluted, it may be diluted with no more than 20 percent by volume clean fresh water with the prior approval of the Engineer. The total application rate shall be as follows:

1. Seal Coat (for new pavement) - a minimum of 20 gallons of undiluted product per 1,000 square feet, as directed by the Engineer.
2. Seal Coat (for existing pavement) - 35 to 40 gallons of undiluted product per 1,000 square feet, as directed by the Engineer.

G. Protect sealed surface until it is cured.

3.7 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 01.

B. Pavement shall comply with the following:
   1. Water shall not be able to accumulate at any point and the surface shall be free to drain to drainage inlets or gutters.
   2. The paving contractor shall water flood the surface with the use of a water truck. If, after 30 minutes on a 70 degree F day, “bird baths” are evident in a depth more than 0.01 foot, the paving contractor and the Owner’s representative will determine the best method of correction.
   3. A 10 foot straightedge shall be used to check for high spots and ridges. High spots and ridges out of compliance shall be reduced by a remedy determined by the paving contractor and the Owner’s representative.

C. Should a section of the work be not acceptable on the basis of inadequate compaction and/or the mixture becomes loose and broken, mixed with dirt, out of tolerance, or in any other way defective, it shall be repaired or removed and replaced with fresh mixture and immediately compacted to conform to the surrounding area to the satisfaction of the Owner.

3.8 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury.

B. Protect sealed surface until it is cured.

END OF SECTION

SECTION 32 13 13 - SITE CONCRETE IMPROVEMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This Section includes the following:
   1. All material, labor, equipment and services necessary to completely install exterior Portland cement flatwork, cast-in-place concrete, and architectural flatwork concrete, accessories and other related items, slabs, ramps and sidewalks and walkways, curb and gutter, mowstrips, and other miscellaneous concrete items of the form and dimensions shown on the plans and necessary to complete the project, and in accordance with the requirements of the Standard Specifications as modified and supplemented by these Special Provisions
   2. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

B. RELATED SECTIONS:
   1. Section 31 20 00 – Earthwork: Excavation, Filling, and Grading
   2. Section 32 11 26 – Aggregate Base Course.
   3. Section 32 13 15 – Concrete Reinforcement

1.3 REFERENCES

A. SSCDOT - Standard Specifications, Department of Transportation, State of California (Caltrans), latest edition, except for references to method of payment, and references to any state furnished materials.

B. ACI standards, including but not limited to #304, 305, 306, 308, 309 and 347.

C. ASTM standards, including but not limited to #C-33, C-39, C-94, C-136, C-143, C-150, and C-309.

1.4 SUBMITTALS

A. Submit under provisions of Specification Section SUBMITTALS.
   1. Certificates of compliance for materials and mix designs.
   2. Load tags for delivered material.
   3. Strength testing as required by the approving agency.
   4. Integral color sample, where applicable.

5. Application instructions for the architectural finish materials.
6. Accessories and manufacturer's installation specifications.

1.5 QUALITY ASSURANCE

A. Furnish concrete materials conforming with SSCDOT.

B. Perform work in accordance with SSCDOT, unless noted otherwise herein.

PART 2 - PRODUCTS

2.1 MIXES

A. Mix Design and Proportions in accordance with SSCDOT:
   1. Mix designs with Fly Ash content no greater than 15 percent of the total weight of cementitious materials shall be proportioned by SSCDOT.
   2. Provide a maximum of 4 percent air entrainment, unless noted otherwise.
   3. Owners Testing laboratory shall review all mix designs before submittal.
   4. All concrete shall have the following minimum compressive strengths in accordance with ACI 318 and SSCDOT at 28 days and shall be proportioned within the following limits:
      a. Site Concrete: Use for exterior concrete slabs on grade including, but not limited to sidewalks, curbs, gutters, mow strips, utility appurtenances and miscellaneous site improvements.
         1) Strength: 3,000 psi at 28 days
         2) Maximum Aggregate Size: 1-inch
         3) Cement Type: Type I/II/IV/V
         4) Cement Content: 5.5 sacks/yd minimum
         5) Max Water/Cement Ratio: Per SSCDOT
         6) Admixture Per SSCDOT
      b. Structures & Vehicular Concrete Paving: Use for site structures and exterior slabs on grade subject to vehicle traffic.
         1) Strength: 4,000 psi at 28 days
         2) Maximum Aggregate Size: 1-inch
         3) Cement Type: Type I/II/IV/V
         4) Cement Content: 6.5 sacks/yd minimum
         5) Max Water/Cement Ratio: Per SSCDOT
         6) Admixture: Per SSCDOT
      c. Slurry Backfill: Use for backfill of over-excavated trenches, encasement of all penetration, and site utility piping.
         1) Maximum Aggregate Size: 3/8-inch
         2) Cement Type: Type I/II/IV/V
         3) Cement Content: 2.0 sacks/yd minimum

B. Reinforcement shall comply with relevant portions of Division 32 Specification Section CONCRETE REINFORCEMENT.

PART 3 - EXECUTION

3.1 PREPARATION

A. Subgrade shall conform to the requirements of Division 31 Specification Section EARTHWORK: EXCAVATION, FILLING AND GRADING. The District may elect to verify compacted subgrade elevations by measurement made from adjacent existing improvements or by a template supported by forms.

3.2 GENERAL CONCRETE

A. Concrete placement shall conform to the applicable requirements of Standard Specification Sections 51 and 90. Concrete shall not be placed when the air temperature in the shade at the project site exceeds 95º F or is below 45º F, or when the temperature of the concrete exceeds 85º F.

B. After the concrete has been placed, it shall be struck off to proper section and compacted with a grid of parallel metal bars until a layer of mortar not less than 3/8 inch thick has been brought to the surface. All exposed concrete surfaces shall receive a medium broom finish applied transversely to the line of pedestrian traffic or to the longest dimension of the concrete, as applicable.

C. General concrete surfaces shall be cured by the curing compound method and shall be protected in accordance with the provisions of Subsections 90-1 and 90-2 of the Standard Specifications.

3.3 PROTECTION OF CONCRETE

A. The Contractor shall be responsible for the condition of all concrete work until such time as all work has been completed and is accepted by the District. The Contractor shall limit vehicular travel across concrete until such time as the concrete has achieved strength sufficient that it can support traffic without damage. In no case, however, will vehicles be allowed to travel across new concrete improvements until seven calendar days have passed since the concrete was placed.

3.4 CONCRETE JOINTS

A. Expansion joints and weakened plane joints shall be constructed at the locations shown on the plans or as directed by the Engineer. Where joint locations are not specified on the plans, expansion joints shall be constructed at maximum intervals of 30 feet, and weakened plane joints shall be constructed at maximum intervals of 10 feet.

B. Expansion joints shall be considered as weakened plane joints for the purpose of spacing weakened plane joints. Expansion joints shall be tooled with a 1/4 inch maximum radius edger, and shall be filled with 3/8 inch pre-formed expansion joint filler.

3.5 CONCRETE FINISHES

A. Where concrete is being installed adjacent to or near existing concrete improvements, match the finish of similar concrete surfaces (i.e. new sidewalks shall match existing sidewalks, new curbs shall match existing curbs, etc.).

B. Sidewalks and Mowstrips: Medium sweat finish or medium broom finish perpendicular to the direction of travel.

C. Curbs: Trowel smooth and finish with a light brush.

D. Gutters: Medium broom finish parallel with curb or direction of flow.

E. Drive approaches and wheelchair ramps: medium broom finish, perpendicular to the direction of travel.

3.6 INSTALLATION OF ACCESSORIES

A. Strictly comply with manufacturer's instructions and recommendations and approved details. Securely anchor work to substrate.

3.7 REPAIR AND CLEAN-UP

A. Contractor shall legally remove all trash, debris, containers and excess materials from the site on a periodic basis, and shall keep the work broom clean until Owner’s acceptance.

B. The Contractor shall be held responsible for the repair and/or replacement of new or existing improvements damaged as a result of this work to the satisfaction of the Owner.

C. The Contractor shall provide roll-off bins for wash-out of ready mix concrete trucks and pumpers. Do not allow concrete debris or cement water onto soils scheduled for landscape planting.

END OF SECTION

SECTION 32 13 15 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This Section includes the following:
   1. Deformed reinforcing bars for site concrete improvements.

B. RELATED SECTIONS
   1. Section 32 13 13 – Site Concrete Improvements.

1.3 SUBMITTALS

A. Submit in accordance with Specification Section SUBMITTALS and the Contract General Conditions.

   1. Mill test certificates identifying chemical and physical analysis of each load of reinforcing steel delivered. If mill test reports are not available and the quantity of steel for a structure exceeds 5 tons, provide a laboratory test to prove yield strength and bending.
   2. Drawings and placing diagrams for each grade slab including dowels and corner bars.
   3. On the placing diagrams, show all openings for pipelines and architectural features. Include additional reinforcing at openings and corner bar arrangements at intersecting beams, walls, and footings.
   4. Coordinate placing diagrams with the concrete placing schedule.

1.4 PRODUCT DELIVERY

A. Deliver reinforcement to project site in bundles marked with tags indicating bar size and length.

B. Store on wooden supports above ground surface.

PART 2 - PRODUCTS

2.1 BARS

A. Bars shall be deformed billet steel conforming to ASTM A 615, Grade 60. Mixing of steel grades will not be allowed.

2.2 BAR SUPPORTS

A. Bar support shall be concrete or metal chairs, spacers or hangers. Reinforcing bars shall not be supported by forms.

2.3 TIE WIRE

A. Tie wire shall be annealed steel wire of not less than 16-gauge.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Position reinforcement in accordance with the drawings, secure with wire ties or suitable clips at all intersections, and support by an adequate number of concrete or metal chairs, spacers, or metal hangers such that reinforcing bars do not sag more than one quarter of an inch (1/4") between supports. Do not place reinforcement or supports in contact with the forms. Bend tie wires away from the forms in order to provide the specified concrete coverage. To secure reinforcement in position, the Contractor may elect to locate bars additional to those shown on the drawings, but at no additional cost to the Owner.

B. Set reinforcing dowels and anchor bolts in place prior to placing concrete. Do not press them into the concrete after the concrete has been placed.

3.2 SPLICES

A. Splice bars only at locations shown on the drawings. Where splices are not detailed, lap bars 72 bar diameters.

3.3 CLEANING

A. Remove dirt, form oil, excessive rust, cement coating from previous pours, and foreign matter that will reduce bond with concrete.

3.4 PROTECTION DURING CONCRETING

A. Keep reinforcing steel in proper position during concrete placement.

END OF SECTION

SECTION 32 17 23 – PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Furnishing and installing paint parking stall, traffic marking and wording on asphalt-concrete surfaces.

B. Furnishing and installing disabled marking and hatching area on asphalt-concrete pavement.

1.2 RELATED SECTIONS:

1. Section 32 12 17 – Asphalt Paving.
2. Section 32 13 13 – Site Concrete Improvements.
3. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

1.3 REFERENCES

A. SSCDOT - Standard Specifications, California Department of Transportation (Caltrans), latest edition, except for references to methods of payment and to furnishing of materials by State.

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Certificates of compliance for materials.

1.5 COORDINATION

A. Coordinate work with other work, including associated traffic signing.

B. Commence striping or marking of asphalt-concrete no sooner than 7 days following any sealing of the asphalt-concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paint: Quick drying, high visibility water soluble acrylic striping paint; Stripe Master, Wikel Mfg. Company, or similar by Sherwin-Williams, J.E. Bauer, or PPG, or approved equal.

B. Paint shall be of color indicated on the construction plans.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that site is ready for application.

3.2 PREPARATION

A. Identify installation locations. Place parking stall striping, traffic marking, wording, disabled symbol and access striping at locations, as shown on construction plans.

B. Thoroughly clean all surfaces to be painted.

C. Employ equipment and methods appropriate to the work site.

D. Provide vehicular and traffic controls per Division 1.

3.3 INSTALLATION

A. Apply paint striping and marking as indicated on the plans.

B. Apply paint uniformly, straight and true, with equipment designed for traffic striping and marking applications.

C. Apply paint striping and marking per Section 84 of SSCDOT, except supply paint conforming to 2.1 A. of this specification.

D. Apply a minimum of 2 separate coats of paint at all striping and marking locations, including asphalt-concrete and concrete surfaces.

E. Paint international symbol of accessibility at the location as shown on the plans.

F. Paint accessible access area striping at the location as shown on the plans.

3.4 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Division 1.

END OF SECTION

SECTION 32 31 13 – CHAIN LINK FENCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Provisions of constructing chain link fence at locations shown on the Construction Documents, including but not limited to:
   a. Site chain link fencing and gates.

B. RELATED SECTIONS

1. Contract General Conditions and Division 1 Specifications.
2. Section 312000 – Earthwork: Excavation, Filling, and Grading
3. Section 321313 – Site Concrete Improvements.

1.2 QUALITY ASSURANCE

A. Qualifications of Installer

1. Throughout the progress of installation of the work of this Section, provide at least one person who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills, and who shall be present at the site and shall direct all work performed under this Section.
2. In actual installation of the work of this Section, use adequate numbers of skilled workmen to insure installation in strict accordance with the contract documents.
3. In acceptance or rejection of work performed under this Section, the Engineer will make no allowance for lack of skill on the part of the workmen.

1.3 PRODUCT HANDLING

A. Protection

1. Use all means necessary to protect the materials of this Section before, during and after installation, and to protect the work of other trades.

B. Replacements

1. In the event of damage, immediately make all repairs and replacements necessary to the satisfaction of the Engineer and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The materials and fabrication of chain link fabric shall conform to these specifications, and as shown on the plans and details.

B. All ferrous materials shall be new and galvanized. Imperfectly galvanized material or material upon which serious abrasions of the galvanizing occur shall not be used.

C. Height - all fencing shall stand at the heights shown on the plans.

D. Fabric

1. Standard: Chain link fabric shall conform to ASTM, designation: A392, Class 1. The wire used in the manufacture of the fabric shall be 9-gauge. All chain link fabric shall be woven into approximately 2-inch mesh. Fabric shall be furnished with knuckling at all selvages. The knuckled selvage shall be used along all corners and edges. Fabric shall be GBW, galvanized before weaving.

E. Posts, braces and gate frames

1. The base material for the manufacture of steel pipe used for posts and braces shall conform to the specifications of ASTM, designation: A53 Type A, standard weight, Schedule 40, and the base material for the manufacture of other steel sections used for posts and braces shall be good commercial quality weldable steel.
2. All posts, braces and gate frames shall conform to the size and weight designations shown on the plans.
3. All posts shall be fitted with rainproof caps designed so as to fit securely over the top of the posts.
4. All posts shall be of a total length of not less than the depth of the concrete footing as shown on the plans, plus the length required above ground.
5. Posts and braces shall be galvanized in accordance with specifications of ASTM, designation: A123.
6. All horizontal braces shall be attached to posts by approved steel fixtures.

F. Stretcher bars and other required fittings and hardware shall be steel and shall be galvanized in accordance with the specifications of ASTM, designation: A153.

G. All swinging gates and walk gates shall be installed with a gate holdback, Trimco 1209HOHA-626. Holdbacks shall be installed in the concrete mowstrip, unless otherwise noted.

H. Concrete mowstrip shall be in accordance with Section 321313 SITE CONCRETE IMPROVEMENTS.

I. Walk gates shall be constructed as per detail drawing and in accordance with CBC sections 11B-206.5 and 11B-404.

J. Backstop shall be constructed as per detail drawing.

K. Drive gate, roll gate and walk gate shall be constructed as per detail drawing.

L. Non-accessible swinging gates shall comply with the following:

1. Have a lockable fork latch.
2. Have heavy-duty malleable iron hinges

PART 3 - EXECUTION

3.1 INSTALLATION

A. All posts shall be set in concrete footings as shown on the plans to within 3 inches of bottom.

B. All vertical line and end posts shall be braced to the nearest adjacent vertical post with galvanized horizontal braces as shown on the plans.

C. Welding

1. All welding shall conform to the requirements of the Uniform Building Code, UBC, Chapter 22.
2. Where the galvanized surface has been burned by welding, all surfaces of the welded connections shall be thoroughly cleaned by wire brushing and all traces of the welding flux and loose or cracked galvanizing removed. The damaged area and weld shall then be painted in accordance with the following details.
    a. All galvanized, welded, or damaged surfaces that are to be painted shall first be cleaned by washing with mineral spirit solvent sufficient to remove any oil, grease or other materials foreign to the galvanized coating.
    b. After washing, all areas shall be roughened by abrasive blasting using an abrasive that is no larger than 30-mesh. Galvanizing shall not be removed by this operation.
    c. After preparation, all galvanized surfaces that are to be painted shall be covered with one application of zinc dust-zinc oxide primer, federal specification TT-P-641, Type II. The zinc dust-zinc oxide paint shall be applied by spraying to produce a complete covering of the galvanized surface.
    d. After the application of the zinc dust-zinc oxide paint, one application of pre-treatment, vinyl wash primer, Section 91-2.7 of the state Standard Specifications, shall be applied to such surfaces. The vinyl wash primer shall be applied by spraying to produce a uniform wet film on the surface.
    e. Such surfaces shall then be covered with two separate applications of white tint base vinyl finish coat, Section 91-2.22 of the state standard specifications, sufficient to completely cover the preceding color. Paint for the first application shall be tinted with a compatible coloring agent to slightly contrast with the color of the second application. After drying for 24 hours, one application of aluminum paint, finish coat, Section 91-2.8 of the state standard specifications, shall be painted on the welded areas.

D. Perimeter fencing chain link fabric shall be fastened to the outside of the fence.

E. All fabric shall be stretched and securely fastened to the posts, as follows:

F. The fabric shall be fastened to end, corner and gate posts with 3/16 inch by 5/8 inch stretcher bars and not less than 1/8 inch by 3/4 inch stretcher bar bands spaced at one foot intervals for whatever widths of fabric are supplied. The fabric shall be fastened to line posts with tie wires or post clips. Tie wires shall be at least 9-gauge (0.148 inch diameter) steel. Post clips shall be at least 6-gauge (0.192 inch diameter) steel. The wire or clip fasteners shall be spaced at approximately 14 inches on line posts, with a minimum of 5 fasteners per 6 foot high post. Top and bottom edges of the fabric shall be secured to each horizontal brace with tie wires or fastened to tension wire with hog rings spaced at 15 inch maximum intervals. Hog rings shall be at least 9-gauge (0.148 inch diameter) steel. Wire ties shall be given at least one complete turn. Hog rings shall be closed with ends overlapping. The distance from the selvage to the braces or top rails shall be 2 inch maximum and shall be fastened to the brace or rail by wire fasteners spaced at approximately 14 inches with a minimum of 8 fasteners per each 10 foot horizontal span.

G. Construct concrete mowstrip at the width as shown on the plans.

END OF SECTION

SECTION 323310 - TACTILE/DETECTABLE WARNING SURFACE TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Tactile/Detectable Warning Surface Tile where indicated.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s literature describing products, installation procedures and routine maintenance.

B. Samples for Verification Purposes: Submit two tile samples minimum, 6 inch by 8 inch of kind proposed for use.

C. Shop drawings are required for products specified showing fabrication details; composite structural system; plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.

D. Material Test Reports: Submit test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated. All test reports shall be conducted on Surface Applied tactile tile system as certified by a qualified independent testing laboratory.

E. Maintenance Instructions: Submit copies of manufacturer’s specified maintenance practices for each type of tactile tile and accessory as required.

1.4 QUALITY ASSURANCE

A. Provide Surface Applied tactile tiles and accessories as produced by a single manufacturer.

B. Installer’s Qualifications: Engage an experienced Installer certified in writing by tactile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.

C. Americans with Disabilities Act (ADA): Provide tactile warning surfaces that comply with detectable warnings on walking surfaces section of Americans with Disabilities Act (Title 49 CFR TRANSPORTATION, Part 37.9 STANDARDS FOR ACCESSIBLE TRANSPORTATION FACILITIES, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES.

D. California Code of Regulations (CCR): Provide only approved DSAAC detectable warning products as provided in the California Code of Regulations (CCR). Title 24, Part 1, Articles 2, 3 and 4 and Part 2, Section 205 definition of “Detectable Warning”. Section 11B-406 for “Curb ramps, blended transitions and islands” and Section 11B-705 for “Detectable warnings and detectable directional texture”.

E. Detectable Warning Texture: Division of the State Architect (DSA Access Compliance) approved products shall be used, compliance with CBC Section 11B-705.1, IRs 11B-2, 11B-3 and 11B-4 and the California Accessibility Reference Manual.

1. Truncated Domes: provide raised Detectable Warnings with diameter of 0.9 inch at base tapering to 0.45 inch at top, height of 0.2 inch, with center-to-center spacing of 2.35 inches and corner domes spaced at 0.896 inch from the corner edges of tile. Provide raised truncated domes in a square grid (in-line) pattern.

a. Truncated Dome: shall contrast visually with adjoining surfaces, light-on- dark or dark-on-light. Material used to provide contrast shall be integral part of walking surface. Warning surface shall differ from adjoining surface in resiliency or sound to cane contact.

1.5 DELIVERY, STORAGE AND HANDLING

A. Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.

B. Tiles shall be delivered to location at building site for storage prior to installation.

1.6 SITE CONDITIONS

A. Environmental Conditions and Protection: Maintain minimum temperature of 40°F in spaces to receive tactile tiles for at least 48 hours prior to installations, during installation, and for not less than 48 hours after installation. Store tactile tile material in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 40°F in areas where work is completed.

B. The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the passengers or public. Provide barricades or screens to protect passengers or public.

C. Disposal of any liquids or other materials of possible contamination shall be made in accordance with federal state and local laws and ordinances.

D. Cleaning materials shall have code acceptable low VOC solvent content and low flammability if used on the site.

1.7 EXTRA STOCK

A. Deliver extra stock to storage area designated by engineer. Furnish new materials from same manufactured lot as materials installed and enclose in protective packaging with appropriate identification for Surface Applied tactile tiles. Furnish not less than two (2) percent of the supplied materials for each type, color and pattern installed.

1.8 WARRANTY (DETECTABLE WARNINGS AND DIRECTIONAL TEXTURE)

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of detectable warnings and directional surface products that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly.
   b. Degrade significantly means that product maintains at least 90 percent of its approved design characteristics, as determined by the authority having jurisdiction.
2. Warranty Period: Five years from date of Final Completion.
3. Authority: California Building Code Section 11B, Division of the State Architect Interpretation of Regulations (IR) 11 B-2, 11B-3 11B-4.

PART 2 - PRODUCTS

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. Engineered Plastics Inc., Armor Tile.
2. ADA Solutions, Inc., North Billerica, MA.

B. Detectable Warning Texture: Division of the State Architect (DSA/Access Compliance) approved products shall be used, compliance with CBC Section 11B-705.1, IRs 11B-2, 118-3 and 11B-4 and the California Accessibility Reference Manual.

1. Truncated Domes: provide raised Detectable Warnings with diameter of 0.9 inch at base tapering to 0.45 inch at top, height of 0.2 inch, with center-to-center spacing of 2.35 inches and corner domes spaced at 0.896 inch from the corner edges of tile; Provide raised truncated domes in a square grid (in-line) pattern.
   a. Truncated Dome: shall contrast visually with adjoining surfaces, light-on- dark or dark-on-light. Material used to provide contrast shall be integral part of walking surface. Warning surface shall differ from adjoining surface in resiliency or sound to cane contact.

2. Detectable Warning Texture (Truncated Domes): Plastics/Composites: Armor Tile, ADA Tactile Systems by Engineered Plastics Inc., North Billerica, or equal.

C. The Vitrified Polymer Composite (VPC) Surface Applied Tactile Tile specified is based on Armor-Tile manufactured by Engineered Plastics Inc. Existing engineered and field tested products which are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.

D. Color: Yellow conforming to Color No. 33538 of SAE AMS-STD-595A. Color shall be homogeneous throughout the tile.

2.2 MATERIALS

A. Fasteners: Color matched, corrosion resistant, flat head drive anchor: W diameter x 1 3/4” long, or manufacturer’s recommended fasteners.

B. Adhesive and Sealant: Manufacturer’s recommended adhesive and sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Surface Applied: The following installation instructions shall be used for tactile warning tiles installed at existing concrete surfaces.

1. During all surface preparation and tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.
2. The application of all tile, adhesives, mechanical fasteners, and caulking shall be in strict accordance with the guidelines set by their respective manufacturers.
3. Ensure that surfaces being prepared and fabricated to receive the tiles are constructed correctly and adequately for tile installation. Review design drawings with the Contractor prior to the construction and refer any and all discrepancies to Engineer.
4. Set the tile true and square to the curb ramp area as detailed in the design drawings, so that its location can be marked on the concrete surface. Use thin permanent marker. Remove tile when done marking its location.
5. The surface to receive the detectable warning surface tile (not recommended for asphalt) is to be mechanically cleaned with diamond cup grinder or shot blaster to remove any dirt or foreign material. This cleaning and roughening of the concrete surface should include at least 4 inches around the perimeter of the area to receive the tile, and also along the cross pattern established by the corresponding areas on the backside of the tile. Those same areas should then be cleaned with a rag soaked in Acetone.
6. Immediately prior to installing the detectable warning surface tile, the concrete surfaces must be inspected to ensure that they are clean, dry, free of voids, curing compounds, projections, loose material, dust, oil, grease, sealers and determined to be structurally sound and cured for minimum of 30 days.
7. Using Acetone, wipe the backside of the tile around the perimeter and along the internal cross pattern, to remove any dirt or dust particles from the area to receive the adhesive.
8. Apply the adhesive on the backside of the tile, following the perimeter and internal cross pattern established by the tile manufacturer. Sufficient adhesive must be placed on the prescribed areas to have full coverage across the 2” width of the adhesive locator. A 3 x 4 foot tile will typically require an entire tube of adhesive.
9. Set the tile true and square to the curb ramp area as detailed in the design drawings.
10. Standing with both feet applying pressure around the molded recess provided in the tile, drill a hole true and straight to a depth of 3W using the recommended diameter bit. Drill through the tile without hammer option until the tile has been successfully penetrated, and then with hammer option to drill into the concrete.

11. Immediately after drilling each hole, and while still applying foot pressure, vacuum, brush or blow away dust and set the mechanical fastener as described below, before moving on to the next hole.
12. Mechanically fasten tiles to the concrete substrate using a hammer to set the fasteners. Ensure the fastener has been placed to full depth in the dome, straight, and flush to the top of dome. Drive the pin of the fastener with the hammer, taking care to avoid any inadvertent blows to the truncated dome or tile surface. A plastic deadblow or leather hammer is recommended.
13. Working in a sequence that will prevent buckles in the tile, proceed to drill and install all fasteners in the tile's molded recesses.
14. Following the installation of the tiles, the perimeter caulking sealant should be applied. Follow the perimeter caulking sealant manufacturer's recommendations when applying. Tape all perimeter edges of the tile and also tape the adjacent concrete back 1/2" from the tile's perimeter edge. Tool the perimeter caulking with a plastic applicator or spatula to create a straight edge in a cove profile between the tile and adjacent concrete. Remove tape immediately after tooling perimeter caulking sealant.
15. Do not allow foot traffic on installed tiles until the perimeter caulking sealant has cured sufficiently to avoid tracking.
16. If installing adjacent tiles, note the orientation of each tile. Careful attention will reveal that one of the long edges of the tile is different than the other, in regard to the tiny dotted texture. You may also note a larger perimeter margin before the tiny dotted texture pattern begins. Consistent orientation of each Tile is required in order that the truncated domes on adjacent tiles line up with each other.
17. In order to maintain proper spacing between truncated domes on adjacent tiles, the tapered edge should be trimmed off using a continuous rim diamond blade in a circular saw or mini-grinder. The use of a straightedge to guide the cut is advisable. All cuts should be made prior to installation of the tiles.
18. If installing adjacent tiles, care should be taken to leave a 1/8 inch gap between each. If tiles are custom cut to size, and if pre-molded recesses (to receive fasteners) are removed by the cut, then any truncated dome can be center-drilled with a 5 inch through hole, and countersunk with a suitable bit, to receive mechanical fasteners. New holes should be created no closer to the edge of the tile than any of the other perimeter fastener pre-molded recesses. Care should be taken to not countersink too deeply. Fasteners should be flush with the top of the truncated dome when countersunk properly.
19. Adhesive or caulking on the surface of the Tile can be removed with Acetone.

B. Wet Set: The following installation instructions shall be used for tactile warning tiles installed at new concrete surfaces.

1. During all surface preparation and tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.
2. The application of all tile, adhesives, mechanical fasteners, and caulking shall be in strict accordance with the guidelines set by their respective manufacturers.
3. Ensure that surfaces being prepared and fabricated to receive the tiles are constructed correctly and adequately for tile installation. Review design drawings with the Contractor prior to the construction and refer any and all discrepancies to Engineer.
4. Set the tile true and square to the curb ramp area as detailed in the design drawings.
5. Immediately prior to installing the detectable warning surface tile, the wet concrete surfaces must be inspected to ensure that it is clean and free of debris.

6. Do not remove protective plastic covering on detectable warning tile product until tile is installed and concrete is fully cured.
7. Slowly press the detectable warning tile into the wet concrete until the base of the truncated domes is flush with the adjacent concrete. Do not stand on the tile during installation. Tap the detectable tile with a rubber mallet as required to ensure all edges are flush with concrete. Install anchors into wet concrete as specified per manufacturer's recommendation and ensure that the anchors are flushed with the detectable tile surface. Provide weight to the detectable tile surface if "floating" occurs after tile placement. All detectable tile edges shall be flush with adjacent concrete.
8. While the concrete is workable, a 1/8" deep troweled edge shall be installed around the tile perimeter. Finish the concrete as required per specifications. Ensure concrete edge do not have any low areas that collect water.
9. Set the tile true and square to the curb ramp area as detailed in the design drawings.
10. If installing adjacent tiles, note the orientation of each tile. Careful attention will reveal that one of the long edges of the tile is different than the other, in regard to the tiny dotted texture. You may also note a larger perimeter margin before the tiny dotted texture pattern begins. Consistent orientation of each Tile is required in order that the truncated domes on adjacent tiles line up with each other.
11. In order to maintain proper spacing between truncated domes on adjacent tiles, the tapered edge should be trimmed off using a continuous rim diamond blade in a circular saw or mini-grinder. The use of a straightedge to guide the cut is advisable. All cuts should be made prior to installation of the tiles.
12. Remove protective plastic sheeting after all post-installation treatments are complete and the concrete has cured.

3.2 CLEANING AND PROTECTING

A. Protect tiles against damage during construction period to comply with tactile tile manufacturer's specification.

B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. Clean tactile tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean tactile tile by methods recommended by manufacturer.

END OF SECTION

SECTION 32 84 00 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Provide all materials, labor, equipment and services necessary to furnish, install and maintain the Irrigation System, accessories and other related items necessary to complete the Project as indicated by the Contract Documents unless specifically excluded.

B. Related Work Specified Elsewhere
   1. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to work of this section.
   2. Section 31 20 00 – Earthwork
   3. Section 31 23 00 – Trench Excavation and Backfilling
   4. Section 32 90 00 – Landscape Planting

1.02 CODES AND REGULATIONS

A. All work and materials shall be in full accordance with the following codes adopted and amended by the authority having jurisdiction. Nothing in these drawings or specifications is to be construed to permit work not conforming to these codes. The work described in these specifications shall govern in the event that the drawings or specifications call for material or methods of construction of higher quality or standard than required by these codes.
   1. California Plumbing Code
   2. California Administrative Codes:
      a. Title 8, Industrial Relations
      b. Title 19, Public Safety
   3. California Electrical Code
   4. California Green Building Standards Code, Section 5.304.
   5. California Department of Water Resources, Model Water Efficient Landscape Ordinance (MWELO)
   6. Standards and Regulations of other agencies, water utility provider, or organizations as listed in this specification relating to products or procedures, e.g. American Society for Testing and Materials.

1.03 DEFINITIONS

A. Piping: All pipe fittings, valves, and accessories as required for a complete piping system.

B. PVC: Polyvinyl Chloride.

C. Agencies and Organizations:
   1. ASTM- American Society for Testing and Materials
   2. AWWA- American Water Works Association
   3. IAPMO- International Association of Plumbing and Mechanical Officials
   4. NEC - National Electrical Code.
   5. UL - Underwriter's Laboratories

6. SSPWC – Standard Specifications for Public Works Construction, by the American Public Works Assoc./Associated General Contractors of California.

D. Owner: An authorized representative of the Owner or the Owner's authorized consultant.

1.04 QUALITY ASSURANCE

A. The work of this section shall be performed by a single firm experienced in irrigation work and holding a current California Contractor's A or C27 License.

B. Qualifications of Workers
1. The Contractor shall employ skilled workers who are thoroughly trained and experienced in irrigation system installation and who are completely familiar with the specified requirements and methods needed for proper performance of this work.
2. The Contractor shall provide adequate supervision by a qualified foreman fluent in English that will be continuously onsite during the performance of this work.

1.05 SUBMITTALS

A. An operational assessment report of any existing irrigation system in the area of work shall be submitted prior to the start of the project's work, including demolition and clearing. See Subsection 1.07.

B. The Contractor shall submit complete lists of proposed materials and equipment per the Division 01 Submittal Section, including manufacturer's name and model numbers. Only provide additional product data and/or catalog cut sheets if a substitute material or equipment is proposed. No substitution will be allowed without prior written approval.

C. Shop drawings shall be provided for the layout and description of all equipment assemblies, including dimensions, capacities, and other characteristics as listed in product specifications. Shop drawings for booster pump assemblies shall clearly and neatly indicate the layout of the assemblies and proposed piping in the pump yard, and shall show adjacent equipment, required clearances, walls, fences, piping and other existing permanent improvements affecting the layout. Materials and equipment shall not be ordered until given written acceptance. Equipment or materials installed or furnished without prior approval or acceptance may be rejected and the Contractor shall be required to remove such materials from the site at his own expense.

D. When specific name brands of equipment and materials are used, they are intended as preferred standards only. This does not imply any right upon the part of the Contractor to furnish other materials unless specifically approved in writing as equal in quality and performance by the Owner. Decisions by the Architect/Engineer shall govern as to what name brands of equipment and materials are equal to those specified on the plans and his decisions shall be final. It shall be the responsibility of the Contractor to furnish proof as to equality of any proposed equipment or material.

E. Approval of any item, alternate or substitute indicates only that the products apparently meet the requirements of the drawings and specifications on the basis of the information or samples submitted. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.

F. Acceptance of any submittals, deliverables, or other work product of the Contractor shall not be construed as assent that the Contractor has complied with, nor in any way relieved the Contractor of compliance with (i) the applicable standard of care, and/or (ii) applicable statutes, regulations, rules, guidelines, and contract requirements.

G. Irrigation Equipment: When the Contractor desires to transfer salvaged irrigation equipment and/or new spare equipment and/or parts to the Owner, he must submit along with the equipment an itemized list. The Contractor is solely responsible to obtain a written confirmation by the Owner that all materials received by the Owner matches his material list. The transfer of materials will not be considered executed without written confirmation of same.

H. Submit any required or requested testing data and/or Certificates, including but not limited to the backflow prevention assembly testing Certificate after the assembly is installed prior to regular system operation.

1.06 EXPLANATION OF DRAWINGS

A. The intent of the drawings and specifications is to indicate and specify a complete and efficient sprinkler irrigation system ready for use in accordance with the manufacturer's recommendations, and all applicable local codes and ordinances. Interpretation of irrigation plans and specifications shall be the responsibility of the Landscape Architect or Owner.

B. All existing systems and improvements are shown in their approximate locations. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and shall report any variations to the Owner.

C. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, etc., which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all his work, and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed in the most direct and workmanlike manner, so that conflicts between sprinkler systems, planting, utilities, and architectural features will be avoided. Locate pipe, valves and other equipment in planting areas unless specifically noted otherwise.

D. All work called for on the drawings by notes shall be furnished and installed whether or not specifically mentioned in the specifications.

1.07 EXISTING CONDITIONS

A. The Contractor shall not install the irrigation system and equipment as shown on the Drawings when it is obvious in the field that obstructions or differences in existing conditions and/or systems are present. Such obstructions or differences should be immediately brought to the attention of the Owner. Failure to provide notification prior to the start of this work shall make the Contractor liable for any and all repairs and/or corrections necessary for proper functioning and coverage of the system without any additional cost to the Owner.

B. The Contractor shall examine carefully the site of work contemplated and the proposal, plans, specifications, and all other contract documents. By submitting a bid, the Contractor attests that he has investigated and is satisfied as to the conditions to be encountered, as to the

character, quality, and quantity of work to be performed and materials to be furnished, and the requirements of the specifications. The Contractor shall take necessary precautions to protect existing site conditions that are to remain. Should damage be incurred, the Contractor shall make the necessary repair or replacement to bring it back to its original condition at his own expense.

C. Prior to cutting into the soil, the Contractor shall coordinate with the Owner to locate all cables, conduits, sewers, septic tanks, and other such underground utilities as are commonly encountered and he shall take proper precaution not to damage or disturb such improvements. If a conflict exists between such obstacles, notify the Owner who will consider realignment of the proposed work. The Contractor will proceed in the same manner if a rock layer or any other condition encountered underground makes change advisable. Should utilities not shown on the plans be found during excavations, Contractor shall promptly notify the Owner for instructions as to further action. Failure to do so will make Contractor liable for any and all damage thereto arising from his operations subsequent to discovery of such utilities not shown in plans.

D. The Contractor shall verify the correctness of all finish grades within the work area in order to insure the proper soil coverage (as specified) of the sprinkler system pipes. The Contractor shall verify and be familiar with location and size of the proposed water supply (P.O.C.). He shall make approved type connection and install new work.

E. The Contractor shall be responsible for notifying the Owner prior to installation that equipment or methods indicated on the drawings or in the specifications conflict with local codes, are incompatible or an error is apparent. It the event the Contractor neglects to do this, he will accept full responsibility for any revisions necessary.

1.08 PERMITS

A. The Contractor shall obtain and pay required fees to any governmental or public agency. Any permits for the installation or construction of any of the work included under this contract, which are required by any of the legally constituted authorities having jurisdiction, shall be obtained and paid for by the Contractor, each at the proper time. He shall also arrange for and pay all costs in connection with any inspections and examination required by these authorities.

1.09 TESTING

A. General: Unless otherwise directed, tests shall be witnessed by the Owner. Work to be concealed shall not be covered until prescribed tests are made. Should any work be covered before such tests, the Contractor shall, at his expense, uncover, test and repair his work and that of other contractors to original conditions. Leaks and defects shown by tests shall be repaired and entire work re-tested. Tests may be made in sections, however, all connections between sections previously tested and new section must be included in the test.

B. Main Line Piping: Maintain 125 psi water or air pressure in new main line piping for a duration of twenty-four (24) hours. There shall be no drop in pressure during test except that due to ambient temperature changes (+/- 5psi).

C. After being installed at the project site, any newly installed Backflow Prevention unit must be tested and approved as functioning properly per the local water agency requirements.

Approval of the backflow prevention unit must precede any final inspection of the irrigation system. All costs for testing shall be the responsibility of the Contractor.

1.10 OBSERVATION

A. General:
   1. Installation and operations must be approved by the Owner.
   2. In no event shall the Contractor cover up or otherwise remove from view any work under this contract without prior approval of the Owner. Any work covered prior to inspection shall be opened to view by the Contractor at his expense.
   3. In all cases, where inspection of the irrigation system work is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Owner's Representative, the Contractor shall notify the Owner's Representative at least 48 hours in advance of the time when such inspection and/or direction is required. Any necessary re-excavation or alterations to the system needed because of failure of the Contractor to have the required inspection, shall be performed at the Contractor's own expense.

B. Periodic observations shall be required for basic operations and installations during progression of the project. The Owner's Representative, Owner or Landscape Architect shall perform the observations and shall record the observation on the Irrigation System Observation Log form on the As Built Record Drawings. Such observations will include but not necessarily be limited to the following items as included in the scope of work:
   1. Layout and flagging of sprinkler heads.
   2. Trenching.
   3. Main line installation.
   4. Main line sustained pressure check.
   5. Wire placement.
   6. Partial fill compaction of trenches.
   7. Control valve installation.
   8. Drip line installation prior to backfilling.
   9. Irrigation controller installation and operation.
   10. Sprinkler/emitter coverage prior to the start of planting operations.
   11. Overall system operation and primary/secondary communication.

C. Coverage & Operations Review:
   1. When the irrigation system is operational and prior to soil conditioning operations, the Contractor in the presence of the Owner shall perform a coverage test of the irrigation system. The Contractor shall furnish all materials and labor required to perform the coverage test and to correct any minor inadequacies of coverage disclosed. The Contractor shall inform the Owner and Owner of any deviation from the plan required due to wind, planting, soil, or site conditions that bear on proper coverage. If such notification of necessary corrections or additions to the irrigation system is not provided prior to or during the coverage test, the Contractor shall make all subsequent adjustments and corrections needed for proper coverage without any extra cost to the Owner.
   2. Prior to the start of the maintenance period, the irrigation system shall be reviewed by the Owner for proper operations, and a review of and training on equipment and associated controls performed. Any corrections and/or adjustment shall be made as a condition for the start of the maintenance period and subsequent Final Acceptance.

3. Submit a Pump Start-up and Training Report after start-up. Include a copy in the O&M manual.

D. Final Acceptance: The work will be accepted in writing when the entire project improvements have been completed to the satisfaction of the Owner. In judging the work, no allowance for deviation from the original plans and specifications will be made unless already approved in writing at proper time. Should it become necessary for the Owner to occupy any portion of the work area before the contract is fully completed, such occupancy shall not constitute acceptance. The Contractor will not be responsible for any damage caused by the Owner's separate work forces.

1.11 REJECTION OF NON-CONFORMING MATERIAL OR WORK

A. The Owner reserves the right to reject any material or work which does not conform to the contract documents. The rejected material or work shall be removed or corrected by the Contractor at no additional cost to the Owner.

1.12 OPERATIONS AND MAINTENANCE INSTRUCTIONS & RECORD DOCUMENTS

A. The Contractor shall prepare and deliver to the Owner’s Representative within ten (10) calendar days prior to completion of the construction and as a prerequisite to the start of the maintenance period, all required and necessary descriptive material in complete detail and sufficient quantity, properly prepared in two individually bound sets of Operating and Maintenance Manuals. These manuals shall describe the material installed and shall be in sufficient depth to permit operating personnel to understand, operate and maintain all equipment. Spare part lists and related manufacturer identification shall be included for each installed equipment item. Each complete, bound manual shall contain the following information:
   1. Cover sheet stating Contractor's address and telephone number, duration of guarantee period, and a list of equipment, with names and addresses of local manufacturer representatives and warranty periods.
   2. The Contractor to issue a "CERTIFICATE OF CONSTRUCTION COMPLIANCE" which indicates that all work done, materials and equipment used and installed are in compliance with the approved plans, specifications and all authorized revisions and that the system functions properly.
   3. Complete operating and maintenance instructions and warranties on all major equipment.
   4. Complete set of manufacturer's literature and specifications of material installed, including parts list.
   5. A list of the controller station number for each control valve if different than the control valve number shown on the drawings.
   6. Initial electrical data on each control valve:
      a. Ohms reading for each valve taken at the controller (circuit is OFF).
      b. Voltage reading for each valve taken both at the controller and at the valve (circuit is ON).

B. The contractor shall furnish one set of As-Built full-scale drawings on bond, and two compact disks with complete sets of digital PDF files of all close-out documents after the As-Built Record Drawings have been reviewed and accepted by the Landscape Architect.
   1. Label first page of each document, or set of documents, "AS-BUILT PROJECT RECORD" in neat large printed letters on lower right hand corner. Record information concurrently with construction progress. Prints for this purpose may be obtained from the

Owner. This set of drawings shall be kept on the site and shall be used only as a record set. Do not conceal any work until required information is recorded. These drawings shall also serve as work in progress sheets, and the Contractor shall make **neat and legible** annotations thereon daily as the work progresses, showing the work as actually installed. These drawings shall be available at all times for inspection and shall be kept in a location designated by the Owner.

2. Drawings: Legibly mark to record actual construction:
   a. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Give sufficient horizontal and vertical dimensions to accurately trace route and depth of each concealed line or item. Accurately locate each capped, plugged or stubbed line.
   b. Field changes of dimension and detail.
   c. Changes made by Field Order, Addenda, or other change document.
   d. Show the final controller station number for each control valve if different than the control valve number shown on the drawings.
3. Deliver all Close-out Documents (As-Builts) to the Owner. Accompany submittal with transmittal letter in duplicate, containing:
   a. Date.
   b. Project title.
   c. Contractor's name and address.
   d. Title and number of each Record Document (As-Built).
   e. Signature of Contractor or his authorized representative.

C. The Contractor shall provide controller chart(s) as follows:
   1. The Contractor shall provide two controller charts for each controller’s area of work.
   2. The chart shall show the area of work controlled by the automatic controller and shall be the maximum size that the controller door will allow.
   3. Show the controller station number for each control valve if different than the control valve number shown on the drawings.
   4. The chart may be a reduced drawing of the actual as-built system. However, in the event the valve numbering is not legible when the drawing is reduced, it shall be enlarged to a size that will be readable when reduced.
   5. The chart shall be colored with a different permanent color for each station.
   6. The chart shall be enclosed in a waterproof envelope or laminated.

D. Per MWELO Section 492.9, upon completion of the landscape planting and irrigation system, and as a condition of Final Acceptance and/or the issuance of a Certificate of Occupancy, the licensed landscape contractor shall submit to the approving agency and/or Owner, the following items in a form acceptable to the approving agency and/or Owner:
   1. Project information and contact information for the Owner and Applicant (Contractor).
   2. Certification that the installation complies with the approved Landscape Documentation Package.
   3. Irrigation scheduling parameters used in programming the controller during the establishment and maintenance periods.
   4. A Schedule of Irrigation System Maintenance.
   5. A Landscape Irrigation Audit Report per MWELO Section 492.12. Provide the Audit Report unless the report is not required by the approving agency or Owner.

1.13 SPARE PARTS AND EQUIPMENT

A. Prior to the conclusion of the maintenance period, furnish the Owner with the following spare parts and equipment:
   1. One quick coupler key with attached hose swivel for each set of four quick coupler valves installed.
   2. Ten spare nozzles for each different sprinkler head arc and/or radius nozzle installed.
   3. One valve key for the 2" operating nut and/or hand wheel isolation valve.
   4. One hundred feet of in-line emitter tubing with ten straight and ten ninety degree compression fittings.

1.14 WORK AREA AND SAFETY

A. The Contractor shall furnish, erect, and maintain all temporary facilities; perform all temporary work during the period of construction, including those herein specified. All facilities shall be maintained in proper and safe operating and sanitary conditions at all times.

B. The Contractor shall comply with the provisions of the Construction Safety Orders, and General Safety Orders issued by the State Division of Industrial Safety, as well as all other applicable laws, ordinances and regulations.

C. The project site shall be maintained in a neat and safe condition at all times. Cleanup shall be accomplished as the work progresses and upon completion of the work. The Contractor shall provide adequate safety measures to protect workers and the public from injury.

1.15 GUARANTEE

A. Irrigation system consisting of materials, equipment and workmanship shall be guaranteed for proper operation a minimum of one year from date of Final Acceptance of the Work or the Notice of Substantial Completion of the Project, whichever is later. Manufacturer's warranty periods may be longer, and shall be noted in the close-out documents.

B. The Contractor shall be held responsible for repair and/or replacement of damages to new or existing improvements resulting from the defects of materials, equipment or workmanship one year from the date of Final Acceptance of the Work or the Notice of Substantial Completion of the Project, whichever is later.

C. The Owner reserves the right to make temporary repairs as necessary to keep the irrigation 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 Guarantee as herein specified.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

A. Schedule rated white rigid PVC Pipe shall be made from NSF approved Type 1, Grade I, PVC compound conforming to ASTM D-1785.

B. Class rated (Standard Dimension Ratio) white rigid PVC Pipe shall be made from NSF approved Type 1, Grade I, PVC compound conforming to ASTM D-1784.

C. PVC pipe shall be of the Class or Schedule as follows:
   1. PVC pipe shall meet ASTM D-2241 for solvent weld, plain end, ASTM D-2672 for solvent weld, bell end, and ASTM D-3139 for gasketed bell end. Pipe shall be of the Schedule and/or Class as indicated herein.
   2. Pipe sleeves under paving shall be PVC Schedule 40 for 3-inch and smaller or SDR 35 for 4-inch and larger pipes.
   3. Riser and/or manifold pipe connecting valves to main line fittings shall be Schedule 80 PVC.
   4. Pressurized main line pipe shall be Schedule 40, belled end with solvent welds for pipe sizes less than 2 inches. Pipe sized 2 inches and greater shall be Class 200, SDR 21, with gasketed bell ends.
   5. Non-pressurized lateral line pipe shall be Schedule 40, belled end with solvent welds.

D. All pipes shall be continuously and permanently marked and conform with the following information: manufacturer's name or trademark, nominal pipe size, Schedule or Class of pipe, pressure rating in PSI, ASTM designation and (NSF) seal of approval.

E. Rigid polyvinyl chloride (PVC) Fittings:
   1. White Schedule 40 type I and II grade 1, solvent weld socket fittings ASTM D-2466 for all lateral lines 2-1/2 inches and smaller.
   2. Gray Schedule 80 type I and II grade 1 solvent weld socket fittings ASTM D-2464 for all main line less than 2 inches diameter, and lateral lines 3 inches and larger.
   3. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable (IPS) schedule, and (NSF) seal of approval.
   4. All plastic fittings and connectors shall be injection molded of an improved polyvinyl chloride compound featuring high tensile strength, high chemical resistance and high impact strength in terms of current ASTM standards for such fittings. Where threads are required in plastic fittings, these shall be injection molded also.

F. PVC Solvent Weld Adhesive: All socket and bell type connections shall be joined with primer and PVC solvent cement which shall meet the requirements of ASTM F656 for primer and ASTM D2564, "Standard Specification for Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings." Solvent cement joints for plastic pipe and fittings will be made as prescribed by manufacturer. The high chemical resistance of the pipe and fitting compounds specified in the foregoing sections makes it mandatory that an aggressive colored primer, which is a true solvent for PVC be used in conjunction with a solvent cement designed for the fit of pipe and fittings specified. A heavy bodied, medium set solvent cement, e.g. Weld-On 711 gray, shall be used for all classes and schedules of pipe and fittings.

G. PVC Pipe Thread Sealant: A non-hardening all purpose sealant and lubricant similar to Permatex #51 or Lasco blue pipe thread sealant which is certified by the manufacturer to be harmless to PVC pipe and fittings. Apply sealant to clean male threads, brushing into grooves and to the first three threads of the female threads. A good quality grade of teflon tape recommended by the manufacturer for use with plastics may be used in lieu of sealant. Minimum width of tape to be used is 3/4". A minimum of two wraps and a maximum of three wraps shall be used.

H. PVC Swing Joints: Connections to sprinkler heads from lateral lines shall be made with swing joints as detailed. Pre-assembled swing joints from Hunter, King Brothers or Spears are acceptable.

1. Use 6” length nipples for 1/2 inch inlet heads.
2. Use 12” length nipples for 3/4 or 1 inch inlet heads.

I. Coated Ductile Iron pipe and fittings:
   1. Ductile Iron pipe shall be centrifugally cast pipe conforming to ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, thickness Class 50, with cement - mortar lining and seal coating per ANSI/AWWA C104/A21.4.
   2. Ductile Iron flanged pipe shall conform to ANSI/AWWA C115/21.15.
   3. Ductile Iron flanged fitting to PVC pipe shall use a ‘Megalug’ mechanical joint restraint Series 2000PV by EBAA Iron per either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, or equal.
   4. Joints shall comply with the following standards:
      a. Rubber gasketed/mechanical joints: ANSI/AWWA C111/A21.11.
      b. Flanged joints: ANSI/AWWA C110/A21.10, B16.1, B16.2.

J. Coated ductile iron push-on fittings meeting ANSI/AWWA C110 or C153/A21.10 shall be used for:
   1. Main line connections for pipe 2 inches and greater in diameter.
   2. New main line service tee at valve connections where a service saddle is not acceptable.
   3. Self-restrainted fittings or joint restraints (Leemco LH or equal) shall be used for all elbows, tees, bends, etc fittings.

K. Coated ductile iron service saddles with stainless steel double straps, Smith-Blair 317, Romac Industries 202NS, or equal, shall be used for remote control/quick coupler valve service connections on main lines 1.25 inch or greater, and where the available outlet size can match the largest lateral line size downstream of the remote control valve.

L. Galvanized pipe and fittings:
   1. Galvanized Pipe shall be hot dip galvanized continuous welded, seamless steel SCH 40 pipe conforming to current ASTM A53 standards.
   2. Galvanized Fittings shall be galvanized, threaded malleable iron SCH 40 conforming to current ASTM A865 standards.

2.02 BACKFLOW PREVENTION ASSEMBLY

A. The backflow prevention assembly is existing and shall remain in place.

2.03 VALVES

A. Electric Control Valves:
   1. Globe valves operated by low-power solenoid, normally closed, manual flow adjustment. Sizes and types as shown on drawings.
   2. Provide a pressure regulating module on all control valves, or other pressure regulating components as part of the operating spray head or low volume head zones when the dynamic system pressure is, or may be greater than 45 psi.

B. Control Valve Marking: Christy’s valve identification tag (or equal), yellow color (purple color for recycled water) with text designating controller and valve station number, e.g. “A12”, or equivalent.

C. Isolation Valves:

1. Cast bronze, coated ductile iron or coated cast iron gate valve with resilient wedge, non-rising stem and two inch operating nut for main line 2 inch size or greater. Match size of mainline.

D. Quick Coupling Valve: Two piece quick coupling valve as shown on the Drawings.

2.04 VALVE BOXES

A. Control Valve/Master Valve/Flow Sensor boxes:
1. Shrub/Ground Cover areas: Carson 1419 body with lockable tan plastic cover, or equivalent. Drip Valve Kits shall use a Jumbo body with lockable tan plastic cover.
2. Turfgrass areas: Carson 1419 body with lockable green plastic cover, or equivalent.
3. Hardscape areas: Christy B16 concrete box (11.75” x 22.25”) with N16R composite solid flush lid, or equivalent.

B. Quick Coupler Valve boxes:
1. Shrub/Ground Cover areas: Carson 910 body with lockable tan plastic cover, or equivalent.
2. Turfgrass area: Carson 910 body with lockable green plastic cover, or equivalent.
3. Skinned ballfield areas: Christy F08 round concrete valve box (8” ID) with F08R concrete lid, or equivalent. Boxes in a sports venue’s field of play that are noted to be installed below grade shall use a metal lid with a non-woven geotextile of a minimum 0.5 lb./sq. yd. covering the lid and box frame.

C. Isolation Valve boxes:
1. Gate Valve box in hardscape: Christy G05 round concrete valve box (10.375” ID) with cast iron G05C lid, or equivalent.
2. Gate Valve box in planting areas: Christy F08 round concrete valve box (8” ID) with F08R concrete lid, or equivalent. Use F14 ADS adapter and extension for sizes 2.5 inches and larger.
3. Ball Valve box: Same as 2.04, A.

D. Control Valve box marking: Plastic lids shall have branded markings, and concrete lids shall have painted markings on the top of lid with minimum 2 inch high stenciled letters showing controller letter and station number.

2.05 CONTROLLER

A. Solid state microcomputer controller, completely automatic in operation, which shall electrically start the sprinkler cycle and program and time the individual stations. Controller shall have attached instruction booklet, integral 24V transformer, clock indicating time of day and day of week, 24V master valve circuit and terminal connection strip. Drawings for manufacturer and model.

B. Controller enclosure shall be stainless steel of a size and type as specified on the Drawings.

C. Upgrade components, sensors, flow meters and other accessories shall be a model type compatible with the controller and as specified on the Drawings. Controller assembly shall include boards and/or connections for sensor inputs. Weather sensors shall be located over a planting area.

D. Grounding materials shall conform to ASIC Guideline 100-2002 and manufacturer's specifications.

2.06 CONTROL AND TRACER WIRE, COMMUNICATION CABLE

A. Connections between the automatic controllers and the electric control valves, and tracer wire shall be made with direct burial AWG – UF 600 volt copper wire manufactured for irrigation system use.

B. Hot control wires for the first controller shall be red. If multiple controllers are installed, the hot wire color shall be orange, yellow, purple in order for each controller. Common ground wire shall be white, with a color stripe corresponding to the hot control wire color when multiple controllers are installed. Spare control wires shall be black and spare common wire blue. Tracer wire shall be green.

C. Install in accordance with valve manufacturer's specifications and wire chart. In no case shall wire size be less than #14. Common wire shall be a minimum #12 size.

D. All control wire splices/caps shall be made with direct bury rated, waterproof wire connectors with silicone sealant, Spears DS-500 Dri-Splice, 3M DBR/DBY or approved equal. Use one splice per connector sealing pack.

E. Apply waterproof numbered wire markers or sleeves at both sides of all splices and at the controller terminal board corresponding to the controller (A, B, etc.) and station number (02, 14, etc.). If multiple valves are connected to one station, add a single digit indentifier (1, 2, etc.) to the station number (XX), e.g. A02-1, A02-2, etc.

F. Communication/flow sensor cable shall be a shielded and jacketed, minimum 16 gauge twisted pair with drain wire, Paige P7162D or equal compliant with the controller manufacturer's specifications.

G. Below-grade conduit for control wires and/or cables shall be PVC for electrical use with long radius sweeps at direction changes and at valve/splice/pull box terminations.

2.07 IRRIGATION HEADS

A. Spray/Bubbler Pop-up Head: Molded plastic body with pop-up plastic riser and nozzle. Manufacturer's model numbers are listed with description on the Drawings.

B. Rotor Pop-up Head: Molded plastic body with plastic riser and nozzle. Gear driven rotation with memory arc, balanced nozzle sets. Manufacturer's model numbers are listed with description on the Drawings.

2.08 DRIP IRRIGATION EQUIPMENT

A. Flexible distribution tubing shall be 0.66" – 0.70" OD (17mm nominal) fabricated from virgin polyethylene resin specifically designed for subsurface drip irrigation use and conforming to ASTM D 1248 for Type I, Class C, Category 4 Grade P14, and to ASTM D-3350 for PE 122111C. Provide all fittings, connectors and accessories compliant with the tubing for a complete, properly functioning system.

B. Pressure rating of tubing shall be as defined in Standard ASAE S435. Burst strength shall be minimum 50 psi at 176 degrees F for 4,200 hours.

C. In-line wye filters shall be type as noted on the Drawings. Filter element shall be molded polyester screen cylinder with minimum 150 mesh screen (blue).

D. Preset pressure regulators shall be type as noted on the Drawings for above or below ground application.

E. In-line emitter tubing shall be a below grade product with self-cleaning emitters. Manufacturer as noted on the Drawings.

F. Flush valve as noted on the Drawings.

G. Operation indicator shall be a 6 inch pop-up sprinkler body with built-in check valve. Install a bubbler or variable arc nozzle that can be adjusted to a no-flow condition, Hunter ECO-INDICATOR, or equal.

2.09 CONCRETE

A. Cast-in-place Portland cement concrete used for pipe encasement, cover, thrust blocks, pipe support or other below-grade use shall at minimum comply with 2,800 psi 28 day strength.

2.10 OTHER MATERIALS

A. Materials not specifically indicated but necessary for the proper execution of this work shall be of first quality as selected by the Contractor subject to the acceptance of the Owner.

B. All materials appearing in the legend and details of the irrigation drawings are to be furnished and installed by the Contractor unless specifically noted to the contrary. Contractor is responsible for installation according to plans and details. The system shall efficiently and uniformly irrigate all areas and perform as required by these plans and specifications.

C. Granular bedding material shall be clean natural occurring sand, free from clay, salt, sea shells or organic material, suitable for the purpose intended, and shall be of such size that 90 percent to 100 percent will pass a No. 4 sieve and not more than 5 percent will pass a No. 200 sieve.

PART 3 - EXECUTION

3.01 SYSTEM DESIGN AND VERIFICATION

A. Contractor shall verify existing pressure and any existing irrigation equipment, and shall inform the Owner of any discrepancies between the exsiting systems' make and model of equipment, such as sprinkler heads, control valves, etc., and those indicated in the Drawings in writing prior to the start of irrigation system installation. Failure to inform the Owner of any discrepancy within seven working days prior to beginning of system installation will place the responsibility of any and all corrective action on the Contractor at no expense to the Owner.

3.02 PIPING INSTALLATION

A. General:
   1. Any equipment installed by the Contractor and deemed to be for the use of the Owner in various situations (i.e., control valves, control panels, etc.) shall be so installed to be readily accessible and quickly operable. Equipment deemed by the Owner to be inoperable for its intended purpose shall be reinstalled by the Contractor in an operable position before approval will be given. Any changes made by the Contractor shall be done without any additional cost to the Owner.
   2. The Contractor shall be responsible for layout of proposed facilities and any minor adjustments required due to differences between existing conditions and the Drawings. Any such deviations in layout shall be within the intent of the original drawings, and without additional costs to the Owner. The Owner will indicate the proposed precise location of the control panels. Head spacing on drawings is diagrammatic. Head spacing and patterns shall be adjusted to provide complete and adequate coverage with a minimum spray on non-planted areas. Where head spacing is not specifically noted, Contractor shall install sprinkler heads evenly along the irrigation area's perimeter. Flush all lines prior to installation of heads.
   3. Support piping without strain on joints or fittings and allow for piping expansion and contraction. "Snake" pipe into trench in accordance to manufacturer's recommendations to allow for expansion. Lay on solid bedding, at uniform depth.

B. The Contractor shall examine all other portions of working drawings and plan trenching and pipe layout so that no conflict will arise between irrigation and any other work. Any corrective action will be the Contractors responsibility at no further expense to the Owner.

C. Excavations:
   1. Excavations shall be open vertical construction, sufficiently wide to provide clear working space around the work installed and to provide ample space for backfilling and tamping.
   2. The use of a vibratory plow or methods other than open vertical trenching will not be allowed without the written approval of the Owner. To obtain such approval, a field test must be performed, at the proposed site, with the equipment to be used in the presence of the Owner and Owner. The field test is to indicate if the proposed site is favorable to the plowing method. Approval for plowing at one location does not allow the use of plowing at another location. Approval for plowing must be obtained for each location where the use of plowing is proposed. If, at previously approved plowing locations, conditions for plowing become unfavorable as determined by the Owner, plowing shall be terminated.
   3. Trenches for pipe and equipment shall be cut to required grade lines, and compacted to provide an accurate grade and uniform bearing for the full length of the line.
   4. Unless written approval for using native soils as bedding material is given by the Owner, main line pipe shall be placed on a minimum 6 inch depth of granular bedding material.
   5. Excess trench soil with rocks greater than ½ inch diameter shall be removed from the planted area and spread as directed by the Owner.
   6. When two pipes/conduit are to be placed in the same trench, it is required to maintain a minimum six inch (6") horizontal separation between pipes/conduit.
   7. Depth of trenches shall be sufficient to provide a minimum cover above the top of the pipe as follows:
      a. 24-inch minimum over main lines and wire conduit.
      b. 18-inch minimum over non-pressure (rotary pop-up) lateral lines.
      c. 12-inch minimum over non-pressure (pop-up spray head) lateral lines.

d. 24-inch minimum from subgrade over any lines located in a paved vehicle area.
e. Maximum cover above the top of the pipe shall not exceed twelve inches (12”) greater than the required minimum cover.
f. 12-inch minimum cover over drip line non-pressure lateral and manifold pipe, and main distribution tubing.
g. 3-inch minimum cover over in-line emitter tubing.

D. Assemblies:
1. Routing of pressure supply lines as indicated on drawings is diagrammatic. Install lines (and various assemblies) in such a manner as to conform with details on plans.
2. Install all assemblies specified herein according to the respective detail drawings or specifications pertaining to specific items required to complete the work. Perform work according to best standard practice.
3. Install no multiple assemblies on plastic lines. Provide each assembly with its own outlet.
4. All threaded pipe and fittings shall be assembled using an approved teflon tape, or equivalent, applied to the male threads only. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved teflon tape will be required.
5. No main line elbows, branch tees or isolation valves are to be located closer than five (5) feet to each other without prior approval of the Owner.

E. Line Clearance: All lines shall have a minimum clearance of four inches (4") from each other, and six inches (6") from lines of other trades. Parallel lines shall not be installed directly over one another.

F. Plastic to Steel Connections:
1. At all plastic (PVC) pipe connections, the Contractor shall work the steel connections first. Connections shall always be plastic into steel, never steel into plastic. An approved teflon tape shall be used on all threaded (PVC) to steel, never steel into plastic. An approved teflon tape shall be used on all thread (PVC) to steel pipe joints applied to the male threads only, and light wrench pressure is to be applied. A minimum of two (2) wraps and a maximum of three (3) wraps of an approved 3/4" wide teflon tape will be required.
2. A non-hardening sealant and lubricant similar to Permatex #51 or LASCO blue pipe sealant may be used in lieu of teflon tape. Apply sealant to clean male threads brushing into grooves and to the first three threads of the female threads.

G. Plastic Pipe:
1. The Contractor shall exercise care in handling, loading, unloading, and storing plastic pipe and fittings. All plastic pipe and fittings shall be stored under a weatherproof roofed structure before using and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lie flat so as not to be subject to undue bending or concentrated external load at any point.
a. All lumber, rubbish, rubble, concrete and rocks shall be removed from the trenches by the Contractor. Pipe shall have a firm uniform bearing for the entire length of each pipe line to prevent uneven settlement. Wedging or blocking under riser tees shall be done only if specified on the plans. Pad trenches with soil as necessary to provide uniform bearing surfaces.
b. Where extensive lengths of pipe are installed, snake pipe in trench from side to side to allow for expansion and contraction. One additional foot per one hundred (100) feet of pipe is the minimum allowance for snaking. Never lay pipe when there is water in the trench or when the temperature is 32 degrees F or below.

c. All changes in direction of pipe shall be made with fittings, not by bending. No main line fittings for changes in direction shall be greater than 45 degrees. Provide a minimum five (5) feet between changes in direction fittings.
d. Safely handle primers and cements per ASTM F-402. Make solvent weld joints per ASTM D-2855 with a non-synthetic bristle brush in the following sequence:
    1) Make sure pipe is cut square and all rough edges and burrs are removed. All connecting surfaces are properly cleaned and dry prior to application of pipe primer.
    2) Apply an even coat of colored primer to pipe and fitting prior to application of solvent.
    3) Apply an even coat of solvent to the outside of the pipe, making sure that the coated area is equal to the depth of the fitting socket.
    4) Apply an even light coat of solvent to the inside of the fitting.
    5) Apply a second coat of solvent to the pipe.
    6) Insert the pipe quickly into the fitting and turn pipe approximately one-eighth to one-quarter turn to distribute the solvent and remove air bubbles. Hold the joint for approximately fifteen seconds so the fittings do not push off the pipe.
    7) Using a clean rag, make sure to wipe off all excess solvent to prevent weakening at joint.
    8) Exercise care in going to the next joint so that pipe is not twisted, thereby disturbing the last completed joint.
    9) Allow at least fifteen minutes setup time for each welded joint before moving.
    10) Repairing plastic pipe when damaged shall be done by replacing the damaged portion of pipe.

H. Concrete Thrust Blocks: Concrete anchors or thrust blocks shall be provided on pressure main pipelines 2 inches or greater in diameter at abrupt changes in pipeline grade, changes in horizontal alignment (bends, tees and crosses), reduction in pipe size (reducers, reducing tees or crosses), end-line caps or plugs, and/or in-line isolation valve to absorb any axial thrust of the pipeline. The pipe manufacturer's recommendation for thrust control shall be followed. Thrust blocks must be formed against solid unexcavated earth (undisturbed). Do not enclose entire joint in concrete. Provide a minimum of three cubic feet of concrete for each thrust block.

I. Concrete thrust blocks may be eliminated if the main line piping system uses self-restrainted fittings and bell joint restraints per manufacture’s specifications throughout.

3.03 PIPE DEPTH AND BACKFILL

A. Backfill shall not be placed until the installed system has been inspected, pressure tested and approved by the Owner.

B. Backfill for first 6 inches underneath, and 4 inches around and above main line pipe and control wires shall be granular bedding material, unless the Owner approves in writing that native soil may be used for initial backfill in lieu of granular bedding material. Backfill material for the upper portion of the trench shall be approved soil. Unsuitable martial, such as pipe remnants and wire including clods and rocks over two inches (2") in size, shall be removed from the premises and disposed of legally at no cost to the Owner.

C. Backfilling for all pipe shall be carried out in two basic stages.

1. Stage One Backfilling: This shall be accomplished as soon as possible after the pipe is laid. A bedding of uniform depth with no voids must be provided along the entire length of the pipe. The bedding material should be placed in the trench and tamped into the areas under the pipe, using a suitable tool. Joints should be left exposed until hydrostatic tests are completed. Cover only those portions of the pipe necessary to prevent movement or damage.
2. Stage Two Backfilling: This shall be completed after all hydrostatic tests are completed and the piping system has been thoroughly checked for leaks or other defects. Continue to add backfill material in four inch (4") layers and hand tamp to achieve density similar to adjacent soil. After twelve inches (12") in main line trenches and eight inches (8") in lateral line trenches of hand tamped soil is in place over the pipe and fittings, backfilling can be continued, using light machinery to place dirt in the trenches in six inch (6") layers and to compact the dirt to conform to adjacent soil. Extreme care should be taken to avoid damage to the pipe from machinery that is too heavy. All trenches shall then be water jetted to assure uniform settling and compaction. Backfilling operations will not be considered complete until the top surface has been graded to conform to the adjacent soil. All rocks uncovered and not used as backfill must be collected and removed from the site.

D. All backfilling shall be done carefully and shall be properly tamped. All soil shall be tamped and puddled to eliminate any voids.

E. Surplus earth remaining after backfilling shall be disposed of as directed by the Owner.

F. PVC piping and fittings shall not be backfilled during periods of extreme heat or when a sudden lowering of temperature of the pipe may cause separation of joints or fittings.

G. Contractor shall fill with properly amended topsoil any irrigation trench that subsides during the warranty period. Contractor shall assume all cost associated with the trench repair, including but not limited to plant replacement of a size of plant disturbed at the time of the repair.

3.04 BACKFLOW PREVENTION ASSEMBLY

A. Check the existing backflow assembly for leaks or any improper condition. Notify the Owner as such if found.

3.05 CONTROL AND TRACER WIRE, AND COMMUNICATION CABLE

A. Do not tape wires together when encased in sleeve or conduit. Minimum cover shall be 24 inches. Crimp wires together at valve manifold with Scotchlok connector. Conventional valve wire splices shall use a 3M DBY splice kit. Tag all control wire at splices with approved control wire markers.

B. Wire size shall be determined by the number of valves operating on a given wire and the distance from the controller to the farthest valve, as specified by the charts furnished by the remote control valve manufacturer. Splices are only allowed when rerouting or repairing existing wire. All splice connections must be provided in a valve box.

C. Communication/sensor cable shall be installed in electrical conduit with long radius sweeps at direction changes and at valve/splice/pull boxes. Maintain a minimum six inch clearance to adjacent pipe. Minimum cover shall be 24 inches.

D. Install tracer wire along the top of pipe at the following locations:
   1. All pipe sleeves.
   2. Main line pipe without adjacent control wire.

3.06 VALVES

A. The Contractor shall make all necessary connections for operation, and shall be connected and aligned to provide the most efficient flow of water to the irrigation heads. Where pressure regulating electric control valves are specified, the Contractor shall adjust the valve so a uniform distribution of water is applied by the heads, and that the most remote heads operate at the pressure recommended by the head manufacturer.

B. Each valve is to be enclosed in a separate valve box. The valve box shall be secured on firm soil clear of valves and wiring connections. Valve boxes and lids shall be set to finished grade or as indicated on the Drawings. Use valve box extensions of the same material as the box to the proper depth below the pipeline. Valve boxes shall be supported by common bricks at each corner and at the long side of the box. Use a minimum of six bricks to support rectangular boxes and four bricks to support round boxes. Backfill carefully and properly compact in order to prevent settlement and subsequent damage.

C. Install a concrete collar around valve boxes when located in asphaltic concrete pavement or in turfgrass areas.

D. Remote control valve boxes within the field of play at sports venues shall be buried with a minimum of 8 inches of cover over the box lid in turfgrass, and a minimum 3 inches in skinned infield or warning track surfacing.

E. When existing valve and/or splice boxes are within the area of work, replace in kind any damaged boxes and/or lids, unless noted otherwise. Adjust the elevation of all existing boxes within the area of work to final grade per the drawings.

F. Locate valve boxes in ground cover/shrub planting areas instead of turfgrass areas whenever possible. Locate valve boxes 18” from and perpendicular to adjacent paving. When grouped together, provide equal spacing of at least 36" between boxes.

G. Permanently attach the plastic valve identification tag to the remote control valve body and locate so it’s clearly visible in an open valve box.

H. Permanently secure the control valve identification label to the top of concrete valve box lids with non-corrosive connectors.

3.07 AUTOMATIC CONTROLS

A. Install the controller and/or associated equipment, enclosure, sensors, and accessories per the manufacturer’s details and installation requirements, and the construction documents.

B. Where the controller is not connected to a building's electrical grounding system, install a grounding circuit for controller and associated equipment with either a ground rod or ground plate per ASIC Guideline 100-2002.

C. Where the new controllers are a site satellite controller in a central control system, the site satellite controller equipment and installation shall be reviewed for system compliance by an authorized central system distributor/installer.

D. Connect operational control wires or accessory components to the controller, and program valve schedules appropriately for the new planting.

E. The Owner shall review the fully functional operation of the irrigation control system prior to acceptance of the system, and as a requirement for the start of maintenance.

F. Install automatic controller chart in laminated or watertight plastic envelope inside controller cover showing which valves are connected to which stations on controller in the work area.

3.08 SPRINKLER HEAD INSTALLATION

A. Head spacing on drawings is diagrammatic. Head spacing and patterns shall be adjusted to provide complete and adequate coverage with a minimum spray on non-planted areas. Flush all lines prior to installation of heads.

B. Overhead distribution sprinkler heads shall be installed as detailed, set adjacent to the edge of hardscape elements (2 - 4 inches for spray heads, 6 - 8 inches for rotary heads) and perpendicular to the finish grade. Sprinkler spray heads directed toward a building shall be a minimum 7 feet from building walls, and a minimum 2 feet when directed away from the building. Sprinkler heads in turfgrass areas shall have a minimum 10 foot radius except for corners.

C. The top of the nozzle in pop-up bodies shall be flush to the finish grade in areas to receive turfgrass seed/stolons, and in ballfield skinned infields. The top of the nozzle shall be one-half inch (1/2") above the finish subgrade in areas to receive standard cut turfgrass sod.

D. High speed or other sprinkler heads in dust control zones at ballfield skinned infields shall be installed in turfgrass areas where directly adjacent to the skinned infield.

E. Where individual shrub bubblers are installed, each plant shall have a bubbler within 10 - 14 inches of the shrub center.

F. Upon completion of the installation, the Contractor shall adjust or change sprinkler head nozzles to uniformly distribute water without overspray and shall place entire irrigation system in first-class operating condition without any additional cost to the Owner.

G. Sprinkler heads shall be adjusted in order by fully opening the sprinkler furthest from the control valve and working back toward the control valve. Adjust sprinkler heads which spray toward buildings or adjacent hardscape so that water spray does not contact the side of buildings or significantly over-spray onto hardscape .

3.09 DRIP IRRIGATION SYSTEM

A. Install control valves, wye strainer, pressure regulator and rigid PVC lateral distribution lines or manifolds prior to planting soil conditioning operations.

B. Install in-line emitter tubing as follows:
   1. After planting soil has been amended, tilled and rough graded, remove and stockpile the planting soil to the required depth of the in-line tubing, and install and stake drip tubing taking into account adjustments needed in the tubing location based on the planting layout. Stake in-line tubing at every-other emitter. Install flush and air relief valves, and operation indicator. Install the operation indicator on the supply manifold with a swing joint in a location easily visible by maintenance personnel.
   2. After system flushing, verification of proper operation and inspection, reinstall the stockpiled planting soil and finish grade to final elevation.

C. Operate the system to moisten the planting soils to a minimum 8 inch depth prior to planting operations.

D. Program the controller to operate the drip system using the controller's "cycle and soak" feature in order to apply the required daily watering amount in three equal cycles with a one hour delay between cycles.

3.10 CONCRETE

A. Concrete shall be installed in accordance with the relevant portions of the Site Concrete specification section.

3.11 COMPLETION AND MAINTENANCE

A. After the system has been completed but prior to the start of maintenance, the Contractor shall operate the automated system with the Owner, shall instruct the Owner in the operations and maintenance of the system and controls, and shall program the controller for each station.

B. If site satellite controller(s) for a central control system is installed, an authorized central control distributor/installer shall program the central base station to communicate with the site satellite controller(s), and shall verify that proper communication protocols are operational.

C. The irrigation system shall be maintained and adjusted as required to provide proper coverage throughout the maintenance period or until Final Acceptance of the project, whichever is greater. Irrigation system maintenance shall commence upon an acceptable review following the completion of irrigation installation, planting operations and general clean-up.

D. The maintenance period shall not terminate until the close-out documents and as-builts record drawings have been submitted and accepted.

3.12 REPAIR AND CLEAN-UP

A. All areas shall be maintained in a neat and orderly condition at all times. All reasonable precautions shall be taken to avoid damage to new planting and improvements. Disturbed and/or damaged areas shall be restored to their original condition to the satisfaction of the Owner.

B. Where trenching or other work disturbs existing and/or newly planted turfgrass and/or planting, the Contractor shall reinstall the existing sod if viable, or install a full width of new turfgrass sod or new planting to match the existing turfgrass/planting species, variety and size, after first conditioning the top 6 inches of soil per the Landscape Planting specification. Adjust finish grades to account for the new turfgrass sod's soil mat so that the new sod is flush to the adjacent turfgrass.

C. After the irrigation operations are completed, the Contractor shall remove all trash, excess materials, empty containers or any other debris accumulated by the work from the site. All damage caused by the work shall be repaired or material replaced at the Contractor's expense. The site shall be left in a neat and orderly condition to the satisfaction of the Owner.

END OF SECTION

SECTION 32 90 00 - LANDSCAPE PLANTING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all material, labor and equipment necessary to install all landscape work as indicated in the plans and specifications.

B. The landscape work includes but is not necessarily limited to the following:

1. Soil preparation including cross ripping of all planting soil.
2. Weed control including an application of a pre-emergent herbicide.
3. Providing import planting topsoil at raised grade planters and/or at planting areas needing fill.
4. Fine grading, conditioning and amending planting topsoil.
5. Installation of turfgrass sod.
6. Planting new trees, plants and ground covers.
7. Tree drainage sump boring and testing.
8. Root Barriers.
9. Installation of mulch.
10. Turfgrass maintenance equipment and training.
11. Sixty (60) day maintenance.

C. Related Work Specified Elsewhere
1. Contract Drawings, Addenda, general provisions of the Contract, including General and Supplemental Conditions, and Division 1 Sections apply to work of this section.
2. Section 31 20 00 - Earthwork
3. Section 31 22 22 - Soil Materials
4. Section 32 01 90 – Existing Landscape Protection
5. Section 32 84 00 - Irrigation System

1.02 1.03 DEFINITIONS

A. Unless noted otherwise, the term "approved" shall mean by the Owner in writing.

B. Agencies and Organizations:
1. ASTM- American Society for Testing and Materials
2. ANSI – American National Standards Institute
3. ISA – International Society of Arborists
4. SSPWC – Standard Specifications for Public Works Construction, by the American Public Works Assoc./Associated General Contractors of California.
5. TPI – Turfgrass Producers International

C. Owner: The Owner’s authorized representative or authorized consultant.

1.03 QUALITY ASSURANCE

A. The work of this Section shall be performed by a single firm experienced in landscape

planting and holding a current California Contractor's A or C27 License.

B. Tree and plant quality and sizes shall conform to the current edition of "American Standard for Nursery Stock" for Number One nursery stock as adopted by the American Nursery & Landscape Association (ANSI Z60.1). Plants shall be of uniform, standard size for their listed container size, neither overgrown and root bound or encircling, nor so recently transplanted that the root system is not thoroughly well established throughout the container. Roots should reach the sides of the container and maintain a firm root ball. Pruning shall not be done prior to delivery except by prior approval.

C. Trees shall also comply with quality characteristics described in "Guideline Specifications for Nursery Tree Quality" current edition, published by the Urban Tree Foundation. Trees not in compliance with any of the following characteristics may be subject to removal and replacement, whether planted or still in their containers.
   1. Acceptable caliper and height ranges for the Type, Form and Size of tree.
   2. An intact central leader, or after heading of an old leader, the new leader diameter is greater than one-half the diameter of the old leader. Co-dominant leaders are not acceptable.
   3. Scaffold branch diameters are less than two-thirds the diameter of the trunk, and without included bark at the attachment.
   4. Scaffold branches shall be balanced, well spaced vertically, and with a radially blank section no greater than one-third of the canopy circumference.
   5. Temporary branches on the lower trunk shall be less than three-eighths inch diameter, and the clear trunk height shall be no more than forty (40) percent of the overall tree height.
   6. The root collar and rootball shall be free of defects, including circling, kinked and girdling roots. Roots at the edge and bottom of the container shall be less than one-quarter inch diameter, and uniformly distributed throughout the container.
   7. The tree canopy width shall be a minimum of twenty-five percent of the standard form tree height, except for naturally columnar forms.

D. Botanical names shall take precedence over common names. Provide plants that are true to name. Tag one representative plant of each species and size with the botanical name and size.

E. Inspection:
   1. All landscape work and materials shall comply with applicable Federal, State, County and City regulations.
   2. All plant material shall be reviewed onsite or by providing photo submittals by the Owner's Representative and/or Landscape Architect prior to positioning and planting. The lack of a review shall not limit the right of rejection during any stage of the work until Final Acceptance for any reason including condition of the foliage or root ball, size, variety, form, appearance, latent defects or injuries or location errors. Rejected or wrongly located plants shall be removed/relocated from/on the site and replaced/replanted immediately by the Contractor as directed at no additional cost to the Owner.

F. Qualifications of Workers
   1. Employ skilled workers who are thoroughly trained experienced in landscape planting and who are completely familiar with specified requirements and methods

needed for proper performance of the work in this section.

2. Provide adequate supervision by a qualified foreman fluent in English that will be continuously onsite during the performance of this work.
3. Weed control pesticides shall only be applied by an individual holding a valid Qualified Applicator Certificate (Category A) issued by the Department of Pesticides Regulation. Submit a copy of the Certificate.

G. Any pruning of existing trees specified as part of this Work shall be performed under the direct supervision of an ISA Certified Arborist and in compliance with ANSI A300-Part 1 Standard Practices (Pruning).

1.04 SUBMITTALS

A. In accordance with the Submittal section, submit:
1. A complete materials list of all items proposed to be furnished including estimated quantities.
2. Laboratory analyses of soil conditioning materials shall have been performed within three months of the submittal date.
3. Quality Certificates and/or Certificates of Inspection required by government agencies (providing duplicate copies for the Owner's Representative).
4. Qualified Applicator Certificate, and DPR Registration Certificates and Material Safety Data Sheets for all pesticides/herbicides proposed for use.
5. Submit photos with a scale marker of all boxed trees, and a representative photo of each species/variety of ground plane plants proposed for use from the nursery source. Photos shall clearly show the individual tree or plant form without background greenery.

B. Soil amendments: Submit one (1) pint sample and an analysis of organic compost and mulch.

C. Other Samples: When requested by the Landscape Architect and/or Owner's Representative.

D. Soil Fertility Analysis and Recommendations:
1. The Contractor shall provide and pay for a fertility analysis of the existing topsoil and any proposed import planting topsoil. After mass grading operations are completed, native soil samples shall be collected for the fertility analysis by collecting a minimum of 5 representative samples of the soil per acre throughout the area of work. Separate samples shall be produced for cut and fill areas, and for any other area composed of soils not similar to the existing soils. Each sample shall be a minimum of one pint each, and shall be thoroughly mixed together to prepare a homogenous sample. A one quart representative sample for cut, fill and any other special conditions shall be submitted to the soil testing laboratory as a representative sample for fertility analysis. The fertility analysis shall at a minimum provide the following data:
a. soil texture class and percent sands, silts and clays per ASTM D422
b. estimated soil infiltration and percolation rates
c. pH
d. organic matter (%)
e. total soluble salts (ECe)

f. Cation Exchange Capacity (CEC) and Percent Cation Saturation for K, Mg, Ca and Na
g. major and minor nutrients (ppm).

2. Recommendations for improvement of the soil conditions for optimum plant growth shall be made by the testing laboratory, and at a minimum shall include the following:
   a. A fertilizer and amendment application program (including macro and micro nutrients) for both pre-planting and maintenance fertility applications for broad area tillage and for planting pit backfill (pre-plant only).
   b. Treatments to neutralize soil pH and to correct any adverse conditions as warranted.
   c. Recommendations shall address soil conditioning for both planting area tillage and tree/plant planting pit backfill.
3. The soil analysis and recommendations shall be performed by one of the following laboratories capable of providing the above analyses by a licensed soil scientist:
   a. D&D Agricultural Laboratory. Contact Darrin Peters at 559-348-1818.
   b. Wilber-Ellis Company. Contact Michael Cline at 209-442-1220.
4. The Contractor shall submit the results of the soil testing investigations and shall receive written direction from the Landscape Architect before proceeding with any soil conditioning activities such as fertilizing and/or tillage of amendments.

E. Within seven days from the start of the maintenance period, submit a calendar of maintenance activities, including scheduled dates for mowing, fertilizing, weed control and all other activities. Provide the quantities of maintenance fertilizer and any other materials scheduled to be used in each application during the maintenance period.

F. Submit invoices and/or delivery tags from material suppliers for all amendments, fertilizer, seed, plants, mulch and any other materials provided for the landscape planting installation and applied during the maintenance period. Submit tags from seed packaging indicating seed varieties, percent purity and percent germination minimums. The invoices and/or delivery tags shall be provided directly to the Owner’s Representative/Inspector of Record within 24 hours of delivery to the site, as well as to the normal submittal recipients per the Contract Documents.

G. Close-out Documents: Submit prior to the end of the maintenance period. Acceptance of the Close-out documents in a condition for scheduling a Final Acceptance review. Provide two bound copies of the following:
1. Cover sheet stating Contractor's address and telephone number, duration of guarantee period, and a list of plant nurseries, materials and equipment vendors with names and addresses of the vendor/manufacturer representatives and warranty periods.
2. A "CERTIFICATE OF CONSTRUCTION COMPLIANCE" which indicates that all work done, materials and equipment used and installed are in compliance with the approved plans, specifications and all authorized revisions.
3. Maintenance Manuals and Instructions: Submit a monthly schedule of procedures to be established by Owner for maintenance of landscapes (trees, mixed planting and turfgrass) for one full year and shall include recommendations for fertilizing, pest and disease control, weeding, mowing, aeration and top dressing.

4. Soil Amendment and/or Seed/Stolon confirmation form noting the installed quantities of materials, tags or invoices from Subsection F. above, and the person who confirmed the delivery and installation of the materials.
5. Operations and Maintenance Manuals and Warranty certificates for any maintenance equipment turned over to the Owner.
6. As-built Record Drawings with all modifications to the Drawings noted in red ink, and the Landscape Planting Observation Log completed.

1.05 AVAILABILITY

A. The Contractor shall confirm availability of plants, supplies, and materials prior to submitting his landscape bid. Plant variety substitutions are not desired.

B. If a plant is found not to be suitable or available, the Contractor is to notify Landscape Architect before bidding. The Landscape Architect is then required to select a reasonable alternate and to inform all those bidding of the availability of the original plant. If a substitute is selected it must be of the same size, value and quality as the original plant. Failure to inform the Landscape Architect of unavailable plants prior to bidding will require that all plants specified shall be provided by the Contractor at time of installation.

C. Plant container size listed on construction documents are minimum acceptable size. If plant material specified is not substituted prior to award of the contract the minimum container size specified shall be provided by the Contractor. If the Contractor can not provide the minimum specified size plant material at the time of installation, the Contractor shall be required to install a larger size container of the plant specified at no additional cost to the Owner.

1.06 EXISTING CONDITIONS

A. The Contractor is to visit the job site to verify existing conditions including soils, vegetative growth, subsurface conditions, existing grade and drainage, irrigation system etc. making allowances in his bid for any required work to provide the landscape installation as specified in the construction documents.

B. The Contractor shall notify the Owner to locate underground lines prior to hole boring or trenching. Do not permit heavy equipment such as trucks, rollers, or tractors to damage utilities. Hand excavate as required to minimize possibility of damage to underground utilities. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned. Prevent damage to temporary risers of underground irrigation system and similar obstructing work located in the landscape areas.

C. If there is a conflict with existing utilities, improvements and/or planting and the proposed planting, Contractor shall promptly notify the Owner's Representative for instructions as to further action. Failure to do so will make Contractor liable for any and all damage or corrective actions arising from his operations.

D. Prior to the start of this work, the Contractor and the Owner’s Representative shall verify the operational condition of that portion of the existing irrigation system pertaining to the proposed planting area. The Contractor shall notify the Owner’s Representative of any repairs and/or corrections necessary for proper functioning and coverage. The repairs and/or corrections shall be completed before any plant material is planted. Failure to

perform system verification and provide notification prior to the start of this work will make the Contractor liable for any and all repairs and/or corrections necessary for proper functioning and coverage, as well as any required plant replacement, without any additional cost to the Owner.

E. No plants shall be planted in situations that show poor drainage infiltration or low areas that result in standing water. Such situations shall be corrected by the Contractor as directed by the Landscape Architect or Civil Engineer. Failure by the Contractor to notify the Owner of poor drainage conditions prior to proceeding with the conditioning or planting operations shall place the responsibility for any plant removals, additional soil conditioning and replanting on the Contractor without any additional cost to the Owner. Any corrections of finish grading not in compliance with the Contract Documents including plant removal, soil conditioning and replanting shall be performed by the Contractor at no additional cost to the Owner.

1.07 PROTECTION

A. The Contractor shall guarantee repair of damage to any part of the premises resulting from but not limited to leaks, defects in materials or workmanship, operation of equipment, storage of materials and/or equipment, installation of underground or overhead utilities. The Contractor shall be liable for any and all accidents resulting from his work, including open holes and trenches during construction.

B. Protect new and existing landscape areas in the area of work from theft, loss, damage and deterioration during storage, installation and maintenance. Protect from unauthorized persons (trespassers) as well as from operations by other contractors and tradesmen, and landscape operations. Protect all planted turf and shrub areas from persons as well as operations of other contractors and the Owner. Cost of protection shall be born by the Contractor with means of protection such as temporary fencing as approved by Owner. Cost for protection shall be included in the Contractor's bid for the work.

C. Contractor shall repair or replace damaged work and/or damage to existing improvements/landscape as identified by the Owner's Representative to a condition acceptable to the Owner's Representative. No additional payment will be made to the Contractor for repair or replacement of damaged work and/or damage to existing improvements/landscape.

1.08 OBSERVATIONS

A. The Owner's Representative, Project Inspector or Landscape Architect shall perform periodic observations and shall record the observation on the Landscape Planting Observation Log form on the As Built Record Drawings. Such observations shall include but are not necessarily be limited to:
   1. Weed control operations prior to other portions of work.
   2. Ripping and soil conditioning of the planting area.
   3. Layout of the plant material and trees at the site prior to planting in order to avoid conflicts and to meet the design intent.
   4. Condition and quality of plant material prior to planting.
   5. Auguring, digging and preparation of plant pits and drainage sumps for trees and shrubs.
   6. Planting and staking of trees.

7. Planting of shrubs, ground cover and turfgrass.

B. Any corrective action called for shall be immediately performed by the Contractor.

C. Failure by the Contractor to obtain the above observations shall place the responsibility on the Contractor for any relocation and/or replacement of planted trees or shrubs.

1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Plant label shall identify each species and variety. A label shall be attached to each individual plant or block of identical plants grouped together.

B. Adequately protect plants from sun and wind prior to planting. Do not allow stored plant material to dry out at any time.

C. Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at the site. Store materials and equipment in a location as directed by the Owner's Representative.

1.10 PESTICIDE NOTIFICATION

A. A written notification of any and all pesticide/herbicide products scheduled for use by the Contractor or their representative on the Owner's property must be submitted to the Owner's Representative at least seven days prior to the scheduled application. Notification shall include the product name, manufacturer's name, the pesticide active ingredient, the U.S. EPA and CalDPR registration numbers, the scheduled date and application areas, and the reason (target species) for the application.

1.11 REPAIR OF DAMAGED EXISTING PLANTING AREAS

A. The Contractor shall be responsible to repair all damage and/or distress to existing planting areas including turfgrass, shrubs, ground covers, perennials, etc., whether specifically shown on the Contract Documents or not, as a result of construction operations, material and/or equipment storage, site access, site offices, utility and/or irrigation line installations or other actions.

B. Replacement shrubs shall be 15 gallon size, replacement ground cover and perennial plants shall be 5 gallon size, and turfgrass shall be full width sod. Damaged areas shall be amended and finish graded per the Contract Documents prior to planting. Non-turfgrass planting areas shall also receive wood mulch as specified herein. The limits of repair shall be determined by the Owner.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Topsoil used in planting areas shall be a clean, friable soil with no noxious weeds, clods or stones larger than 0.5 inch in diameter, subsoil, hardpan, wood, debris, fine organic material greater than 5%, undesirable insects, plant disease or any other natural or

extraneous objects detrimental to normal plant growth to a minimum depth of 18 inches from finish grade.

B. The Contractor shall provide a particle size analysis, fertility testing and amendment recommendations of proposed native and/or import topsoil, and the Landscape Architect reserves the right to reject topsoil not conforming to the minimum specifications. Stockpiled onsite topsoil may be used if analysis and testing determines compliance with these requirements prior to placement. Failure to meet minimum specifications shall result in the removal of any unauthorized placed topsoil at the Contractors expense.

C. Particle size distribution for topsoil shall meet the following per ASTM D422:
1. 100% passing a 12.2 mm (1/2") screen.
2. Minimum 95% passing a 9.5 mm (3/8") screen.
3. Minimum 75% passing a 2.36 mm (No. 8) screen.
4. Maximum 45% passing a No. 200 screen.
5. Silt content shall be a maximum 35%.
6. Clay content shall be a maximum 25%.
7. Silt to Clay ratio shall be less than 2 and greater than 0.5.

D. Other characteristics shall conform to the following:
1. Permeability rate shall be not less than one (1.0) inch per hour or not more than 20 inches per hour.
2. The sodium absorption ratio (SAR) shall not exceed 3.0 and the electrical conductivity (ECe) shall not exceed 2.5 milliohms per centimeter at 25 degrees centigrade.
3. Soluble boron shall be no greater than 1.0 part per million (mg/l).
4. Soil pH range shall be 6.5 – 7.9.
5. Maximum concentration of soluble chloride shall be 150 parts per million.
6. Maximum concentration of heavy metals shall not exceed the following when the pH is between 6 and 7:
   a. Arsenic: 0.5 ppm
   b. Cadmium: 0.5 ppm
   c. Chromium: 5 ppm
   d. Cobalt: 1 ppm
   e. Lead: 15 ppm
   f. Mercury: 0.5 ppm
   g. Nickel: 2.5 ppm
   h. Selenium: 1.5 ppm
   i. Silver: 0.25 ppm
   j. Vanadium: 1.5 ppm
7. Petroleum hydrocarbons shall not exceed 100 mg/kg dry soil.
8. Aromatic volatile organic hydrocarbons shall not exceed 2 mg/kg dry soil.

2.02 SOIL AMENDMENTS

A. Organic Compost: "Harvest Premium" as supplied by Harvest Power (559) 435-1114; "WonderGrow Compost" by Grover, Inc. (866) 764-5765, or "Allgro Compost" by Synagro (559) 341-5158, and conforming to the following minimums per the US Composting Council 'Compost Technical Data Sheet' report dated within three months of

the submittal date:

1. Certified as “Mature” or better
2. Pass EPA Class A standards for pathogens and heavy metals.
3. Particle size: 1/8" maximum
4. pH: 6.0-7.5.
5. Macro-nutrients: Minimum of 1.0% Nitrogen, 0.5% Phosphorus, 0.5% Potassium.
6. AgIndex ratio (Nutrients/Salts) 10 or more.
7. Ammonia N/Nitrate N ratio: rated Mature or Very Mature
8. Organic matter content greater than 25% dry weight.
9. Carbon/Nitrogen ratio: less than or equal to 15.
10. Salinity (ECe): less than 5.0 dS/m.
11. Odor shall be soil-like (musty, earthy) without any sour, ammonia-like or putrid smell.

B. Gypsum shall be mined agricultural grade gypsum composed of no less than 95% $CaS0_4$-$2H_20$ hydrated calcium sulfate in a pelletized form. Elemental Sulfur shall be a minimum 95% pure agricultural grade.

C. Dry Humate organic soil conditioner comprised of a minimum 40% humic acid from Leonardite.

D. Endo 120 Mycorrhizae containing a minimum 60,000 living propagules per pound.

E. Amendment material types and application rates may be subject to change based on the findings and recommendations of the horticultural soil testing lab, and as such may result in an increase or decrease in the Contract Amount.

2.03 FERTILIZER

A. Trees and Shrubs: Fertilizer for all trees and shrubs to be BEST PAKS (20-10-5) controlled release fertilizer in a biodegradable 10 gram packet. The BEST PAKS shall be applied at the following rates:

1. 1 Gallon Can: 1 Best-Pak
2. 2 Gallon Can: 2 Best-Paks
3. 5 Gallon Can: 5 Best-Paks
4. 15 Gallon Can: 10 Best-Paks
5. 24” Box: 16 Best-Paks
6. 36” Box: 24 Best-Paks

B. The pre-plant fertilizer shall be a commercial homogeneous, granular pellet:

1. Pre-plant fertilizer for turfgrass shall be:
   a. BEST 6-24-24-5S XB+ with Avail
2. Pre-plant fertilizer for mixed plantings shall be:
   a. BEST Landscape Color 14-14-14 (14-6-11.6-3S and micronutrients) with 9.9% slow release N, or equal.

C. The maintenance fertilizer shall be a commercial homogeneous, granular pellet:

1. Maintenance fertilizer for turfgrass shall be one or more of the following:
   a. Urea 46-0-0
   b. BEST Ammonia Sulfate 21-0-0-24S, standard grade, or equal
   c. BEST Nitra King 21-2-4-14S-2Fe, or equal.

d. BEST Nitex 20-2-3-12S-5Fe, or equal.

2. Maintenance fertilizer for mixed plantings shall be the pre-planting fertilizer.

D. Fertilizer material types and analysis may be subject to change based on the findings and recommendations from the horticultural soil testing lab, and as such may result in an increase or decrease in the Contract Amount.

2.04 MULCH

A. Mulch for on-grade or raised native soil planters shall be a walk-on type of chipped and aged greenwaste woody material without leaves, green wood, sticks, dirt, stones, dust and other non-organic debris as accepted by the Landscape Architect. Particle size 1/2” to 3" in general size.

2.05 STAKING & GUYING MATERIALS

A. Stakes: 2" Diameter lodgepole pine, pressure treated and pointed one end.

B. Ties: V.I.T. Cinch Tie, 32 inches long, V.I.T. Products, Inc. (619) 673-1760, or equivalent.

2.06 PLANTS

A. Plants shall be typical of their species and variety, shall have normal growth habits, well developed branches and be densely foliated, and shall have fibrous root systems. No substitutions will be allowed unless approved in writing by the Landscape Architect.

B. Plants shall be free from defects and injuries including disease, insects, insect eggs and larvae and girdled or matted roots.

C. Quality and size of plants shall be in accordance with ANSI Z60.1-2004, "American Standard for Nursery Stock", and as described in Quality Assurance.

D. Plants shall not be pruned before planting.

E. Plant material must be selected from nurseries that have been inspected by State or Federal Agencies.

F. Plants shall be nursery grown and shall have been transplanted or root pruned at least once in the past three (3) years. Plants shall have been grown under climatic conditions similar to those in the locality of the project.

G. Each bundle of plants shall be properly identified by weatherproof labels securely attached thereto before delivery to the project site. Label shall identify plant by name.

H. Nomenclature shall be in accordance with Sunset Western Garden Book, current edition.

I. No plants shall be removed from their container until a review has been made in the field or at the nursery, or except when specifically authorized in writing by the Owner.

J. Collected plant material may be used only when approved. Approval shall not limit the right of rejection during work progress for conditions of the root ball, latent defects or

injuries.

K. Where shown a "MULTI" provide trees with a minimum of three trunks.

L. Plant sizes listed on the planting plan are minimum acceptable sizes. The quantities listed are the Landscape Architect's estimate only. The Contractor is responsible for the quantities of plant symbols shown on the plan, and/or the quantities in hatched planting areas at the specified triangular spacing.

2.07 TURFGRASS SOD

A. Sod shall be produced from certified or approved seed/stolons, fresh and labeled in accordance with U. S. Department of Agriculture Rules and Regulations. Sod quality shall be Premium or Standard Grade per TPI specifications.

B. Sod shall be neatly mowed and be mature enough that when grasped at one end it can be picked up and handled without damage, delivered to the project site, adequately protected and installation commenced within 24 hours of harvesting.

C. Turfgrass shall be a species and variety as specified in the Contract Drawings. If a warm-season grass is specified and the installation is to be performed between the months of October and April, a species with an established perennial ryegrass overseeding shall be installed. Submit the overseeded product information for approval prior to the installation.

2.08 ROOT BARRIER

A. A ribbed polyethylene panel of minimum 0.080” thickness equal to Deep Root Partners #UB 24-2 PANEL, (800) 458-7668.

2.09 TREE TRUNK PROTECTOR

A. ArborGard+ polyethylene tree guard by Dimex (800) 334-3776, or equal.

2.10 HERBICIDES

A. Herbicide products for removal of unwanted grass and broad-leafed weeds shall be registered and approved for use by the U.S. EPA and CalDPR, and shall comply with the Owner’s Standards and with the “Healthy Schools Act” with current amendments.

B. Provide pre-emergent and post-emergent, selective herbicide formulations for use on turfgrass areas and/or ornamental shrub/ground cover areas that are not injurious to the proposed plantings and turfgrasses.

C. Provide a non-selective contact herbicide formulation for use on existing established weeds. The herbicide shall be certified for organic use, broad-spectrum with systemic function, ‘Weed Slayer’ by Agro Research International, or equal.

2.11 OTHER MATERIALS

A. Materials not specifically indicated, but necessary for proper execution of the work, shall be of first quality as selected by the Contractor subject to approval of the Landscape

Architect.

PART 3 - EXECUTION

3.01 EXAMINATION & PREPARATION

A. General: Verify that existing site conditions are as specified and indicated before beginning this work.

B. Damaged Earth: Verify that earth rendered unfit to receive planting due to concrete water, mortar, limewater, hydrocarbons or any other contaminant dumped on it has been removed and replaced with clean earth from a source approved by the Owner's Representative.

C. Examine the area and conditions under which the work in this section is to be performed. Verify that any existing irrigation system within the limit of work is in proper working order with full coverage. Correct conditions detrimental to the timely and proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Commencement of the work signifies acceptance of the existing conditions.

D. Protection:
1. Locate sewer, water, irrigation, gas, electric, phone and other pipelines or conduits and equipment within the area of work prior to commencing work.
2. Mark existing irrigation heads, valves, valve boxes and other below grade equipment or components that are scheduled to remain. Protect in place.

E. Runoff and Erosion Control: Furnish equipment, materials and labor necessary to control the flow, drainage, and accumulation of excess water running off the work area and prevent soil erosion, blowing soil and accumulation of wind-deposited material on the site per the approved SWPPP.

3.02 ROUGH GRADING, SOIL PREPARATION, PLANTER BACKFILL

A. Rough grading shall be performed by other subcontractors to the extent of establishing rough pads, slopes and drainage patterns. The Contractor is responsible for placement of topsoil and grading required to ensure positive drainage in all turfgrass and planting areas. All planting areas shall have a minimum topsoil depth of 18 inches from on-site native and/or approved import sources. Rough grading shall be completed prior to weed control, cross ripping or rock removal operations.

B. After the completion and acceptance of the weed control operations outlined below, and unless directed otherwise by the Landscape Architect or noted on the Drawings, and except for the area under the canopy of existing trees, the Contractor shall cross rip and till (break up large clumps and clods in excess of 2 inch diameter) the existing soil within all planting areas outside the canopy drip line of existing trees until the soil is loose and friable. Ripping shall be to a minimum depth of twelve inches (12") in turfgrass areas and eighteen inches (18") in shrub/ground cover areas, with ripping tines a maximum 18" apart performed in a minimum of two passes total in different perpendicular directions. The Contractor shall review the completed ripping operation with the Owner's Representative and Landscape Architect to determine compliance. The first 6 inches of any new topsoil fill shall be tilled into the existing soil to a minimum depth of 6 inches prior to placing any

further topsoil fill. The Contractor shall provide any additional work as directed by the Owner's Representative after the review to obtain compliance. Do not proceed with the addition of topsoil and/or amendments, or commence rock picking or fine grading until the completed ripping operation is accepted in writing by the Owner's Representative.

C. Planting area soil under the canopy drip line of existing trees, or in planting beds not accessible by motorized equipment, shall be ripped to a minimum depth of 12 inches using manual spading shovels, forks and/or broadforks and working around major tree roots and/or utilities. In areas receiving new mulch, rip to a minimum depth of 4 inches while protecting any existing plants and their root system. Break up and/or remove rocks and clods as indicated below.

D. Do not work soil when moisture content is so great that excessive compaction will occur, or when it is so dry that dust will form in air or clods will not break up readily, or when a full ripping depth cannot be achieved. Apply water, if necessary, to bring soil to an optimum moisture content for tilling and dust control. Maintain within 2 percent above or below optimum moisture content for the existing soil type at all times during the work.

E. After soil ripping and preliminary finish grading is completed, the topsoil shall be cleared of all concrete, wire, sticks, roots, debris and foreign materials. Remove native stones and clods as follows:
   1. In shrub/ground cover areas, remove stones and clods greater than one (1.0) inches in diameter from the top 3 inches of finish grade.
   2. In general, non-traffic turfgrass areas, remove stones and clods greater than three-quarter (0.75) inch in diameter from the top 2 inches of finish grade.
   3. In designated play or sports field turfgrass areas, remove stones and clods greater than one-half (0.50) inch in diameter from the top 4 inches of finish grade using a mobile tractor pulled, PTO powered, hydraulic controlled rock picker, Cherrington Model 4500 or similar.

F. Add clean planting topsoil where needed to bring grade to elevation to promote positive drainage. Spread approved planting topsoil over ripped subgrade prior to incorporating amendments.

G. Backfill all raised grade planters with a minimum depth of 18 inches of imported clean sandy loam planting topsoil conforming to Subsection 2.02 and approved prior to import and/or placement. Failure to obtain import approval prior to backfilling raised grade planters shall result in the removal of any planting and non-approved backfill, and the reinstallation of the work with approved materials.

3.03 WEED CONTROL

A. Weed control pesticides shall only be applied by an individual holding a valid Qualified Applicator Certificate (Category A) issued by the Department of Pesticides Regulation.

B. The Contractor shall treat any weeds in proposed new turfgrass and planting areas with a non-selective contact weed killer at the manufacturer's approved rates and procedures prior to any commencement of work at the site including any irrigation work, ripping of soils or fine grading.

C. Weed eradication shall be ongoing throughout the course of the landscape installation. The

Contractor shall apply a pre-emergent herbicide after shrub/ground cover planting and prior to mulch installation. Manually remove weed seed heads. At no time will weeds be allowed to become established. Contractor shall provide all weed control operations as directed by the Owner's Representative.

D. All weed control operations using pesticides/herbicides shall comply with the CalDPR and Owner Standards as well as AB2260 "Healthy Schools Act". The Contractor shall comply with the notification and posting requirements of the "Healthy Schools Act".
   1. The Contractor shall notify the Owner per Subsection 1.11, A.
   2. The Contractor shall post highly visible signs around the treatment area in conformance with the "Healthy Schools Act" warning of a scheduled pesticide/herbicide application a minimum of 24 hours before to 72 hours after a pesticide application.

E. A non-selective contact herbicide for grassy weeds, '20% Vinegar Weed Slayer' by Good Natured, CA DPR Reg# 85208-1-AA-42177, shall be applied directly to the weed foliage. Only apply to dry surfaces, and a minimum of 8 hours before a rain event. Allow a minimum of 14 days from herbicide application to commence any planting.

F. Perform pre-plant clearing and weed control for native open ground areas planned to receive turfgrass as follows:
   1. Apply irrigation to encourage weed growth prior to ripping, and to maintain moisture in the soil.
   2. Apply a contact herbicide to weed foliage. Remove weeds and expose bare soil.
   3. Lightly disk/till to a depth of three-inches.
   4. Perform a "grow and kill" operation after the first disking/tillage:
      a. Water and lightly fertilize to encourage weed germination.
      b. Follow with a second application of a contact herbicide.
      c. Remove weeds and perform a light harrowing or disking.
   5. Apply irrigation to encourage weed growth. If additional weeds germinate, perform a second "grow and kill" operation.
   6. Once existing weeds are completely removed, obtain authorization from the Owner's Representative to proceed with deep ripping, rock removal, soil conditioning and finish grading operations. Allow a minimum of 14 days from herbicide application to commence any planting.

G. After the shrub/ground cover planting is complete and prior to mulch installation, apply an approved pre-emergent herbicide per the manufacturer's recommended rates.

3.04 SOIL CONDITIONING

A. Before commencement of any soil conditioning, weed and rock removal shall be completed as outlined above.

B. Uniformly amend the entire area of topsoil in turfgrass and mixed planting areas per the following bid rates and per the approved modifications as a result of the soils analysis recommendations:
   1. Turf and Non-Sloped (less than 4h:1v) Planting Area Soil Conditioning (per 1,000 square feet).
      a. Compost at a rate of six (6.0) cubic yards (a 2.0 inch thick layer).
      b. Gypsum at a rate of 100 pounds, or Sulfur at 19 pounds, or an equivalent

combination.

c. Humate soil conditioner at a rate of thirty (30) pounds.
d. A pre-planting fertilizer to turfgrass areas at a rate of 1.25 pounds of actual P and K.
e. A pre-planting fertilizer to mixed planting areas at a rate of 1 pound of actual N.
f. Mycorrhizae per Subsection 3.06, Mycorrhizae Application.

C. Till soil amendments into the entire planting area soil to a minimum depth of six (6) inches. Perform the cultivation in at least two passes, one in each perpendicular directions to the first, so that the amendments are homogeneously incorporated into the topsoil. All cultivation inside the dripline of existing trees shall be preformed manually with minimal disturbance to the root system.

D. Planting backfill for trees and shrubs shall be a mix of three parts native soil and one part Compost by volume. Add Humate at 2.0 pounds, and Mycorrhizae at 0.5 pounds per cubic yard of backfill.

E. Amendment material types and application rates may be subject to change based on the findings and recommendations of the horticultural soil testing lab, and as such may result in an increase or decrease in the Contract Amount.

3.05 FINE GRADING

A. Upon completion of soil preparation, fine grade all planting and turfgrass areas to a smooth and even slope conforming to and establishing drainage patterns per the approved Grading Plan. Grading shall eliminate all humps and hollows and promote positive drainage in all planting and turfgrass areas.

B. Where hardscape is installed in existing mixed planting areas, a minimum transition grade width of 2 feet adjacent to the edge of hardscape shall be constructed unless noted otherwise. The maximum slope of any transition grade in mixed planting areas shall be 20 percent (1v:5h). The area of transition grading shall be planted or repaired as specified herein.

C. Tolerance of grade differential for planting and general turfgrass areas shall be plus or minus 0.04 foot. If requested, the Contractor shall water test all turf and planting areas after the grading operations are completed in the presence of the Owner's Representative and Landscape Architect. The water test shall consist of applying water to the turf and planting areas to the point where water begins to run over the soil to show the drainage pattern. Make all corrections to the finish grading as required by the Owner's Representative to re-established positive drainage patterns. Acceptance of the finish grading shall be obtained in writing from the Owner's Representative and Landscape Architect prior to proceeding with soil conditioning and planting operations.

D. Turfgrass sports fields shall be fine graded using a laser controlled machine capable of producing final grades within 0.02 foot plus or minus from the proposed elevations.

E. After the finish grading process, relative compaction of the soil in turf and planting areas shall range between 82% and 85% relative density. Compaction/moisture levels are generally acceptable if an Oakfield probe is able to penetrate a minimum of six inches into

the cultivated planting topsoil with moderate pressure. The Owner reserves the right to require the Contractor to test for over compaction. If the compaction is within the acceptable range, the test will be paid for by the Owner. All testing due to non-compliance will be paid for by the Contractor.

F. Remove all rocks produced as a result of the soil conditioning and finish grading operations per the requirements of Subsection 3.02.

G. Finish grades shall be one-half inch (1/2") to three-quarter inch (3/4”) for turfgrass sod areas, and two inches (2") for shrub/ground cover planting areas below the finish surface of all adjacent walks, curbs, mowstrips and utility/valve boxes or collars. Transition any non-compliant grade in existing turfgrass areas at a maximum 12h:1v slope to meet finish grades above, unless shown otherwise on the grading plan.

3.06 MYCORRHIZAE APPLICATION

A. In turfgrass planting areas, after fine grading is completed broadcast Mycorrhizae at a rate of one and one half (1.5) pounds per 1,000 square feet (65 lbs. per acre). Lightly rake into the top one inch (1”) of topsoil immediately prior to turfgrass installation.

B. In shrub and/or ground cover planting areas, the Mycorrhizae inocculant shall be incorporated into the soil with the other soil amendments at five (5.0) pounds per 1,000 square feet (218 lbs. per acre) per Subsection 3.04, Soil Conditioning. Innocculant shall also be incorporated into the planting backfill per Subsection 3.04, E.

3.07 PLANTING

A. General Requirements
1. Obtain written approval from the Landscape Architect or Owner’s Representative to begin planting operations. The irrigation system shall be fully automated and operational, all weeding, soil conditioning and finish grading completed, and the tree and plant layout approved.
2. Planting shall be performed by workmen familiar with planting procedures and under the supervision of a qualified foreman. The planting foreman shall be on the job site al all times when planting is in progress.
3. Planting operations shall not occur under unfavorable weather conditions.
4. Boxed trees shall be planted first. Shrub planting shall be completed before groundcover is planted.
5. Proceed and complete the landscape work as rapidly as portions of the site become available, working within the seasonal limitations for each kind of planting required.
6. Cooperate with other contractors and trades working in and adjacent to the planting work areas. Examine drawings which show the development of the entire site and become familiar with the scope of other work required.

B. Planting Preparation and Operations
1. Planting material shall be provided with adequate protection of root system and balls from drying winds and sun. Do not bend or bind trees or shrubs in such a manner as to damage bark, break or destroy natural shape. Provide protective covering during delivery.
2. Deliver trees and shrubs after preparations for planting have been completed, and

plant immediately. If planting is delayed more than six (6) hours after deliver, set trees and shrubs in shade, protect from weather and mechanical damage and keep roots moist. Do not remove container grown stock from containers until planting time.

3. All planting areas shall be smooth and even. Finish grades shall be done prior to any placement of plants.
4. Place all trees and shrubs in locations shown on the planting plan and obtain written field approval of the Landscape Architect before planting or digging planting pits. Inform the Landscape Architect seven (7) days prior to placing the plants. Maintain a minimum 15 foot clearance from trees to any light pole, unless specifically noted otherwise.
5. Carefully remove all canned stock from containers with tin snips or approved cutter. Cut away and remove any girdled or matted roots.
6. Excavate holes of circular outline with vertical sides for all plants 15 gallon or less. Boxed trees shall have square planting holes. The vertical sides and bottom of the holes shall be thoroughly scarified to promote union of backfill with existing soils. All trees shall have two drainage sump holes drilled with a twelve inch (12") diameter auger penetrating hardpan layers to a minimum one (1) foot into a sand/gravel layer or to a minimum depth of ten (10) feet below the planting pit bottom. Precautions shall be exercised to avoid smooth sides on the holes. Offset augured holes a minimum of eighteen inches (18") from planned tree location to avoid settling of tree after planting.
7. After cleaning out the sump holes, the Contractor shall test the sumps for drainage by flooding with water. If the water does not drain out within twenty-four (24) hours, auger down as required to achieve such drainage by breaking through the hardpan layer, or by extending the drainage sumps to a minimum depth of 15 feet below the bottom of the planting pit. After obtaining approval of the sump holes, fill the augured drainage sump holes with coarse concrete sand.
8. Tree and shrub planting pits shall be at least two and one half (2.5) times the width of the plant container, but a minimum of 36” wide for trees and 18” wide for container shrubs. Planting pits shall be as deep as the soil depth in the container or box, less the additional height of the crown above the finish grade.
9. Set each plant in the center of the pit, plumb and straight. Set the crown of the plant at one inch (1") for shrubs, two inches (2”) for trees above finish grade. When 1/2 of the backfill mix has been placed, tamp-in, insert fertilizer (BEST PAKS as per Section 2.1B1) and allow no air pockets as remainder of backfill is added.
10. Compact soil around the rootball of all plants and thoroughly water in the entire backfill depth.
11. Excess soil from plant holes shall be cultivated and raked to a smooth outline.
12. Shrubs and groundcovers shall be installed in relation to walks and paving to allow for future growth without obstructing traffic with clearance as shown on the drawings.
13. All plants shall be set in watering basin which shall be as wide as the planting pit, but at least four feet (4') in diameter and four inches (4") deep for trees and two feet (2') in diameter and three inches (3") deep for shrubs and vines.
14. Ground cover plants shall be planted at the spacing noted on the drawings. Not more than fifteen minutes shall elapse from the time any groundcover plant is planted until it is watered.

C. Pruning: Prune plants in accordance with established horticultural practice. Shearing of

any plants will not be acceptable. Tree pruning shall only be performed with the written approval of the Landscape Architect and under the direction of a certified arborist, and shall comply with ISA Pruning Standards (ANSI 300).

3.08 MULCH

A. Prior to any mulch application, perform weed control operations as specified herein.

B. Where mulch is to be installed in an existing planting area, breakup/till the existing soil in open areas around existing plantings to a minimum 4" depth per section 3.02, and adjust finish grade adjacent to hardscape elements per section 3.05 where not prohibited by existing plantings.

C. Install a minimum 3" layer of mulch in all non-turf planting areas, except for slopes greater than 3h:1v and seeded areas. Install a minimum 2" layer of mulch in all areas receiving flatted plants.

D. Install a minimum 3" layer of wood mulch at a minimum 3' radius from the tree trunk of all trees located in turfgrass areas. Provide a smooth finish grade transition to a 2 inch depth where the mulch meets the turfgrass, so that the top elevation of the mulch is flush to the turfgrass soil. Keep mulch off the trunk. For new trees in turfgrass areas, remove the watering berm just prior to the turfgrass planting but maintain the mulched area within the planting pit.

3.09 STAKING & GUYING

A. Trees shall be supported by two (2) tree stakes as shown on the drawings. Cut off the top of stakes damaged by installation or where the stake conflicts with canopy branches.

B. Stakes shall be set firmly in the ground outside the rootball and where possible set stakes perpendicular to the prevailing northwest wind.

C. Trees shall be tied to upright stakes loosely with tree ties (see planting detail). Remove the nursery stake.

D. Multi-trunked trees shall be guyed, or individual branches may be staked and loosely tied as shown on the Drawings.

3.10 ROOT BARRIER

A. Install root barrier along hardscape edges whenever the distance from the center of the trunk to the hardscape edge is less than eight (8) feet. Install per the planting details and manufacturers recommendations.

3.11 ARBOR GUARD

A. Install ArborGard+ on all newly planted tree trunks in turfgrass areas per manufacturer's recommendations.

3.12 TURFGRASS SOD

A. The area to be planted shall be finish graded to present a smooth and even surface free of

humps and hollows and conforming to the finish grading plans. Where new sod is abutting existing turfgrass, fine grade to allow for the thickness of the new sod soil so that the new and existing sod grades are flush. Immediately prior to planting, the surface of the area to be planted shall be sufficiently loose and friable, with adequate moisture to receive the sod. Avoid laying sod on hot or dry soil.

B. Lay first strip of sod slabs along a straight line (use a string in irregular areas). Butt joints tightly. Do not overlap edges. On second strip, stagger head joints (similar to a running bond brick pattern). Use a sharp knife to cut sod in order to fit curves, edges, and sprinkler heads.

C. Install with turf-tired machinery full width sections sod as delivered and flush to adjacent surfaces. Terminating sod edges shall be straight and at right angles to hardscape elements whenever possible.

D. As the sod is being installed, water the sod lightly to prevent drying out. Continue to lay sod and lightly water until installation is complete.

E. After laying sod, roll to eliminate irregularities and to form good contact between sod and soil. Avoid a too heavy roller or excessive initial watering which may cause roller marks.

F. Water the completed lawn surface thoroughly. Topsoil should be constantly moist for a minimum two inches deep. Repeat irrigating at regular intervals to keep sod moist until rooted. The areas shall not be watered to the extent of saturating the soil and causing "flotation" or "flowing" of the top surface of the soil. After water has once been applied, no portion of the planted areas shall be allowed to dry out during the entire maintenance period. After sod roots are established, decrease frequency and increase amount of water per application as necessary to maintain good soil moisture to a minimum 6” depth without standing water or excess runoff. The Contractor shall be responsible to monitor the site and alter the watering times and frequencies to meet site and climatic conditions.

G. Prior to the start of the maintenance period, fill all seam joint gaps greater than 1/8 inch and less than 0.5 inch with washed concrete sand. Fill any joint gaps of 0.5 inch or greater width with a minimum two foot long replacement sod section in order to achieve a tight joint.

H. Replace dead or distressed sod with equivalent material as directed by the Landscape Architect.

I. Do not install turfgrass inside the watering basin of new trees planted in turf areas, or within a 3’ radius of existing tree trunks located in turf areas.

3.13 CLEAN-UP AND REPAIR

A. All areas shall be maintained in a neat and orderly condition at all times. All reasonable precautions shall be taken to avoid damage to existing planting and structures. Disturbed and/or damaged areas, whether a part of this work or from the work of other trades, shall be restored to their original condition.

B. Plants and/or turfgrass shown to remain and damaged or removed by construction operations and/or utility/electrical/drainage lines shall be replaced with plants that match

as closely as possible to the existing plant species, variety and size. The replacement turfgrass sod variety shall be the same as shown in the Planting Legend if for new work, or shall match the existing turfgrass variety where the turfgrass is existing. Adjust the finish grade so that the new turfgrass sod abuts flush to the existing turfgrass or to hardscape. The replacement plants and/or turfgrass sod shall be maintained as part of the original scope of work.

C. After the planting operations are completed, the Contractor shall remove all trash, excess soil, empty containers or any other debris accumulated by the work from the site. All damage caused by the work shall be repaired at the Contractor's expense and the site shall be left in a neat and orderly condition to the satisfaction of the Owner.

3.14 PRE-MAINTENANCE REVIEW

A. A general review will be held prior to the start of the maintenance period upon conclusion of the planting operations, irrigation system installation and after clean-up has occurred. The Owner’s Representative shall be informed in writing a minimum of seven (7) working days prior to the time the work is ready for review in order to arrange a suitable time and date for such review.

B. At the time of review, Contractor shall have all planting areas free of weeds and neatly cultivated and fine graded. All plant basins shall be in good repair. All trees shall be properly staked and tied. All planting areas shall be clear of weeds.

C. The establishment of turfgrass is herein defined as being all work necessary to grow a full, healthy, uniform stand of smooth and even texture and grade with clean straight edges without weeds, distressed areas or bare spots, and has been mowed at least twice per the specifications. The establishment of turfgrass is further defined as being all work necessary to develop a minimum rooting depth of 2 inches into site soil.

D. Work requiring corrective action or replacement in the judgment of the Owner’s Representative shall be performed within five (5) days after the inspection. Corrective work and materials replacement shall be in accordance with the drawings and specifications and shall be made by the Contractor at no cost to the Owner. A subsequent review shall then be arranged.

E. If after the review, the Landscape Architect is of the opinion that all the work has been performed as per the Contract Documents, and a uniform stand of healthy dense turfgrass has been established without weeds or bare spots, the Contractor will be given written notice that the maintenance period may begin.

3.15 MAINTENANCE - GENERAL

A. After all work indicated on the drawings or herein specified has been completed, reviewed, and approved, and the turfgrass has been successfully established per the requirements below, the Contractor shall commence a sixty (60) calendar day maintenance period in which the Contractor shall continuously maintain all areas included in the contract during the progress of the work and throughout the maintenance period, or until Final Acceptance of the project, whichever is greater.

B. Establishment and maintenance work includes monitoring the site to control all watering,

replanting, fertilizing, mulching, weeding, cultivating and mowing necessary to bring the planted areas to a healthy and vigorous growing condition, and any additional work needed to keep the areas neat, edged, weed and trash free, and attractive.

C. All trees, shrubs, ground cover shall be kept at optimum growing condition by watering weeding, replanting, fertilizing, cultivating, tree stake repair, spraying for diseases and insects, replace dead or dying materials, pruning as directed, maintaining proper grades of plants, and providing any other reasonable operations of maintenance and protection required for successful completion of the project.

D. Any date when the Contractor fails to adequately water, replace unsuitable planted areas and other work determined to be necessary by the Owner, will **NOT** be credited as part of the establishment/maintenance period.

E. No additional payment will be made for additional time necessary for turfgrass establishment. The maintenance period shall not start until all contract work has been completed and all close-out documents and materials have been submitted. Turfgrass will be considered weed-free if there is a maximum of one percent undesirable turfgrass species, and nine weeds or less per 50 square yards (one per 50 square feet).

F. During the progress of the maintenance period, the Contractor and the Owner's Representative shall conduct reviews at no less than 21 day intervals to determine that ongoing maintenance activities have been conducted by the Contractor. If in the opinion of the Owner, ongoing maintenance has not been conducted by the Contractor in a satisfactory manner the maintenance period shall be suspended. The Contractor shall provide remedial work as directed by the Owner's Representative to correct the found deficiencies and schedule another review. If after the subsequent review the work is deemed acceptable, the maintenance period shall resume.

3.16 MAINTENANCE – MOWING AND DRESSING

A. Turfgrass areas shall be mowed during the growing season a minimum of twice a week for warm-season varieties and a minimum of once a week for cool-season varieties, or at any time the grass reaches 1.4 times its mowing height. Turfgrass shall be edged weekly. The Contractor shall coordinate his watering and weed control schedules to accommodate his mowing schedule. If the Contractor is unable to mow the turf areas on the required day, he has until 5:00 pm of the next day to do the work. After that time, the Owner reserves the right to secure the services of an alternate mowing entity to perform the work. The cost for the alternate mowing will be deducted from monies owed to the Contractor. The Contractor will remain responsible to perform all scheduled mowings and maintenance of the site. The turfgrass shall be mowed and edged, and all trash and debris removed prior to Final Acceptance.

3.17 MAINTENANCE - FERTILIZATION

A. The Contractor shall fertilize the warm-season turfgrass (Bermudagrass) at the start of the maintenance period and every twenty-eight (28) days with the turfgrass maintenance fertilizer at a rate of 0.75 lb. of actual N /1,000 s.f. and as modified by the soil fertility recommendations and as directed by the Landscape Architect. The Contractor shall continue the fertilizer applications until the established turf is accepted.

B. The Contractor shall fertilize the temporary cool-season turfgrass at the start of the maintenance period every twenty-eight (28) days with the turfgrass maintenance fertilizer at a rate of 0.5 lb. of actual N /1,000 s.f. and as modified by the soil fertility recommendations and as directed by the Landscape Architect. The Contractor shall continue the fertilizer applications until the established temporary turf is accepted.

C. The Contractor shall fertilize the turfgrass areas during the last week of the maintenance period with the turfgrass maintenance slow-release N fertilizer (43-0-0) at a rate of three and one-half (3.5) lbs./1,000 s.f. and as modified by the soil fertility recommendations and as directed by the Landscape Architect.

D. The Contractor shall fertilize the non-turf planted areas during the last week of the maintenance period with the mixed pre-planting fertilizer (14-6-11.6) at a rate of six (6.0) lbs./1,000 s.f. and as modified by the soil fertility recommendations and approved by the Landscape Architect.

3.18 MAINTENANCE – REPAIR AND WEEDING

A. Between the twenty-first (21) day and the twenty-eighth (28) day after turfgrass planting, the Contractor shall perform the following: replant all spots or areas where normal germination or growth is not evident; remove all rocks or other debris that would constitute a hindrance to mowing or cultivating; repair all damage done by his operations. Where poorly compacted trench backfill shows settlement, remove turfgrass or plants, fill all depressions and eroded channels with sufficient conditioned topsoil to raise to proper grade, compact lightly and replant the filled areas. Roll all planted or replanted turfgrass areas with a lightly weighted turf roller in order to provide a smooth and even mowing surface.

B. Visible weeds shall be removed at least weekly during the maintenance period. At the end of the maintenance period, all planting areas shall be without weeds. If weeds are present, the Contractor shall manually remove the weeds and shall then apply a granular, selective pre-emergent herbicide at manufacturer's approved rates. Coordinate application with the Owner’s Representative and provide certificates of application to Owner’s Representative. The turfgrass will be considered weed-free if there are 9 weeds or less per 50 square yards (one per 50 square feet).

3.19 FINAL REVIEW

A. A Final Review will not be scheduled until all Close-out Documents and materials have been submitted and accepted.

B. A Final Review will be performed before the end of the Maintenance Period or upon the pending Final Acceptance of the work, whichever is earlier, provided all deficiencies revealed during the maintenance period have been corrected. If deficiencies have not been corrected by the end of the stated maintenance period, the Contractor shall continue to fully maintain the project at his own expense. After all deficiencies have been corrected, a Final Review will be held with the Landscape Architect, Owner’s Representative, and Contractor.

C. Final Acceptance of turfgrass is contingent on a weed free, healthy uniform stand without dead, bare or distressed areas with a minimum rooting depth of five (5) inches into site

soil.

D. If after the Final Review, the Landscape Architect and Owner's Representative are of the opinion that the work is acceptable and complete, the Contractor's maintenance responsibility shall terminate on an agreed upon date.

3.20 WARRANTY AND REPLACEMENT

A. All trees and plants provided under this Contract shall be guaranteed to be in good, healthy, disease/pest free and in a flourishing condition one growing year from the date of Final Acceptance of the work, provided the Owner maintains the plants properly and in accordance with accepted horticultural practices. Species and size of any tree and/or plant replacements, either prior to or after Final Acceptance, shall be equal to that of the same adjacent trees and/or plants at the time of replacement as determined by the Landscape Architect.

B. The Contractor shall be responsible to replace all lost plants due to theft, vandalism or any other preventable causes till Final Acceptance of the work by the Owner. Replacement trees and plants shall be planted as originally specified and detailed. Replacement trees and plants shall be guaranteed as specified above from the date of replacement. The maintenance period may be extended for a duration of not more than the original maintenance period duration for the establishment of replacement plants.

C. The Contractor shall be held responsible for repair and/or replacement of damages to new or existing improvements resulting from the defects or actions of trees, plants, materials, equipment or workmanship one year from the date of Final Acceptance or the Notice of Completion, whichever is later.

END OF SECTION

SECTION 334000 - STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This section includes the following:

1. Provide all materials, labor, equipment and services necessary to furnish and install Storm Drainage System, accessories and other related items necessary to complete the Project as indicated by the Contract Documents unless specifically excluded.

B. RELATED SECTIONS:

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Divisions 00 and 01 sections, apply to this work.
2. Section 31 22 22 – Soil Materials
3. Section 31 23 33 – Trench Excavation and Backfilling.
4. Section 32 13 13 – Site Concrete Improvements.

1.3 REFERENCES

A. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

B. ANSI/ASTM C443 Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

C. ANSI/ASTM C478 Precast Reinforced Concrete Manhole Sections.

D. ASTM D1557

1.4 DEFINITIONS

A. Bedding: Fill placed under, around, beside and directly over pipe, prior to subsequent backfill operations.

B. Utility: Any buried or above ground pipe, conduit, cable, associate device or appurtenances, or substructure pertaining thereto.

1.5 SUBMITTALS

A. Submit under provisions of Division 01.

B. Certificates of compliance for material.

C. Product Data: Provide data indicating pipe, accessories, and associated equipment to be furnished.

D. Submit manufacturer's data and/or fabrication drawings for all pipes, and appurtenances installed under this Section. No items shall be incorporated into the work until submittals are approved by the Architect/Engineer

1.6 COORDINATION

A. Coordinate work with Owner’s personnel.

B. Verify that the location of existing utilities have been indicated at work site by utility authorities and Owner’s personnel.

C. Coordinate work with other project work.

1.7 EXISTING UTILITIES

A. The Engineer has made a diligent attempt to indicate on the plans the location of all main and trunkline utility facilities which may affect the Work. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

B. Service laterals and appurtenances have also been shown where information was available as to their location. In most cases, however, the only available information relative to the existing location of said facilities was small scale undimensioned plats. The location of said facilities, therefore, shall be considered approximate only, until exposed by the Contractor.

C. At new work location, expose by hand methods all existing utilities along the route of the new work prior to using any mechanical equipment. If mechanical equipment is allowed at a particular location, it may only be used after the completion by the Contractor of a successful exhaustive search by hand methods to locate all existing facilities as indicated on the plans, and as indicated at the work site by Owner’s personnel.

D. Maintain all existing utility mains and service lines in constant service during construction of the Work

1.8 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 01.

B. Accurately record actual locations of utilities encountered.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforced Concrete Pipe for pipe larger than fifteen (15) inches: ANSI/ASTM C76, Class 3, with rubber gasket joints per ANSI/ASTM C443.

B. Storm drainage sewer pipeline shall be polyvinyl chloride (PVC) pipe for storm sewer conforming to ASTM designation 3034, SDR 35, with elastomeric gasket joints per ASTM D 3212 for pipe fifteen (15) inches or less.

C. Storm drainage pipeline shall be polyvinyl chloride (PVC) pipe for storm sewer conforming to ASTM D1785, Schedule 40, for pipe three (3) inches or less.

D. Poured in Place Concrete: Specification Section SITE CONCRETE IMPROVEMENTS.

E. Mortar: Composed of one part, by weight, portland cement (Type II low alkali per ASTM C150), 2 parts, by weight, sand, and water.

F. Manhole Frames, Covers and Grates: Cast Iron per ASTM A48, Class 25.

G. Soil Fill for Concrete Pipe Bedding Envelope: Specification Section TRENCH EXCAVATION AND BACKFILL.

H. Catch basins and drain inlets shall be constructed as per detail drawing.

I. Concrete collar shall be constructed as per detail drawing.

J. Cleanout shall be constructed as per detail drawing.

K. All metallic pipe, fittings and appurtenances in contact with soil shall be coated or wrapped with an approved material, as required to protect it from corrosive soil.

L. Locator Tape: Tape shall be an inert material such as polyethylene plastic with a metallic core, and highly resistant to alkalis, acids, or other chemical components likely to be encountered in soils. The tape shall be bright colors for contrast with the soils with identifying print in black letters. The tape shall be six inches wide and be printed “CAUTION – STORM SEWER LINE BELOW”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify site conditions.

3.2 PREPARATION

A. Identify location of proposed storm drainage facilities to be constructed. Expose connection points to existing system.

B. Locate, identify, and protect existing above and below grade utilities from damage.

C. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.

D. Protect existing structures and other improvements to remain from damage from excavation equipment and vehicular traffic.

E. Employ equipment and methods appropriate to the work site.

F. Protect excavated areas from drainage inflow, and provide drainage to all excavated areas. Dewater existing drainage basins and existing drainage pipeline systems as necessary to accomplish the work.

G. Comply with safety requirements as they pertain to excavations, per Specification Section EARTHWORK.

H. Remove all interfering surface and subsurface improvements authorized for removal.

3.3 EXCAVATION

A. Excavate soil required to locate existing utilities and install the work.

B. Excavate trenches and pits per Specification Section EARTHWORK.

C. Excavate trenches and pits to allow installation and construction of the storm drainage facilities to the alignment, grades, depths and cross-sections as indicated on the construction plans.

D. Excavate trench to depth which is 6 inches below the outside bottom of the pipe barrel to be placed therein.

E. Cut trenches just wide enough to allow the installation of the pipe and pipe bedding as indicated on the plans. Minimize trench width above the pipe.

F. Provide protection to public per Division 01.

3.4 INSTALLATION AND BEDDING OF STORM DRAIN PIPE

A. Install the pipe and fittings to the lines and grades shown on the construction plans.

B. Install pipe and fittings in accordance with the manufacturer's recommendations, and these specifications.

C. Unless otherwise approved by the Engineer, lay all pipe upgrade from structure to structure, with bell or socket ends of pipe upgrade.

D. Excavate suitable bell (or socket) holes in the bedding material, so that the bells do not bear on the subgrade or bedding. Provide uniform bearing of pipe barrel on bedding material.

E. Ensure that all joints are properly "homed" and are watertight.

F. Bed concrete pipe in backfill or sandfill soil envelope, and compact to a minimum of 90% relative compaction. Place and compact the bedding material under, around and over the pipe, filling the trench cavity and extending from the bottom of the trench (6 inches below the outside bottom of the pipe barrel) to a level 12 inches above the outside top of the pipe barrel.

3.5 INSTALLATION OF STORM DRAINAGE STRUCTURES AND APPURTANCANCES

A. Install storm drainage structures as indicated on the construction plans, in accordance with the manufacturer's recommendations, and as specified herein.

B. Construct poured-in-place concrete per Specification Section SITE CONCRETE IMPROVEMENTS.

C. Key top of poured-in-place concrete bases for structures to receive the tongue of precast riser sections.

D. Construct cleanout, outfall structure per detail drawing.

3.6 BACKFILLING TO FINISHED GRADE AND FINISHED GRADING

A. Place and compact backfill per Specification Section TRENCH EXCAVATION AND BACKFILL.

B. Conform finished surface to the lines, grades and cross-sections shown on the plans, or as otherwise directed by the Inspector.

C. In areas to receive paving or a significant thickness of sealing material, temporarily set manhole frame and cover below finish grade, then return after final surfacing and/or pavement sealing and bring manhole frame and cover to final grade, as shown on the plans.

D. Fine grade all finished soil surfaces disturbed to the lines, grades and cross-sections shown on the plans.

E. Rake and smooth all finished dirt surfaces.

3.7 TOLERANCES

A. Pipe laying tolerances:
   1. Above grade: Not to exceed 1/4-inch above planned grade.
   2. Below grade: Not to exceed 1/2-inch below planned grade.
   3. Alignment: Not to exceed 2 inches from planned alignment, if gradual and regular over a distance of 20 feet.

B. Structure finish grade tolerance: Within 1/4 inch of planned grade, but must match adjacent improvements.

3.8 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 01.

B. Compaction testing of bedding and backfill will be performed in accordance with ASTM D 1557.

C. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest at no additional cost to Owner.

END OF SECTION