TECHNICAL SPECIFICATIONS

CONSTRUCTION DOCUMENTS - 4/4/2023

MOORPARK COLLEGE

MOORPARK COLLEGE BEACH VOLLEYBALL COURTS
MOORPARK, CA 93021

CONSTRUCTION DOCUMENTS

Prepared By:

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SECTION 00 01 07 SEALS PAGE

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IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-123023 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 04/19/2023

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DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 02-48 – FACILITY CONSTRUCTION SUBGROUP

GEOTECHNICAL INVESTIGATIONS (For Reference)

Geotechnical Update, Volleyball Court Light Standards, Moorpark College, Moorpark, California – January 31, 2023, Project No. 1003.046, Geotechniques.

SECTION 00 01 11 TECHNICAL SPECIFICATIONS

1.01 GENERAL INFORMATION

A. Job Walk

All bidders are required to attend the job walk to be eligible to bid on this project.

B. Discrepancies

Where there are discrepancies between the General Conditions of the Ventura County Community College District and the Technical Specifications and Drawings, the General Conditions of the District shall take precedence.

C. Alternative Materials

The use of a manufacturer, product brand name or make in the specifications is not intended to restrict bidders. The specifications establish the character or quality of the article desired. Alternative materials or goods on which other proposals are submitted must, in all cases, be equal or exceed in every detail to the item specified. Bid must clearly state the brand, make or model number. Alternative goods and materials are subject to review and must be approved prior to the date listed on the bid specifications. The District, for inspection and specification testing, may require samples of bid items. Samples furnished must be free of expense to the District. Samples furnished must also be identical in all respects to the products specified in the bid. Samples, if not destroyed by tests and if requested, will be returned at the bidder's expense. All goods furnished under this contract shall be newly manufactured goods. Used or reconditioned goods are prohibited, unless otherwise specified.

D. Questions Concerning Technical Specifications

Technical specifications continue on the following pages. All questions regarding this bid and or specifications should be directed to the Purchasing Department of the District. Questions should be addressed by e-mail to the Purchasing Specialist handling this bid.

E. Technical Specifications & Plan Drawings

The technical specifications and the plan drawings continue on the following pages and are considered a part of this bid package.

the construction area shall be determined by the local Fire Marshal and provided by the Contractor.

3) Fires: Employees shall not be allowed to start fires with gasoline or kerosene or other highly flammable materials. No open fires shall be allowed.

4) Flammable Building Materials: Only a reasonable working supply of flammable building material shall be located inside of, or on the roof of, any storage facility.

5) Combustible Waste Materials: Oil-soaked rags, papers, and other highly combustible materials must be stored in closed metal containers at all times, and shall be removed from the site at the close of each day's work and more often where necessary, and placed in metal containers with tight hinged lids.

6) Gasoline and other flammable or polluting liquids/materials shall not be poured into sewers, manholes, or traps, but shall be disposed of, together with flammable or waste material subject to spontaneous combustion, in a safe manner meeting all applicable laws and ordinances. Make appropriate arrangements for storing these materials outside of the building.

7) Provide and maintain fire extinguishers during construction, conveniently located for proper protection, one fire extinguisher for each 5,000 square feet of floor area or less, but not less than four extinguishers. Fire extinguishers shall be ten-pound ABC type. Extinguishers shall meet approval of Underwriter's Laboratory, and shall be inspected at regular intervals and recharged as necessary.

1.17 Self -Propelled Construction Equipment

All self-propelled construction equipment, except light service trucks, panels, pickups, station wagons, crawler type cranes, power shovels and draglines, whether moving alone or in combination, shall be equipped with a reverse signal alarm (hub-cap type).

1.18. Temporary Offices (Construction Trailers).

1.18.1 Prior to starting work, provide and maintain for duration of operations, separate temporary office facilities as required for Contractor's administration; likewise, all necessary sheds and facilities for proper storage of tools, materials, and equipment employed in performance of work.

1.18.2 The office shall be conveniently located in area as directed by the District, substantially and neatly constructed, weather-tight, well lighted, and neatly painted inside and out. The office shall be heated and cooled. It shall have doors, which are separately keyed, and two or more windows on opposite sides.

1.19 Temporary Office (Contractor's Trailer).

1.19.1 Prior to starting work, provide and maintain for duration of operations, temporary office facilities as required for Contractor's administration; likewise, all necessary sheds and facilities for proper storage of tools, materials, and equipment employed in performance of work.

1.19.2 The office shall be a separate structure. The location of the office trailer will be determined at the time of mobilization to be acceptable to the District. The office structure shall be substantially and neatly constructed, weather-tight, well lighted, and neatly painted inside and out. The office shall be heated and cooled. It shall have doors that are separately keyed and two or more windows on opposite sides.

1.19.3 The facilities for Contractor's use shall be not less than described herein. The facilities shall be of suitable size to accommodate the office, and shall be furnished with whatever facilities the Contractor needs.

1.19.4 Costs of the field office and utilities, including cleaning service not less than once per week, shall be borne by the Contractor.

1.20 Temporary Scaffolding, Stairs, and Hoists.

Provide and maintain for duration of work, in accordance with CAL-OSHA and applicable laws and ordinances, all required temporary standing scaffolding, and temporary stairs, ladders, ramps, runways and hoists for use of all trades, unless otherwise specified in Contract Documents.

1.21 Temporary Guards, Barricades, and Lights.

1.21.1 Provide construction canopies, barricades, fences, guards, railings, lights, and warning signs necessary and required by law, and take necessary precautions required to avoid injury or damage to any and all persons and property.

1.21.2 Provide and maintain protective fences and barricades as shown on drawings and as Contractor may deem necessary to protect construction yard, storage areas and work in place, subject to approval as to type and appearance. Hog wire fencing is not acceptable Remove all temporary fences and barricades upon project completion.

1.22 Protection of Work and Facilities.

1.22.1 Protect all adjacent property, roads, streets, curbs, shrubbery, lawns, erosion control materials and planting during construction operations. All damaged material shall be replaced and/or repaired at the expense of the Contractor.

1.22.2 Upon completion deliver the entire work to the District in proper, whole and unblemished condition. Work outside of the immediate construction site shall be restored to a whole and unblemished condition immediately upon completion of that portion of the work.

1) Parts of work in place that are subject to injury, because of operations being carried on adjacent thereto, shall be covered, boarded up, or substantially enclosed with adequate protection.

2) The Contractor shall be responsible for preventing the overloading of any part of the facilities beyond their safe calculated carrying capacity by the placing of materials and/or equipment, tools, machinery, or any other items thereon.

3) The District may provide such watchman services deemed necessary to protect the District's interest, but any protection so provided by the District shall not relieve the Contractor of the responsibility for the safety and condition of the work and material until the completion and acceptance thereof. The Contractor

shall employ such watchman services as he may deem necessary to properly protect and safeguard the work and material.

1.23 Special Controls.

1.23.1 Use of Powder-Driven Fasteners: The use of powder set (cartridge type) anchors or lugs for attaching of any work is strictly prohibited on this project unless approved in writing by the District.

1.23.2 Use of Explosives: Blasting will not be permitted unless approved in writing by the District.

1.23.3 Dust Control: Throughout the entire Contract period, effectively dust-palliate the working area, roads, and storage areas constructed under this Contract and involved portions of the site, except during such periods that other contractors may be performing work of separate contracts in these areas. Such application shall consist of intermittent watering and sprinkling of such frequency as will satisfactorily allay the dust during all hours that work is being performed. At no time shall water be allowed to pond or puddle. Ponds and puddles shall be removed immediately and steps taken to remove or dry the mud resulting from the ponds or puddles.

1.24 Water Control.

Surface or subsurface water or other fluid shall not be permitted to accumulate in excavations or under the structures. Should such conditions develop or be encountered, the water or other fluid shall be controlled and suitably disposed of by means of temporary pumps, piping, drainage lines and ditches, dams or other methods approved by the District.

1.25. Project Identification.

Provide and maintain one sign only on the property at location as directed by the Construction Manager (CM). Signboard shall contain information and be of size as detailed on the drawings. Small direction signs may be installed if specifically approved by the CM. Signs by subcontractors and material suppliers will not be permitted.

1.26 Contractor Vehicles on Campus.

Contractor's vehicles shall be restricted to access routes established by the District. Parking of Contractor's employees' vehicles will be limited to areas as established by the District, not necessarily adjacent to the site.

1.27 Removal of Temporary Construction.

Remove temporary office facilities, toilets, storage sheds, fences, and other construction of temporary nature from site as soon as progress of work permits. Recondition and restore portions of site occupied by same to a condition acceptable to District.

1.28 Use of Facilities.

The Contractor and subcontractor shall not, during hours of construction or at times when they are on site to perform work under the contract, use any of the campus facilities, including but not limited to, the restrooms, phones and roadways and the like without prior permission of the campus DFMO.

1.29 Damages.

The Contractor shall be responsible to report and repair, at no additional cost to the District, any

damage to College property caused by Contractor, Contractor's employees, Subcontractors, material suppliers, or any other persons or entities, which are onsite as a result of the Contract and work there under. Contractor shall notify the District Project Manager/DFMO in writing within four (4) hours of the occurrence, and provide a description of the damage and the exact location. The Contractor shall immediately contact the DFMO, the Project Manager and Inspector of Records (IOR), and immediately repair the damage using materials of equal or superior grade to that which was damaged. No backfilling or covering up of damage or repairs shall be performed by the Contractor until such time as the DFMO has inspected the work and provided the Contractor with written approval to cover the work.

1.30 Waste Management.

Contractor shall not use the campus dumpsters, or dispose of waste or any other items, on Campus.

1.31 State and College Regulations

The Contractor and his Subcontractors shall comply with all District, City, County and State regulations regarding noise, dust, smoke, fire and safety rules, and shall keep the site and surrounding areas clean and free of debris.

1.32 Drawings and Plans.

The terms "drawings" and "plans" are used interchangeable in the Contract Documents and have the same meaning.

1.33 Approval for Commencement of Work.

The Contractor shall obtain approval from the Director of Facilities, Maintenance & Operations, before commencing work in any existing occupied area, or before working on existing piping, wiring, or equipment. The Contractor shall indicate the particular area where work will be in progress and the length of time any existing system will be out of service. This work is to be scheduled in such a manner so as not to disrupt present operations, where possible. If new construction requires interruption of present operations, the Contractor shall obtain approval from the parties named above, after providing them with specific information regarding areas, dates, hours of the day, and number of hours any interruption is expected to take place. All interruption of services shall be approved by the District, in writing, prior to such interruptions and at the sole discretion of the District. The Contractor shall perform such work on weekends, after regular working hours, or in incremental blocks of time as directed by the District, at no additional cost to the contract price. Work performed as herein described shall not be a basis for an extension to the contract time for completion of all work.

1.34 Verify Existing Conditions.

The Contractor shall verify, identify and locate all utilities (above and below grade, visible and concealed), and all conditions and dimensions of the Work as described in the Contract Documents, prior to starting construction. All Subcontractors shall verify at the Site all conditions and measurements related to their work.

1.35 Scaling Dimensions from Drawings.

In no case shall working dimensions be scaled from plans, sections, or details from the Working Drawings. If no dimension is shown, the Contractor shall request in writing that the District provide clarification and dimensions.

1.36 Similar Conditions.

The intent is to provide a fully functional finished product, complete in every respect. Where a specific detail is not shown, the construction shall be similar to that indicated or noted for similar conditions and as necessary for a complete installation. References of notes and details to specific conditions and locations shall not limit their applicability. Materials for similar use shall be of the same type and manufacturer, unless otherwise indicated or specified as different. Any deviation must be approved in writing, by the District, prior to incorporation into the work.

1.37 Handicap Access Regulations.

The Contractor and all Subcontractors shall comply with Title 24, Disabled Access Regulations and ADA, Americans with Disabilities Act Regulations, whether or not specifically indicated on the Contract Documents. Where existing paths of travel are interrupted due to construction, barrier-free paths of travel shall be maintained by the Contractor, without adjustment to Contract Price or Contract Time.

1.38 Items marked "N.I.C." (Not in Contract).

Items marked N.I.C. in the Drawings are not part of the Work. In most instances, they are included for coordination under this Contract of the Work with concurrent or future work outside this contract. However, the Contractor shall review all items marked N.I.C. and provide the District notice and deadline dates of when the items are needed onsite for coordination and incorporation into the project. Failure by the Contractor to give notice to the District and to provide such notice in sufficient time so as to allow District to select, order and receive the items shall not be the basis for delay claims, time extensions, or increased cost to the contract price.

1.39 Coordination for all Trades.

The Contractor shall be responsible for the proper location and size of openings for all trades, and shall coordinate all construction as indicated by the Contract Documents, including Shop Drawings reviewed by the District.

1.40 Items Not Identified in Construction Documents.

Any conditions or installations not identified in the Contract Documents and affecting the Work to be performed shall be brought to the attention of the District in order that cost and responsibility for any added work may be determined before work is undertaken. The Contractor's notice to the District of such installations or conditions shall be in writing. Pending receipt of written direction from the District, the Contractor shall not disturb or perform construction operations in any area affected by such installations or conditions.

1.41 Vehicular Access and Parking.

Construction, which might affect existing College vehicular access and parking, shall be scheduled during non-school hours. The Contractor shall immediately vacate any area if Contractor's operations or activities curtail vehicular access to the campus or to parking. Fire Department vehicular access to and around the construction area shall be maintained at all times by the Contractor clear of obstruction. Contractor shall provide keys to all gates to local Fire Department and DFMO for gate access.

1.42 Right of Access.

The District, or its representative(s), shall be able at all times to enter the construction site and observe the work. They shall have the right to reject defective materials and workmanship and to require appropriate corrections at the Contractor's expense. The Contractor shall not be

relieved of any responsibility under this contract to provide materials and equipment in accordance with the Contract Documents for failure by the District representatives to discover, or otherwise bring to the attention of the Contractor, any deficiencies with the work.

1.43 Restoration of Existing Conditions.

The Contractor shall restore all landscaping, paving, and grading to the original condition at all areas adjoining the construction sites. Prior to performing any work on the project, the Contractor shall, at his sole expense, locate and mark the locations of all components of the irrigation systems which will, or may be, affected by or interfere with work under the contract. The Contractor shall meet with the Director of Facilities, Maintenance & Operations to develop a plan and schedule to expose and rework the irrigation system as necessary to maintain continuous uninterrupted functioning of the irrigation system. In the event that irrigation lines, sprinklers, control wiring or the like are damaged, the Contractor shall notify the Director of Facilities, Maintenance & Operations within one (1) hour, and within four (4) hours of the occurrence provide a written description of the damage and its exact location. The Contractor shall immediately repair the damage using materials of equal or superior grade to that which was damaged. No backfilling or covering up of damage or repair shall be performed by the Contractor until such time as the Director of Facilities, Maintenance & Operations has inspected the work and provided the Contractor with written approval to cover the work. Should any existing conditions such as deterioration or noncomplying construction be discovered which is not covered by the DSA approved documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work.

1.44 Municipal Laws and Regulations.

The Contractor shall have full knowledge of, and at no additional cost to the contract comply with, all laws and regulations including, but not limited to, limitations on noise, hours of operation, hauling routes or limits on weight of equipment traveling on adjacent streets, and any other limitations which might affect the Contractor's work and operations.

1.45. Weekend Hours.

The contract time is expressed in calendar days. The Contractor may perform work, with prior notification as per Article 1.07 of the Special Conditions, on weekends or holidays, at his discretion. Should it be necessary for inspectors, District personnel, consultants, or DFMO to visit the work site on weekends or holidays, additional cost, if any, shall be reimbursed to the District by the Contractor. The District, at its sole discretion, may direct certain portions of the work to be performed after hours, or on weekends or holidays, in order to minimize interruption to the academic operations of the College. The Contractor shall reflect in his Progress Schedule all work, which may impact academic operations, and at Contractor's sole expense, and as directed by the District, perform all work at times convenient to the District.

1.46 Testing and Inspection Costs.

1.46.1 All costs for testing and inspection shall be paid by the District. However, the Contractor shall be responsible for all costs incurred for re-testing that may be required due to failed tests Upon receipt from the Contractor of a Progress Schedule in accordance with the Contract Documents, the District shall provide a copy of the Progress Schedule to the Testing Laboratory and obtain from them a cost to perform all necessary inspections for the project based on the timeframes set forth in the Progress Schedule. The Contractor

shall reimburse the District for quantities, which exceed the scheduled amounts of time.

1.46.2 If the Contractor uses a fabricator or supplier subject to DSA inspection or documentation from beyond a 100 mile radius of the Project Site, costs above and beyond those for the same inspections and documentation were it to occur within a 100 mile radius of the Project Site, including, but not limited to, out of state tests and inspections, per diem, travel, or the like, will be paid by the District and the District shall be reimbursed by the Contractor upon submittal by the District to the Contractor of the costs incurred.

1.46.3 The Project Inspector and testing lab must be employed by the District and approved by the Architect or Engineer of Record, Structural Engineer of Record (when applicable), and DSA.

1.47 Needless Requests for Information.

Any needless Request for Information (RFI) will be billed to the Contractor by the A/E team at the additional service rate contained in their respective contracts. A needless RFI is any request for which an answer is in the plans or specifications, or Contract related correspondence, prior to the date of the RFI. Needless punch list visits will be billed in the same way.

1.48 E-mail Address.

All parties shall have an Email address and be responsible for all correspondence distributed via E-Mail. *No Exceptions*!

1.49 Service Charges.

Electrical, water, telephone, and other utility charges will be billed to the contract at the same rate paid by the Ventura County Community College District (VCCCD).

1.50 Material Substitutions.

Any and all material specification substitutions must be submitted to the District for approval no later than seven (7) days prior to the bid due date. Any substitutions submittal after that date will not be accepted or reviewed.

1.51 Electronic Schedule Files.

Pursuant to the requirements of the General Conditions under Article 7, the Contractor shall provide copies of project schedules submitted to the District on paper, including but not limited to, weekly, semi-monthly & monthly schedule updates, on compact discs, in the proper file format to function in the scheduling program provided by the Contractor to the District as required under Article 7 of the General Conditions.

1.52 Changes to the Work for Contractor Convenience.

Any changes to the Work resulting from a request by the Contractor to deviate from the approved Contract Documents or as a result of the Contractor not following the Contract Documents that requires additional architectural or engineering services, including but not limited to document submittal to the Division of State Architects (DSA), will be billed to the Contractor by the A/E team at the additional service rate contained in their respective contracts. All substitutions affecting DSA regulated items shall be considered as a Construction Change Document or Addenda. Construction Change Documents must be signed by the Architect or Engineer of Record, Structural Engineer (when applicable), Delegated Professional Engineer (when applicable), and DSA per Section 4-338, Part 1, Title 24.

1.53 Mark-ups on Changes to the Work.

In the event of Changes to the Work, the mark-up for all general conditions, costs, overhead (including home and field office overhead), profit and bond, shall not exceed **Twenty Percent (20%)** of the direct actual costs of the performance of an additive Change, as determined in accordance with the provisions of Article 9.4 of the General Conditions. However, in the event that Contractor self-performs the entirety of the Change, the mark-up for all general conditions, costs, overhead (including home and field office overhead), profit and bond, shall not exceed **Fifteen Percent (15%)** of the direct actual costs of the performance of an additive Change, as determined in accordance with the provisions of Article 9.4 of the General Conditions. In addition, the mark-up shall include the actual, direct cost of the bond for such Change, not to exceed **Two Percent (2%)** of the direct, actual costs of the performance of the Change.

The foregoing limitation or mark-up shall apply regardless of the number of subcontractors, of any tier, performing any portion of such additive Change to the Work. In the event that the Work of such additive Change is performed in part by a subcontractor, Contractor agrees to allocate at least Ten Percent (10%) to such subcontractor, with no more than Five Percent (5%) to be allocated to the Contractor. In the event the Change is deductive, the District shall receive a credit equal to the value of the direct actual costs of the Work of the deductive Change plus Zero **(0%)** of such direct actual costs for all general conditions, overhead (including home and field office overhead), profit and bond.

1.54 Allowances.

The following allowances are in addition to the scope of the Work as defined in the Contract Documents and the Contractor shall add all Allowances to complete the work and shall include the total Allowances amount in the Bid Proposal Lump Sum Amount (Refer to Bid Proposal, Section 00210).

List of Allowances

Item	Description	Amount ($)
1	No Allowance included in this project	
	Total Allowances	

The District may utilize the above allowances up to the total amount during the course of construction by issuing a Work Order(s) to the Contractor. A deductive Change Order will be issued at the completion of the Work to return the entire balance of the unused allowances to the District, without application of any mark-up.

Upon incorporation of the Work described in each Work Order, the Contractor will be paid out of the Allowance fund as a line Item included in the Contractors payment application.

1.55 Inclement Weather Days.

Pursuant to Article 7.4.1 of the General Conditions, the number of Working Rain Days (including inclement weather) for this Contract is Thirty Five (35) days.

1.56 District's Project Manager.

The District's Project Manager is
John Sinutko, Moorpark College Director of Facilities, Maintenance & Operation,

7075 Campus Rd., Moorpark, CA 93021, Phone: 805-378-1454.

[End Of Section]

1.4 PRODUCT DATA

A. Preparation:

1. Clearly mark each copy to identify pertinent products or models.
2. Show performance characteristics and capacities.
3. Show dimensions and clearances required.
4. Show wiring or piping diagrams and controls.

B. Manufacturers' standard schematic drawings and diagrams:

1. Modify the Drawings and other diagrams to delete information which is not applicable to the work.
2. Supplement standard information to provide information specifically applicable to the work.

1.5 SAMPLES

A. Office Samples shall be of sufficient size and quality to clearly illustrate the following:

1. Functional characteristics of the products, with integrally related parts and attachment devices.
2. Full ranges of color, texture, and pattern.

1.6 CONTRACTOR'S REVIEW OF SUBMITTALS

A. Review, mark up as appropriate, and stamp Shop Drawings, Product Data, and Samples prior to submission. Submittals shall clearly show that Contractor has reviewed them for conformance with the requirements of the Contract Documents and for coordination of the Work.

B. Determine and Verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with Contract Documents.

C. Coordinate each submittal with requirements of the work and of the Contract Documents.

D. Notify Owner in writing, at time of submission, of any changes in the submittals from requirements of the Contract Documents.

E. Begin no fabrication or work which requires submittals until the return of Owner's final reviewed submittals.

1.7 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with the Submittal Schedule and in such sequence as to cause no delay in the work or in the work of any separate contractor.

B. Number of Submittals Required:

1. Shop Drawings & Product Data: Submit one (1) electronic copy (PDF).
2. (if requested) Non-Reproducible Submittals: Submit the number of copies which contractor will need, plus four (4) copies (minimum) which will be retained by Owner.
3. Samples: Submit the number specified in the Section that requires them.
4. Do not submit product data for multiple specifications sections in the same submittal.

C. Submittals shall contain:

1. Cover Sheet with the following
    a. Date of submission and dates of any previous submissions.
    b. Project name and number.
    c. Contract identification.
    d. Names of
        - Contractor.
        - Subcontractor.
        - Supplier.
        - Manufacturer.
2. Specification Section requiring submitted products and materials.
3. 8-inch x 3-inch blank space for review stamps.
4. Contractor's stamp, initialed or signed, certifying to the review of submittal; verification of materials and field measurements and conditions; and compliance of the information within the submittal with requirements of the Work and of the Contract Documents.

D. Product Data and Shop Drawings

1. Product and material data
2. Required product certifications, engineering stamps and testing certifications
3. Field dimensions clearly identified as such.
4. Relation to adjacent or critical features of the Work or materials.
5. Reference standards, such as ASTM or Federal Specification numbers.
6. Identification of changes from requirements of the Contract Documents.
7. Identification of revisions on re-submittals.

E. Resubmission Requirements:

1. Shop Drawings and Product Data:
    a. Revise Shop Drawings or Product Data and resubmit as specified for the initial submittal.

b. Identify any changes that have been made other than those requested.

c. Note any departures from the Contract Documents or changes in previously reviewed submittals that were not commented upon by Owner.

2. Samples: Submit new samples as required for initial submittal.

F. Distribution:

1. Owner will electronically (as applicable) distribute approved Shop Drawings, Product Data and Samples, (all of which carry Owner's review stamp).

G. Owner's Review: Owner will review Contractor's submittals, such as Shop Drawings, Product Data, and Samples, for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor as required by the Contract Documents.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 26 0000

GENERAL PROVISIONS

PART 1 - GENERAL

A. The general contract provisions apply to this section and take precedent over this section in case of conflict.

1.01 GENERAL PROVISIONS

A. This division supplements the applicable requirements of other divisions.

1.02 DEFINITIONS

A. For the purposes of Division 260000, the following definitions apply:

1. Provide: Furnish and install.

2. Indicated: As shown on the drawings or specified herein.

3. Circuit Designation: Panel designation and circuit number, i.e., LA-13.

4. Approved equal: Approved by the engineer of record as equal in his sole determination.

1.03 SCOPE OF WORK

A. The Specifications for Work of Division 260000 include, but are not limited to the0020following sections:

26 0000–General Provisions
26 0050–Basic Electrical Materials and Methods
26 0060 Minor Electrical Demolition
26 0111–Conduits
26 0120–Conductors
26 0130–Electrical Boxes
26 0140–Wiring Devices
26 0142–Nameplates and Warning Signs
26 0163–Distribution Panelboards
26 0164–Branch Circuit Panelboards
26 0190–Support Devices
26 2450–Grounding

B. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this division, complete, as shown on the drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

1. Examine all divisions for related work required to be included as work under this division.

2. General provisions for electrical work.

3. Site observation including existing conditions.

C. Related Work Specified Elsewhere but included in the scope of work:

2. Control wiring and conduit for lighting

D. Work Not In Contract (N.I.C.):

1. Telephone instruments.

E. Coordination

1. The following supplements are additional General Requirements pertaining to work of this Division. Provisions of Division 1 - General Requirements shall remain in effect.

a. Coordinate work of various sections of Division 26 and 27.

b. Coordinate work of this Division 26 with work of Divisions 2 through 25.

1.04 REFERENCE STANDARDS

A. American National Standards Institute (ANSI).

B. Association of Edison Illuminating Companies (AEIC).

C. Electrical Testing Laboratories (ETL).

D. Illuminating Engineering Society (IES).

E. Institute of Electrical and Electronic Engineers (IEEE).

F. Insulated Cable Engineers Association (ICEA).

G. National Electrical Manufacturers Association (NEMA).

H. National Fire Protection Association (NFPA).

I. Underwriters Laboratories, Inc. (UL).

J. California State Fire Marshal (CSFM).

K. California Energy Commission (CEC) Title 24.

1.05 QUALITY ASSURANCE

A. Regulations: All the electrical equipment and materials, including their installations, shall conform to the following applicable latest codes and standards:

1. California Electric Code, Latest Adopted Edition (NEC), 2022 unless a more current version has been adopted.

2. Local and State Fire Marshal.

3. Occupational Safety and Health Act (OSHA).

4. Requirements of the Serving Utility Company.

5. Local Codes and Ordinances.

6. Requirements of the Office of the California State Architect (OSA).

7. California Administrative Code, Title 8, Chapter 4, Industrial Safety Orders.

8. California Administrative Code, Title 24.

9. County of Ventura Codes and Regulations.

B. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply. In instances where plans and specifications are at variance or conflict the most restrictive requirement shall apply. Contractor shall be responsible for all his associated work and materials and also the work and materials of related or affected trades.

C. Contractor's Expense: Obtain and pay for all required bonds, insurance, licenses, and pay for all taxes, fees and utility charges required for the electrical work.

D. Testing and Adjustment:

1. Perform all necessary tests required to ascertain that the electrical system has been properly installed, that the power supply to each item of equipment is correct, and that the system is free of grounds, ground faults, and open circuits, that all motors are rotating in the proper directions, and

such other tests and adjustments as may be required for the proper completion and operation of the electrical system. Contractor shall provide a copy of all test reports to prove these tests have been performed.

2. If, during the course of testing, it is found that system imbalance is in excess of 20%, rearrange single-pole branch circuit in lighting and receptacle panels to bring system balance to within 20% on all phases. Record all such changes on the typewritten panelboard schedule and submit a summary of changes to the Engineer on the record drawings.

1.06 SUBMITTALS

A. Procedure: In accord with the Submittal Section.

B. Shop drawings: Detailed shop drawings for the following equipment:

1. Distribution panelboards.

2. Branch circuit panelboards.

3. Low voltage cabling riser diagram

C. Product data: Detailed manufacturer's data for:

1. Concrete pull boxes.

2. Transformers.

D. Test results for the following:

1. Circuit breakers.

2. Grounding systems.

3. Cables.

E. Include sufficient information to indicate complete compliance with Contract Documents. Include illustrations, catalog cuts, installation instructions, drawings, and certifications. On each sheet show manufacturer's name or trademark.

F. Operating, maintenance, and instruction data for:

1. Switchboards/panelboards

2. Ground fault protection.

G. Instruction materials:

1. Provide at the time of personnel instruction period three bound copies of instruction manuals for the systems as listed in Subparagraph 1.04.A.4.f.

2. Include the following (minimum) information in each copy of instruction manual:

a. Manufacturers' names and addresses including phone numbers.

b. Serial numbers of items furnished.

c. Catalog cuts, exploded views and brochures, complete with technical and performance data for all equipment, marked to indicate actual items furnished and intended use.

d. Recommended spare parts.

1.07 OWNER'S PERSONNEL INSTRUCTIONS

A. Prior to completion of the contract, and at the Owner's convenience, instruct verbally and demonstrate to the Owner's personnel, the operation of the systems as listed under operating, maintenance, and instructional data and/or emergency generator, automatic transfer switch and fire alarm annunciator panel.

1.08 CLEANING

A. Clean exterior surfaces and interiors of equipment and remove all dirt, cement, plaster and other debris. Protect interior of equipment from dirt during construction and clean thoroughly before energizing.

B. Clean out cracks, corners and surfaces on equipment to be painted. Remove grease and oil spots so that paint may be applied without further preparation.

1.09 PROJECT RECORD DOCUMENTS - Prepare the following and submit to the engineer before final acceptance:

A. Mark Project Record Documents daily to indicate all changes made in the field.

1. In addition to general requirements of Project Record Drawings, indicate on drawings, changes of equipment locations and ratings, trip sizes, and settings on circuit breakers, alterations in raceway runs and sizes, changes in wire sizes, circuit designations, installation details, one-line diagrams, control diagrams and schedules.

B. Use green to indicate deletions and red to indicate additions.

1. Use the same symbols and follow the same drafting procedures used on the Contract Drawings.

C. Locate dimensionally off of contract drawings all underground conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations using building lines by indicating on the Project Record Drawings.

D. At the completion of underground conduit installation provide underground conduit record documents to owner's representative.

E. Two copies, in binder form, of all test results as required by these specifications - 260030.

F. Two copies of local and/or state code enforcing authorities final inspection certificates.

G. Two copies, in binder form, of electrical equipment cut sheets, manufacturer's installation instructions, warranty certificates, and product literature for all products utilized on project.

1.10 SERVICE INTERRUPTIONS AND UTILITY

A. Coordinate with the Owner the interruption of services necessary to accomplish the work.

B. Coordinate with the utility company all work associated with power and communications distribution systems and service entrance equipment.

C. Electrical contractor shall supply temporary power for all trades.

1.11 MINIMUM SPECIFICATION REQUIREMENTS (ALL WORK OF DIVISION 260000)

A. As a minimum Specification requirement, all materials and methods shall comply with applicable governing codes.

1.12 PENETRATION SEALING

A. Seal penetration through exterior walls and fire rated walls, floors, ceilings, and roofs with 3M Firestopping materials of fire rating capacity rated per architectural plans and UBC or prevailing building code requirements.

1.13 PLACING EQUIPMENT IN SERVICE

A. Do not energize or place electrical equipment in service until all interested parties have been duly notified and are present or have waived their rights to be present. Where equipment to be placed in service involves service or connection from another contractor of the owner, notify the owner in writing when the equipment will be ready for final testing/connection and schedule to the owner's satisfaction of this service connection. Notify the owner two weeks in advance of the date the various items of equipment will be complete.

1.14 OWNER-FURNISHED ITEMS

A. Pick up Owner-furnished items and handle, deliver, install, and make all final connections.

1. Assume responsibility for the items when consigned at the storage facility or in the field in accord with requirements of the Contract Documents.

1.15 ELECTRIC ITEM LOCATION

A. Electrical drawings are generally diagrammatic. Verify equipment sizes with shop drawings and manufacturers' data and coordinate location layout with other trades. Notify owner and engineer of any changes of location requirements prior to installation and obtain engineer's written acceptance for all changes/revisions.

1.16 DEMOLITION

A. Scope: Provide and perform demolition, preparatory and miscellaneous work as indicated and specified, complete.

B. Principle Items of Work:

1. Demolition and removal of existing electrical conduit, wiring and equipment required to complete the project.

2. Preparation of the existing building to receive or connect the new work.

3. Miscellaneous demolition, cutting, alteration, and repair work in and around the existing building necessary for the completion of the entire project.

4. Disconnecting and reconnection of electrical equipment as required by the construction modifications.

C. Existing Conditions: Make a detailed survey of the existing conditions pertaining to the work. Check the locations of all existing structures, equipment and wiring (branch circuiting and controls). Provide at bid time any exclusions for existing conditions work.

D. Salvage and Disposal: All removed material other than items to be reused shall be returned to the owner or disposed of in accordance with instructions from the owner's representative. Disposal shall be done in accordance with EPA and governing body requirements and regulations. Contractor shall pay all fees and charges for disposal.

1.17 ELECTRICAL WORKMANSHIP REQUIREMENTS

A. It is required that all electrical construction of this Contract be performed by journeyman electricians. All journeyman electricians shall have a minimum of 4 years of apprenticeship training and hold a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards. This is intended to mean that a person who does not hold a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards will not be permitted to do electrical work of any kind that involves new construction, nor make repairs, alterations, additions, or changes of any kind to any existing system of electrical wiring, apparatus, equipment, light, heat, or power.

B. Contractor may employ electrical helpers or apprentices on any job of electrical construction, new or existing, when the work of such helpers or apprentices is performed under direct and constant personal supervision of a journeyman electrician holding a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards.

1. Each journeyman electrician will be permitted to be responsible for quality of workmanship for a maximum of eight helpers or apprentices during any same time period, provided the nature of work is such that good supervision can be maintained and quality of workmanship achieved is the best, as expected by Owner and as implied by the latest edition of the California Electrical Code (National Electrical Code with State of California amendments).

2. Before each journeyman electrician commences work, deliver to Owner at project site a photocopy of journeyman's valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards.

C. All electrical systems shall be installed in a neat and workmanlike manner per National Electrical Code requirements and ANSI approved NEIS National Electrical Installation Standards.

1.18 DESIGN CHANGES AFTER AWARD OF BID

A. When a change in the quantity or size of conductors is made, the conduit size will remain in accordance with that indicated in the original contract drawings rather than the drawing symbol conduit table. When code permits, provide conductor insulation 'THWN' where required to maintain conduit fill conformance with the National Electrical Code.

1.19 MATERIAL AND EQUIPMENT SUBSTITUTION

A. Where two or more trade names or manufacturers are mentioned, selection shall be made from the group listed for use in the base bid. The order in which names are listed is not intended to be any indication of preference.

B. Where a single manufacturer, product or trade name is stated, that manufacturer, product or trade name shall be used in the base bid. The use of other manufacturers, products or trade names will be considered by the engineer of record (unless that product is indicated for no substitution) only if submitted as alternate items at the time of bidding, with evidence of equality and a statement of net price difference as compared to the specified item. After approval by the engineer of record, the architect and owner reserve the right to review such submittals and to determine the acceptability for use.

C. Equipment other than that specified will be accepted only when written approval is given by the engineer of record and architect, in accordance with Division 1.

D. The contractor shall be held responsible for all physical changes in piping, equipment, etc. resulting from equipment substitution and likewise bear any increased cost of other trades in making said substitution. Approval by the architect of equipment other than that specified does not relieve this contractor of this responsibility.

1.20 REQUESTS FOR INFORMATION

A. The contractor shall submit all requests for information (RFI's) typewritten on the attached form.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 26 0050

BASIC ELECTRICAL MATERIALS & METHODS

PART 1 - GENERAL

1.01 DESCRIPTION: Division 1 applies to this Section. This Section contains general requirements for the Sections in Division 26.

A. Related Work Not in Division 26: Refer to individual Division 26 Sections.

1.02 QUALITY ASSURANCE:

A. Codes: Entire installation shall comply with requirements of authorities having jurisdiction.

B. Permits: Contractor shall pay for all permits required by work under this Division.

C. Inspections: Contractor shall arrange for all inspections and correct non-complying installations.

1.03 SUBMITTALS: Refer to Division 1 for procedures.

A. Material and Equipment: Prior to start of work, 6 copies of a list of all materials and equipment covered by Division 26 shall be submitted for approval. Contractor shall allow ample time for checking and processing and shall assume responsibility for delays incurred due to rejected items. No installation of material concerned shall be made until such written approval has been obtained. Approval of materials and equipment shall in no way obviate compliance with the Contract Documents. Each item proposed shall be referenced to the applicable Section, Page, and Paragraph of Division 26. For each item proposed, give name of manufacturer, trade name, catalog data, and performance data.

B. Equipment Layout Drawings: Submit "Equipment Layout Drawings" for each equipment room or area containing equipment items furnished under this Division. Layout Drawings shall consist of plan view of room, to scale, showing projected outlines of all equipment, complete with dotted line indication of all required clearances including all those needed for removal or service. Location of all conduit and pull boxes shall be indicated.

C. Service Manuals: Refer to Submittal Section. Indexed Service Manuals shall be submitted which shall include test reports, service instructions, and renewal parts lists of all equipment.

1. Submission and Information: Service Manuals shall be submitted for approval at least 30 days before final inspection. The following information together with any pertinent data, shall be included in Service Manual:

a. Renewal part numbers of all replaceable items.

b. Manufacturer's cuts and rating data.

c. Serial numbers of all principal pieces of equipment.

d. Supplier's name, address, and phone number.

e. Final settings for all breakers, relays, and control devices (See Section 26032).

2. Copies: Four (4) copies of approved Service Manual shall be delivered on or before date required.

D. Record Drawings: Prepare and submit in accordance with requirements. Contractor shall make notations, neat and legible, daily as the work proceeds. Drawings shall be available for inspection at all times and kept at the job site. All buried conduit and/or indicated future connections outside any building shall be located both by depth and by accurate measurement from a permanently established landmark such as a building or structure.

E. Seismic Calculation: Refer to Article 3.01 herein.

F. Spare Parts: Conform to the Submittal Section. Deliver following spare parts to Owner and obtain receipts. Submit at same time as Operating Instructions:

1. Spare fuses; 1 set for each combination fuse breaker.

2. Spare pilot light lamps of each type used on project, in quantity of 10%, but not less than 2%.

3. Overload heater elements; 2 sets for each size used on project.

G. Special Tools: If any part of the equipment furnished under Division 26 requires a special tool for assembly, adjustment, resetting, or maintenance thereof and such tool is not readily available on the commercial tool market, it shall be furnished with the equipment as a standard accessory and delivered to the Owner.

H. Maintenance Paint: One (1) can of touch-up paint shall be delivered to Owner for each different color factory finish which is to be the final finished surfaces of the product.

1.04 DRAWINGS:

A. Diagrammatic Drawings: For purposes of clarity and legibility, drawings are essentially diagrammatic although size and location of equipment is drawn to scale wherever possible, Contractor shall make use of data in all the Contract Documents and verify information at building site.

B. Routing of Conduit and Piping: The drawings indicate required size and termination of conduits and raceways. It is not intent to indicate all necessary offsets and it shall be the responsibility under this Division to install conduit in such a manner as to conform to structure, avoid obstructions, preserve headroom, keep openings and passageways clear, and make all equipment requiring inspection, maintenance and repair accessible without extra cost to the Owner.

C. Coordination with Other Trades: Check with other Divisions of the Specifications so that no interference shall occur and in order that elevations may

be established for the work. Installed work which interferes with the work of other trades shall be removed and rerouted at the discretion of the Architect.

1.05 DAMAGE AND REPAIRS:

A. Emergency Repairs: Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding Contractor's warranty or relieving Contractor of his responsibility during warranty period.

B. Responsibility for Damage: Contractor shall be responsible for damage to grounds, buildings, or equipment due to work furnished or installed under this Division 26.

1.06 PROTECTION, CARE, AND CLEANING:

A. Protection: Provide adequate protection for finished parts of materials and equipment against physical damage from any cause during progress of work and until final completion. Sensitive electrical equipment shall not be installed until major construction is completed.

B. Care: During entire construction, properly cap all lines and equipment to prevent entrance of sand and dirt. Protect equipment against moisture, plaster, cement, paint or work of other trades by covering with polyethylene sheets.

C. Cleaning: After installation is completed, clean all systems as follows in addition to requirements specified:

1. Field Painted Items: Clean exterior of conduits, raceways, piping and equipment exposed in completed structure; removing all rust, plaster, cement and dirt by wire brushing. Remove grease oil and similar materials by wiping with clean rags and suitable solvents.

2. Factory Finished Items: Remove grease and oil on all factory finished items such as cabinets and controllers, and leave surfaces clean and polished.

D. Connection: Prior to energizing, check all electrical connection hardware and torque where necessary.

PART 2 - PRODUCTS

2.01 PRODUCTS: Products and materials shall be as specified in the pertinent Sections of Division 26.

2.02 MATERIALS AND EQUIPMENT: Wherever possible, all materials and equipment used in installation of this work shall be of same manufacturer throughout for each class of material or equipment. Materials shall be new and bear UL label, wherever subject to such approval. Comply with ANSI, IEEE and NEMA standards, where applicable.

PART 3 - EXECUTION

3.01 SEISMIC REQUIREMENTS: Electrical equipment for emergency systems shall be braced to withstand the lateral forces that result from earthquakes. Under Work of Division 26, submit seismic calculations stamped and signed by a registered California structural engineer confirming size, number, and location of required anchoring hardware. Electrical equipment vendors shall furnish weights together with dimensions and the center of gravity location for all emergency electrical equipment for this purpose.

3.02 GENERAL LATERAL BRACING REQUIREMENTS: As shown on Drawings. Additional bracing requirements shall conform to specific requirements shown on Drawings or in other Sections of Division 26. Anchorages for equipment subject to thermal expansion and movement shall conform to manufacturer's recommendation and intent of general bracing requirements. When general and specific bracing requirements enumerated above are in conflict with referenced standards, the most stringent requirements shall govern.

3.03 EXCAVATION AND BACKFILL: Perform all excavation and back fill required to install Work of Division 26, both inside and outside. Perform all excavation and backfilling in accordance with Division 2.

A. Excavation: Bury conduits outside building to a depth of not less than 24" (or as required by Code) below finish grade, unless noted otherwise.

B. Backfilling: Do not backfill until after final inspection and approval of conduit installation by all legally constituted authorities and recording of the buried items on the Record Drawings.

3.04 CUTTING AND PATCHING:

A. Cutting of Existing Structural Work: Holes in existing slabs and concrete walls shall be cored to the minimum size required. The Contractor shall submit Drawings showing dimensioned sizes and locations for all such holes to Architect for approval before cutting. Where required for conduit installation, slabs on grade shall be saw-cut to minimum required width; submit cutting Drawings to the Architect for approval before cutting.

B. Patching: Holes or chases shall be patched to match adjacent surfaces.

3.05 CONCRETE WORK: Concrete construction required for the Work of Division 26 shall be provided under the Work of Division 26.

3.06 PAINTING: Finish painting of electrical equipment will be as specified in Division 9, unless equipment is herein specified to be furnished with factory applied finish coats. Equipment to be field painted shall be furnished with a factory applied prime coat.

A. Touch-Up: If factory finish on any equipment furnished under Division 26 is damaged in shipment or during construction of building, the equipment shall be refinished by Contractor to satisfaction of Architect.

B. Concealed Equipment: Uncoated cast-iron or steel that will be concealed, or will not be accessible when installations are completed, shall be given one heavy coat of black asphaltum before installation.

3.07 OPERATING INSTRUCTIONS: Contractor to provide services of an experienced Engineer to instruct Owner in operation of entire installation. Instructional period shall be during normal work day hours. This instruction period may be simultaneous with compliance tests.

3.08 COMPLIANCE TESTS: Conduct such tests of all portions of installation as may be necessary to ensure full compliance with the Drawings and Specifications. Tests shall be made in the presence of the Owner. Costs of test shall be borne by Contractor and Contractor shall provide all instruments, equipment, labor and materials to complete all the tests. Tests may be required on any item between installation of Work and the end of 1 year warranty period. Should these tests develop any defective materials, poor workmanship or variance with requirements of Specifications, Contractor shall make any changes necessary and remedy any defects at his expense.

A. All Feeders: Measure and record as follows:

1. 600 volt conductors shall be tested with 500 volt megger to ground on each phase. megger to be on test for one minute before any readings are taken. The minimum values on all feeders shall be 100,000 OHMS.

2. Copies of the certified test readings shall be transmitted to Owner.

3.09 SYSTEM ACCEPTANCE:

A. Final Review: The Contractor shall request a final review prior to system acceptance after:

1. Completion of installation of all systems required under the Contract Documents.

2. Submission and acceptance of operating and maintenance data.

3. Completion of identification program.

B. Acceptance: Is contingent on:

1. Completion of final review and correction of all deficiencies.

2. Satisfactory completion of acceptance tests demonstrating compliance with all performance and technical requirements of Contract Documents.

3. Satisfactory completion of training program and submission of manuals and Drawings required by Contract Documents.

3.10 PRELIMINARY OPERATION: The Owner reserves the right to operate portions of the electrical system on a preliminary basis without voiding the warranty or relieving the Contractor of his responsibilities.

3.11 CLEAN-UP: Conform to the Submittal Section. Upon completion and at other times during progress or Work, when required, remove all surplus materials, rubbish, and debris resulting from Work of Division 26.

END OF SECTION

SECTION 26 0060

MINOR ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify field measurements and circuiting arrangements are as shown on Drawings.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Owner and Architect/Engineer before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. Disconnect and make safe all electrical systems in walls, floors, and ceilings scheduled for removal.

B. Coordinate utility service outages with Utility Company and Owner's representative.

C. Provide temporary wiring and connections to maintain required existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary

connections to maintain service in areas adjacent to work area when outage affects business operation.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner and local fire service at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Notify Owner and Telephone Utility Company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

G. Existing Security System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Obtain permission from the Owner and security company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Demolish and extend existing electrical work under provisions of this Section.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply and re-label devices as spares.

D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

F. Disconnect and remove abandoned panelboards and distribution equipment.

G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

I. Disconnect and remove abandoned conduit.

J. Repair adjacent construction and finishes damaged during demolition and extension work.

K. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

L. Extend existing installations using materials and methods compatible with existing electrical installations, and in compliance with new project specifications.

M. Modify existing as-built drawings to note changes.

3.04 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts, and broken electrical parts.

3.05 INSTALLATION

A. Install relocated materials and as required by this section and Owner's representative.

END OF SECTION

SECTION 26 0111

CONDUITS

PART 1 - GENERAL

A. The general provisions apply to this section.

1.01 WORK INCLUDED

A. Conduits; including:

1. Rigid steel conduit.
2. Intermediate metal conduit (IMC).
3. Electrical metallic tubing (EMT).
4. Rigid aluminum conduit.
5. Polyvinyl chloride conduit (PVC).
6. Flexible metal conduit.
7. Liquid-tight flexible metal conduit.

1.02 DEFINITION

A. Conduit: This term shall be construed to mean conduit and conduit fittings; and tubing and tubing fittings.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Support material: Section 260190.

B. Support material: Section 312333.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION - ALL MATERIALS SHALL BE MANUFACTURED IN THE USA.

A. Rigid Steel Conduit: Hot-dipped galvanized or sherardized including the threads, manufactured in accordance with ANSI C80.1 and UL6.

1. Threaded, hot-dipped galvanized or sherardized fittings manufactured in accordance with ANSI C80.4.

B. Intermediate Metal Conduit: Hot-dipped galvanized including the threads, manufactured in accordance with UL 1242.

C. Electrical Metallic Tubing: Manufactured in accordance with ANSI C80.3 and UL 797.

1. Provide compression fittings in walls, ceiling spaces or exposed construction areas.

2. Provide compression (water tight) fittings in damp areas or areas exposed to weather.

D. Rigid Aluminum Conduit: Manufactured in accordance with ANSI C80.5.

1. Threaded fittings, manufactured in accordance with ANSI C80.4.

E. Polyvinyl Chloride Conduit: Schedule 40 and schedule 80, manufactured in accordance with ANSI C33.91, UL 651, and Nema TC-2.

1. Cemented type fittings of the same manufacturer as the conduit.

F. Polyvinyl Chloride Conduit: Type EB, heavy wall, manufactured in accordance with ANSI C33.91, UL651, and Nema TC-8.

1. Cemented fittings of the same manufacturer as the conduit.

G. Flexible Metal Conduit: Hot-dipped galvanized steel, manufacturer in accordance with UL 1.

1. Squeeze type, malleable iron, cadmium plated, straight and angle connectors for all sizes and twist-in connectors for 1/2-inch and 3/4-inch flexible metal conduit.

H. Liquid-Tight Flexible Conduit: Hot-dipped galvanized with liquid-tight vinyl jacket.

1. Liquid-tight fittings.

PART 3 - EXECUTION

3.01 USE

A. EMT for all exposed and concealed work except as indicated in Paragraphs B, C, D, E, F, and G.

B. Rigid steel, IMC, or rigid aluminum conduit in areas where exposed conduit could be subject to physical damage or where conduit is exposed and conductor phase to ground voltage exceeds 300 volts.

C. Rigid aluminum conduit may be used for all feeder runs exposed or concealed in stud walls and spaces above suspended ceilings.

D. PVC Conduit:

1. Schedule 40 for runs below grade in direct contact with earth.

2. Schedule 40 in concrete floors, walls or roofs.

E. Flexible Conduit (steel only permitted):

1. For connection to equipment subject to vibration, maximum length 18 inches. In wet locations use liquid-tight flexible conduit.

2. For connection to lighting fixtures above suspended ceilings. Lengths limited to 72 inches.

3. Install ground conductors in all flexible conduits.

F. Where 3/4-inch conduit runs are concealed in walls or ceilings and these runs are through wood studs and wood joists, flexible steel conduit may be used up to a maximum length of 6'0".

G. All risers shall be PVC coated RGS with bushings.

H. In concrete or below grade use conduit not smaller than 1 inch. Maximum size in concrete slab: 1 inch. Run larger sizes under slab.

I. Use long sweep elbows with minimum radius 10 times nominal conduit diameter for all telephone and communication runs.

3.02 INSTALLATION

A. Provide conduit support and bracing in accordance with the latest published SMACNA guidelines.

B. Perform excavating, trenching, backfilling, and compacting as specified in Division 2.

C. Minimum cover for runs below finished grade outside buildings: 24 inches except where noted or required by the serving utility. Minimum cover for conduit in concrete floors, walls or roof: 1/3 thickness of slab. Minimum cover under building slabs is 12-inches.

D. Minimum separation from uninsulated hot water pipes, steam pipes, heater flues or vents: 6 inches. Avoid running conduit directly under water lines.

E. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose.

F. Provide conduit bodies for exposed conduit runs at junctions, bends or offsets where required. Do not use elbows or bends around outside corners of beams, walls or equipment. Make conduit body covers accessible.

G. Make conduit field cuts square with saw and ream out to full size. Shoulder conduits in couplings.

H. Run a minimum of one 3/4-inch empty conduit for every three single pole spare circuit breakers, spaces or fraction thereof and not less than two 3/4-inch conduits from every flush mounted panel to an accessible space above the ceiling and below the floor.

I. Make conduit projections from covered areas to areas exposed to the weather watertight by proper flashing. Extend flashing a minimum of 6 inches in all directions from conduit.

J. Where conduit is to remain empty, install polypropylene or nylon pull-line 3/16" minimum diameter from end to end with tag at each end designating opposite terminations.

K. Run conduit parallel and at right angle to building lines, when visible in finished construction.

L. Cap conduits indicated to be stubbed-out underground using glued-on PVC caps intended for this purpose.

M. Install a coupling flush with the floor on all conduits stubbed up through floors on grade.

N. Make no bends with a radius less than 12 times the diameter of the cable it contains nor more than 90 degrees. Make field bends with tools designed for conduit bending. Heating of metallic conduit to facilitate bending is not permitted.

O. Where conduit installed in concrete or masonry extends across building construction joints, provide expansion fittings as manufactured by O.Z.; Crouse-Hinds; Appleton; or equal, with approved ground straps and clamps.

P. Concrete Wall or Slab Penetrations: All core drilling, sleeves, blockouts or other penetrations must be approved by the Structural Engineer prior to installation.

1. Space sleeves and core drills to insure a minimum dimension of 3 times the nominal trade diameter of the largest adjacent conduit between sleeves or core drills.

2. Use blockouts for concentrations of conduits in a confined area.

Q. Do not penetrate walls with flexible conduit where subject to physical damage. Use recessed box with extension ring for transition from interior to exterior of wall.

R. All homeruns shown shall be run to the panel indicated independently of all other homeruns. Provide pull points so as not to exceed total bends of 360 degrees between them unless otherwise indicated.

S. At switchboards, manholes and floor standing distribution panelboards, provide insulated throat bushings or bell ends on all non-metallic conduit entries and bushings on all metallic conduit entries.

T. Provide bushings on all conduit terminations sized 1" and larger.

U. Provide weatherproof boxes and connectors for all exposed parking structure raceways and boxes.

V. Provide bell ends on all conduits into pullboxes and manholes, seal all conduits after conductors are pulled.

W. Cap all unused conduits with end cap. Do not tape.

X. All Fire Alarm Conduits shall be painted red.

END OF SECTION

SECTION 26 0120

CONDUCTORS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Conductors; for power, lighting, sound, communication and control, including conductors for general wiring, flexible cords and cables, and ground conductors.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Submittals: Section 260000.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

A. Conductors for General Wiring: Thermoplastic insulated rated for 600V manufactured in accordance with UL 83.

1. Provide 3/4 hard drawn copper conductors. Provide solid conductor for #12 AWG and smaller. Provide stranded conductors for #10 AWG and larger.

B. Conductor Connectors for General Wiring:

1. Sizes No. 14 to No. 8: Splice with insulated spring wire connectors.

a. Ideal No. 451, 455 and 453.

b. Minnesota Mining: Types Y, R, G, and B.

c. Buchanan No. B1, B2 and B4.

2. Size No. 6 or Larger, Copper: Splice and terminate with compression or pressure type connectors and terminal lugs.

C. Provide connector sealing packs for all area lighting and exterior box splices which require complete protection from dampness and water.

1. Scotchlok No.’s 3576, 3577 and 3578, by 3M Company.

PART 3 - EXECUTION

3.01 USE

A. Conductors for General Wiring:

1. Minimum 75 degrees C temperature rated insulation on conductors, except use minimum 90 degrees C temperature rated insulation on conductors in conduits exposed on roof, or where required due to ambient temperature.

2. Stranded conductors at motors, audio video and other applications where subject to vibration.

3. Minimum size conductors for power and lighting #12 AWG, except where noted.

4. Minimum size conductors for control circuits #14 AWG stranded with THHN/THWN insulation.

B. Use flexible cords and cables for connection of special equipment as indicated. Length not to exceed 72 inches.

C. Ground Conductors:

1. Provide an insulated green ground conductor for all branch circuit wiring where indicated.

2. Bare copper conductor may be used.

a. Install ground conductors in all non-metallic conduits as required by code. Install ground conductors in all motor branch circuits and all feeders. Where ground conductor size is not indicated, provide size as required for an equipment ground conductor by the National Electrical Code.

b. Install ground conductors in all flexible metal conduits.

D. Install XHHW – 2, 90°C copper conductors for all underground installations unless noted otherwise on the plans.

E. Install for all dimmers, stranded THHN/THWN – 2 copper 90°C conductors with dedicated neutrals.

3.02 INSPECTION

A. Check conduit system for damage and loose connections, replace damaged sections.

B. Check for caps at conduit openings. Make sure that inside of conduit is free of dirt and moisture.

C. Pull mandrel, one size smaller than the conduit, through entire length of all underground conduits prior to conductor installation.

3.03 INSTALLATION

A. Conductors for General Wiring:

1. Color code conductors insulation as follows:

CONDUCTOR	SYSTEM 208Y/120	VOLTAGE 480Y/277
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow

2. For conductors #6 AWG or larger, permanent plastic colored tape may be used to mark conductor in lieu of coded insulation. Tape shall cover not less than 2 inches of conductor insulation within enclosure.

a. Provide color tape on each end and at all terminal points and splices on wire enclosed in conduit.

b. Provide color tape every 3 feet on wire not enclosed in a listed wireway.

3. When pulling conductors, do not exceed manufacturer's recommended values.

4. Use polypropylene or nylon ropes for pulling conductors.

B. Insulate splices with plastic electrical tape: Scotch No. 33+, Tomic No. 1T, or equal.

C. Terminate all control wires with terminal lugs on terminal boards not designed with pressure plates. If splices are needed, use same procedure, installing a terminal board in a junction box for protection.

D. All splices or connections shall be compression type Thomas & Betts or Burndy, no split bolt connections are allowed.

3.04 IDENTIFICATION

A. Feeders: Identify with the corresponding circuit designation at over-current device and load ends, at all splices and in pull boxes.

B. Branch Circuits: Identify with the corresponding circuit designation at the over-current device and at all splices and devices.

C. Control Wires: Identify with the indicated number and/or letter designation at all terminal points and connections.

D. Alarm and Detection Wires: Identify with the indicated wire and zone numbers at all connections, terminal points, and coiled conductors within cabinets.

E. Conductors Terminated By Others: Indicate location of opposite end of conductor, i.e., Pull Box-Room 101.

F. For identification of conductors, use heat shrinkable white marking sleeves such as Brady Permasleeve with type written identification.

G. Circuit designation is construed to mean panel designation and circuit number, i.e., LA-13.

END OF SECTION

SECTION 26 0130

ELECTRICAL BOXES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Boxes; including:

1. Outlet boxes.
2. Pull and junction boxes.
3. Cabinets.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Submittals: Section 260000.

B. Support Material: Section 260190.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

A. Outlet Boxes:

1. Pressed Steel Boxes: Knockout type, hot-dipped or electro-plate galvanized.
2. Cast Iron Boxes: Hot-dipped or electro-plate galvanized with threaded hubs.
3. Cast Iron Conduit Bodies: Hot-dipped or electro-plate galvanized with threaded hubs.
4. Cast copper free aluminum conduit bodies with threaded hubs.
5. Covers for Pressed Steel Boxes: Hot dipped or electro-plate galvanized.
6. Outlet boxes manufactured in accordance with UL 514.

B. Pull and Junction Boxes:

1. Sheet steel, hot-dipped or electro-plate galvanized, or prime coated and a final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.

a. Where exposed to weather, provide raintight hubs for conduits entering the boxes, top and sides only.

2. Floor Boxes:

a. Single gang, similar to Hubbell #B-2536.

b. Covers:

1) Combination, similar to Hubbell #S-2525.

2) Duplex receptacle, similar to Hubbell #S-3925.

c. Carpet flange, similar to Hubbell #S-3075 thru #S-3079.

d. Hubs: Provide hubs as required to suit the conduit arrangement.

3. Pre-Cast Concrete Pull Boxes: As manufactured by Jensen Pre-Cast or Utility Vault and shown on drawings.

4. High impact resistant PVC boxes: As manufactured by Carlon, Sedco, or R & G Sloan.

C. Cabinets: Sheet metal, prime coat and final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.

1. Control Cabinet: NEMA 1 enclosure, door with butt hinges and flush handle latches.

a. Provide with removable steel back panel.

2. Terminal Cabinets: NEMA 1 enclosure, door with concealed hinges and spring catch type flush cylinder locks. Key locks alike, provide two keys with each lock.

3. Provide engraved plastic nameplates with 1/2" minimum height letters indicating designation of control and terminal cabinets as shown on the drawings.

a. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

PART 3 - EXECUTION

3.01 USE

A. Outlet Boxes:

1. Ceiling Outlet Boxes: Not less than 4" octagonal by 2" deep.

2. FDD cast iron or cast aluminum device boxes and conduit bodies with metal covers for exposed conduit installation. Provide gasket for covers in wet areas.

3. Intercom, Microphone and TV Outlet Boxes: Not less than 4-11/16" square x 2-1/8" deep.

4. Provide floor boxes with quantity of gangs as required for power, communication or control as indicated. Use boxes with barriers where required. Provide carpet flanges in carpeted areas.

B. Pull and Junction Boxes:

1. Use sheet steel boxes NEMA Type 1 for indoor and NEMA Type 3R for outdoor installation, except as follows.

2. Use pre-cast concrete boxes for boxes flush in finish grade where requiring a nominal capacity greater than 144 cubic inches, where located in vehicular traffic areas, or where indicated.

3. Use polyvinyl chloride (PVC) boxes flush in finish grade when the nominal internal volume is less than or equal to 144 cubic inches or where indicated.

4. Use cast iron boxes for boxes flush in slab on grade.

3.02 INSTALLATION

A. Provide 3/8" fixture studs in wall bracket and ceiling boxes.

B. Provide covers suitable for the fixtures or devices used.

C. Make outlet box covers flush with finished surfaces.

D. Close unused open knockouts with knockout seals.

E. Provide 1" deep plaster rings on recessed outlet boxes installed in areas where concrete will be exposed after construction is complete.

F. Where boxes are concealed in exposed concrete unit masonry, use square cornered types or boxes fitted with rings of sufficient depth for the box to be recessed completely within cavity of block or tile. Install box to insure that ring fits an opening sawed out of the masonry, so that no mortar is required to fill between ring and construction.

G. Provide a 6" base of compacted crushed rock under pre-cast concrete pull boxes.

H. Adjust floor boxes so they are level with top of finished floors.

I. Provide pull boxes and junction boxes in all branch circuit and feeder runs as indicated. Do not provide pull boxes unless they are indicated or required by the Electrical Code.

3.03 IDENTIFICATION

A. Junction Boxes: Use permanent black marker, 2" high lettering, and on each cover plate indicate the power source and circuits contained within that junction box.

END OF SECTION

SECTION 260140

WIRING DEVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Wiring devices.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Identification: Section 260030.

B. Boxes: Section 260130.

1.03 Submittals

A. In accord with Section 260010.

1.04 DEFINITION

A. Wiring devices: This term includes all wall switches, pushbuttons, receptacles, and plates used for general purpose installation.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

A. Wall switches:

1. Quiet toggle type, 20A – 120/277 VAC rated, with terminal screws to take up to No. 10 AWG conductors:

	SPST	DPST	3-WAY	SPST KEY SWITCH LOCK	4-WAY
Arrow-Hart	1991-I	1992-I	1993-I	1991-L	1994-I
Bryant	4901-I	4902-I	4903-I	4901-L	4904-I
General Electric	GE5951-2	GE5952-2	GE5953-2	GE5951-OL	GE5954-2
Hubbell	1221-I	1222-I	1223-I	1221-L	1224-I
Pass & Seymour/ Legrand	20AC1-I	20AC2-I	20AC3-I	20AC1-L	20AC4-I

2. Momentary contact type, 20A-120/277V, two-circuit, three-position, center off:

Arrow-Hart	1995-I
Bryant	4921-I
General Electric	GE5935-2
Hubbell	1557-I
Pass & Seymour/Legrand	1250-I

3. Passive infrared wall switch sensors: Ivory, 180° field of view, adjustable time out and ambient light, 1200 sq. ft. Coverage, 120 VAC, 60 Hz, 1500W. Maximum load, incandescent and fluorescent. As manufactured by Hubbell No. AT1201 or Owner- approved equivalent by Leviton or Pass & Seymour.

4. Fan speed controllers: AC unit rated 15A - 120V used to control up to twelve 56 in./52 in./48 in. ceiling fans or up to twenty 42 in. fans on a single circuit. Rinaudo's Reproductions No. 22394.

B. Passive infrared motion switching system:

1. Ceiling mount sensor, white, 500 sq. ft. coverage, requires control unit. Hubbell No. ATD500CRP.

2. Ceiling mount sensor, white, 2000 sq. ft. coverage, ceiling height dependent, requires control unit. Hubbell No. ATD2000CRP.

3. Ceiling or wall mount sensor, white, 1000 sq. ft. coverage, requires control unit. Hubbell No. ATD1000CRP.

4. Ceiling or wall mount hallway sensor, white, covers area 75 ft. long by 20 ft. wide, requires control unit. Hubbell No. PIR90HW1.

5. Low-voltage control unit, 120VAC, controls one to four sensors. Mount in 4 in. x 4in. enclosure. Hubbell No. CU120A.

6. Relay, 120VAC coil, used when load to be controlled exceeds capacity of a single circuit. Hubbell No. AAR

C. Receptacles, caps, and connectors:

1. 15A-125V, NEMA 5-15, parallel slot type with grounding pin:

	DUPLEX	SINGLE	GFI
Arrow-Hart	5252-I	5261-I	GF5242-I
Bryant	5252-I	5261-I	GFR52FT
General Electric	5252-2	5261-2	TGTR115F
Hubbell	5252-I	5251-I	GF5252-I
Pass & Seymour/Legrand	5252-I	5261-I	1591-SHG

2. 15A-250V, NEMA 6-15, straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5661-I	6666
Bryant	5661-I	5666-N
General Electric	GE4069-2	GED0611
Hubbell	5661-I	5666-C
Pass & Seymour/Legrand	5662-I	5666-X

3. 15A-125V, NEMA L5-15, locking type with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	4700	4721	4731
Bryant	4700	4721-NSY	4732-NSY
General Electric	GL4700	GLD0511	GLD0513
Hubbell	4700	4720-C	4729-C
Pass & Seymour/Legrand	4700	L515-P	L515-C

4. 20A-125V, NEMA 5-20, straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5361-I	5362-I
Bryant	5361-I	5362-I
General Electric	GE4102-2	GE4108-2
Hubbell	5361-I	5362-I
Pass & Seymour/Legrand	5361-I	5362-I

5. 20A-125V, NEMA L5-20, two-pole, three-wire locking type, with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6200	6202	6204
Bryant	70520-FR	70520-NP	70520-NC
General Electric	GL0520	GLD0521	GLD0523
Hubbell	2310-A	2311	2313
Pass & Seymour/Legrand	L520-R	L520-P	L520-C

6. 20A-125V, NEMA 5-20, two-pole, three-wire, straight blade isolated grounding type receptacle:

	DUPLEX	SINGLE
Arrow-Hart	IG5362	IG5361
Bryant	5362-IG	5361-IG
General Electric	GE8300-IG	GE8310-IG
Hubbell	IG-5362	IG-5361
Pass & Seymour/Legrand	IG-6300	IG-5361

7. 20A-125 VAC, two-pole, three-wire, NEMA 5-20, straight blade, specification grade, ivory color, ground fault circuit interrupter receptacle (GFCI), rated for feed-through wiring, with LED indicator light:

	GFCI RECEPTACLE
Hubbell	GF-5362I
Pass & Seymour	2091-S-L-I
Leviton	6898-I

8. 20A-125/250V, NEMA 14-20, three-pole, four-wire straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5759	5757
Bryant	-	-
General Electric	GE1420	GED1421
Hubbell	8410	8411-C
Pass & Seymour/Legrand	L1420-R	L1420-P

9. 20A-250V, NEMA 6-20, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	8510	6866	6869
Bryant	5461	5466N	5469N
General Electric	GE4182	GED0621	GED0623
Hubbell	5461	HBL5466-C	HBL5469-C
Pass & Seymour/Legrand	5871	5466-X	5469-X

10. 20A-120/208V, NEMA L21-20, four-pole, five-wire locking and grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6470	6472	6474
Bryant	72120-FR	72120-NP	72120-NC
General Electric	GL2120	GLD2121	GLD2123
Hubbell	2510A	2511	2513
Pass & Seymour/Legrand	L2120R	L2120P	L2120C

11. 20A-250V, NEMA L6-20, two-pole, three-wire locking and grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6210	6212	6214
Bryant	70620FR	70620NP	70620NC
General Electric	GL0620	GLD0621	GLD0623
Hubbell	2320A	2321	2323
Pass & Seymour/Legrand	L620-R	L620-P	L620-C

12. 20A-480V, NEMA L16-20, three-pole, four-wire locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6430	6432	6434
Bryant	71620-FR	71620-NP	71620-NC
General Electric	GL1620	GLD1621	GLD1623
Hubbell	2430A	2431	2433
Pass & Seymour/Legrand	L1620-R	L1620-P	L1620-C

13. 30A-125V, NEMA 5-30, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5716N	5717N	6716N
Bryant	9530-FR	9630-RP	-
General Electric	GE4138-3	GED0531	GED0533
Hubbell	9308	9309	-
Pass & Seymour/Legrand	3802	5921	-

14. 30A-125V, NEMA L5-30, two-pole, three-wire grounding and locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6330	6332	6334
Bryant	70530-FR	70530-NP	70530-NC
General Electric	GL0530	GLD0531	GLD0533
Hubbell	2610	2611	2613
Pass & Seymour/Legrand	L530-R	L530-P	L530-C

15. 30A-125/250V, NEMA 14-30, three-pole, four-wire straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5744N	5746N
Bryant	9430-FR	5746
General Electric	GE4191-3	GED1431
Hubbell	9430	9431
Pass & Seymour/Legrand	5740	5741-AN

16. 30A-125/250V, NEMA L14-30, three-pole, four-wire grounding and locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6510	6512	6514
Bryant	71430-FR	71430-NP	71430-NC
General Electric	GL1430	GLD1431	GLD1433
Hubbell	2710-A	2711	2713
Pass & Seymour/Legrand	L1430-R	L1430-P	L1430-C

17. 30A-250V, NEMA L6-30, two-pole, three-wire locking blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6340	6342	6344
Bryant	70630-FR	70630-NP	70630-NC
General Electric	GL0630	GLD0631	GLD0633
Hubbell	2620-A	2621	2623
Pass & Seymour/Legrand	L630-R	L630-P	L630-C

18. 30A-250V, NEMA 6-30, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5700N	5701N	6700N
Bryant	9630-FR	9630-ANP	-
General Electric	GE4139-3	GE4328-9	GE4373-9
Hubbell	9330	9331	-
Pass & Seymour/Legrand	3801	5931	-

19. 50A-208V (50A-600V), three-pole, four-wire locking type with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	3769	3765	3764
Bryant	3769	3765	3764
General Electric	LD3769	LD3765	LD3764
Hubbell	3769	3765-C	3764-C
Pass & Seymour/Legrand	3769	3765	3764

20. 50A-125/250V, NEMA 15-50, three-pole, four-wire grounding straight blade type:

	RECEPTACLE	CAP
Arrow-Hart	5754N	5745N
Bryant	9450-FR	5745
General Electric	GE4181-3	GE4180-3
Hubbell	9450	9451
Pass & Seymour/Legrand	5750	5751-AN

21. 50A-125/250V, three-pole, four-wire grounding locking blade type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	CS6369	CS6365	CS6364
Bryant	CS6369	CS6365	CS6364
General Electric	-	-	-
Hubbell	CS6369	CS6365	CS6364
Pass & Seymour/Legrand	-	-	-

22. 50A-250V, NEMA 6-50, two-pole, three-wire grounding straight blade type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5709N	5710N	6709N
Bryant	9650-FR	9650-RP	-
General Electric	GE4141-3	GED0651	GED0653
Hubbell	9367	9368	-
Pass & Seymour/Legrand	3804	3869	-

23. 60A-120/208V, three-phase, 60 Hz, five-pole, five-wire, watertight, with threaded cap:

	BOX	ANGLE ADAPTER	RECEPTACLE BODY	COMPLETE ASSEMBLY
Hubbell	26401	26404	26520	-
Crouse-Hinds	-	-	-	Area-6575
Russell Stoll	-	-	-	DS6516-FRAB-

24. 60A-480V, NEMA L16-20, three-pole, four-wire locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	-	-	-
Bryant	-	-	-
General Electric	-	-	-
Hubbell	HBL 26410	HBL 26402	HBL 26418
Pass & Seymour/Legrand	-	-	-

D. Safety receptacle: 15A-125V, NEMA 5-15, straight blade grounding safety receptacle, Hubbell No. SG-62H-1.

E. Door monitoring switches:

1. General: Provide magnetic door switches (one per leaf) and key switches at specific door locations as indicated on Drawings. Refer to Electrical Drawings details for schematic installation details of door switches.

2. Magnetic contact switches: Provide concealed magnetic SPDT switches with minimum 6-ft. wire leads, Sentrol No. 1076W-06 for hollow metal doors and frames. Where necessary, provide other similar Sentrol types to suit concealed installation conditions, as approved by Owner and compatible with Owner's ride control and/or existing security system equipment. Color of switches to closely match finish or paint color of door frame.

3. Key switches: Arrow-Hart No. 1191L.

F. Device cover plates:

1. Interior plates: Specification grade plastic, 0.1 in. thick, ivory in color, UL listed.

a. Plates in kitchens and restrooms to be polished stainless steel, 0.040 in. thick except in kitchens use double lift lid weatherproof gasketed plates for convenience receptacles.

b. MATV plate: RMS No. CA-4028.

2. Exterior plates: Choose type of exterior cover plate in accord with the device location and/or manner in which device will be used. Device cover plates shall be die-cast aluminum with hinged cover, rated for respective type of use specified below, or as indicated on Drawings.

a. Outlet box weatherproof hoods: NEMA 3R rating, gasketed, for unattended use with cover closed, padlockable latching cover to meet OSHA lockout/tagout requirements, large cord opening and UL listed. As manufactured by Hubbell, Intermatic or Leviton.

b. Low profile weatherproof cover: Gasketed, approved for use with cover open, self-closing hinged covers (two independent self-closing lids for duplex receptacles which are horizontally mounted), UL listed. As manufactured by Hubbell, Leviton or Pass & Seymour.

c. Communication outlet weatherproof hoods: NEMA 3R rating for unattended use with cover closed, two-cord openings and UL listed. As manufactured by Red Dot.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Mount switches and receptacles in vertical position in building interiors.

B. Mount receptacles with weatherproof plates in horizontal position.

C. Install receptacles mounted vertically so that the ground contact falls on the top position, and horizontally-mounted receptacles with neutral pole in top position.

D. Use plastic blank plates on J-boxes in public areas.

E. Use mechanical type door switches for load control.

F. Install receptacles for plug in lighting fixtures within 36 in. of fixture location.

G. Use safety type receptacles with low profile weatherproof metal covers for all convenience outlets in guest accessible areas (i.e., queue lines, waiting areas, etc.).

H. All GFI type exterior receptacles shall be provided with weatherproof metal hoods.

I. GFI type receptacles shall not be fed-through wire.

END OF SECTION

SECTION 26 0142

NAMEPLATES AND WARNING SIGNS

PART 1 - GENERAL

Not Used.

PART 2 - PRODUCTS

2.01 NAMEPLATES

A. Nameplate shall be plastic laminate with 3/4" high letters in white on black background screwed onto equipment designations shall clearly state:

1. Equipment Enclosure Nameplates.

   a. Manufacturer's nameplate including equipment design rating of current, voltage, KVA, HP, bus bracing rating, or as applicable.

   b. Equipment nameplate designating system usage and purpose, system nominal voltage, equipment rating for KVA, amperes, HP and RPM as applicable. Designation data per drawings or to be supplied with shop drawings approval.

2. Device nameplates: Device usage, purpose, or circuit number; manufacturer and electrical characteristic ratings including the following:

   a. Circuit Breakers: Voltage, continuous current, maximum interrupting current and trip current.

   b. Switches: Voltage, continuous current, horsepower or maximum current switching. If fused, include nameplate stating "Fuses must be replaced with current limiting type of identical characteristics."

   c. Contactors: Voltage, continuous current, horsepower or interrupting current, and whether "mechanically-held" or "electrically-held".

   d. Motors: Rated voltage, full load amperes, frequency, phases, speed, horsepower, code letter rating, time rating, type of winding, class and temperature.

   e. Controllers: Voltage, current, horsepower and trip setting of motor running over current protection.

2.02 WARNING SIGNS

A. Warning signs shall be minimum 18 gauge steel, white porcelain enamel finish with red lettering. Lettering to read "DANGER - HIGH VOLTAGE" in 1" letters. Warning signs to be included on door or immediately above door of all electrical equipment rooms, vaults or closets containing equipment rooms, vaults or closets containing equipment energized above 150 volts to ground, except where such spaces are accessible from public areas.

2.03 WARNING SIGN DESIGNATION

A. Warning designation in 1" red letters shall be painted by stencil or pre-printed adhesive on each pull box, cabinet or 1-foot length of exposed conduit stating "DANGER" and giving voltage of enclosed conductors such as "DANGER - 480 VOLTS", for all systems over 150 volts to ground.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Nameplates shall be mounted by self-tapping or threaded screws and bolts or by rivets.

B. Signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.

END OF SECTION

SECTION 26 0164

BRANCH CIRCUIT PANELBOARDS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Branch circuit panelboards.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Submittals: Section 260000.

B. Overcurrent Protective Devices: Section 260180.

C. Control Devices: Section 264901.

PART 2 - PRODUCTS

2.01 MATERIAL AND FABRICATION

A. Provide factory assembled, enclosed panelboards in dead front cabinets, with doors, surface mounted or recessed as indicated, not less than 20" wide and 5-3/4" deep. Height will depend on the number of breakers and spaces.

B. Where a control compartment is indicated, provide an integral compartment with a separate hinged lockable door held with captive screws. Identify all internal control wiring with manufacturers wire numbering or control wire numbering when indicated, at all terminal points and connections.

C. Provide feeder terminal lugs for both main lugs only and main breakers rated for use with copper conductors.

D. Provide full length copper bussing including areas indicated as space only.

E. Provide full size neutral bus where neutral bus is indicated. Provide equipment ground bus and bolt-on circuit breakers.

F. Key all door locks alike.

G. 120/208V, 3 Phase, 4 Wire Panelboards: Square-D Co. Type NQOD or Powerlink G3 NF with programmable module where designated, alternate bid for General Electric type AQ.

H. 277/480V, 3 Phase, 4 Wire Panelboards: Square-D Co. Type NF, alternate bid for General Electric type CCB.

I. All equipment shall be listed to meet or exceed the available fault current by 10%.

J. Doors shall be hinged.

K. All placards are welded steel type.

L. Provide hinged deadfront doors to allow internal access to panel without totally rewiring cover panel.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Secure panelboards to building structure to withstand wire pulling strains.

B. Secure surface mounted panelboards to wood studs or channel material spanning metal studs.

C. Do not use toggle bolts.

D. Contractor shall program lighting control Powerlink panelboard per owner's requirements.

3.02 LABELING AND IDENTIFICATION

A. Provide engraved plastic nameplates on all branch circuit panelboards shown on the single line diagram.

B. Provide panelboard and source feed designation on nameplates with 3/8" minimum height lettering for the panel name and 1/4" height lettering for the source feed designation.

EXAMPLE: LA

FED FROM: DLA

C. Secure nameplates with at least two spaces or rivets. Cementing and adhesive installation not acceptable.

D. Provide a typewritten directory for each branch circuit panelboard, showing each circuits and its use. Provide metal directory frame with plastic window.

END OF SECTION

SECTION 26 0190

SUPPORT DEVICES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Support devices for conduit, boxes, lighting fixtures and equipment.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Hangers, Straps and Beam Clamps:

1. Efcor.
2. Raco, Inc.
3. Steel City.
4. O.Z./Gedney Co.
5. Caddy Fastening System by ERICO Products Inc.

B. Channels and Fittings:

1. Kindorf.
2. Unistrut Corp.

C. Anchors:

1. Acherman-Johnson Corp.
2. Phillips Drill Co.
3. Rawl Products Co.

2.02 MATERIAL AND FABRICATION

A. Hangers: Steel cadmium plated.

B. Straps: One-hole and two-hole malleable iron, hot-dipped galvanized or steel, cadmium or zinc plated.

C. Beam Clamps: Malleable iron, hot-dipped galvanized or cadmium plated.

D. Channels and Fittings:

1. Channels: Hot-dipped galvanized.

2. Fittings: Galvanized.

E. Anchors: Self drilling and expansion bolt types. No wood or fiber plugs or concrete nails are acceptable.

PART 3 - EXECUTION

3.01 USE

A. Use one-hole or two-hole straps for single conduit runs on walls or ceilings.

B. Use hangers with solid steel rods for hanging single conduits.

C. Use formed channel trapezes for groups of two or more conduits.

D. To fasten boxes and supports to:

1. Wood: Use wood screws or screw type nails of equal holding power.

2. Brick and Concrete: Use bolts and expansion shields.

3. Hollow Masonry Units: Use toggle bolts.

E. Support sheet metal boxes from building structure directly or by bar hangers.

F. Do not penetrate reinforced concrete beams with fastenings more than 1-1/2" or reinforced concrete joints with more than 3/4" fastenings to prevent contact with reinforcing steel.

END OF SECTION

SECTION 26 2450

GROUNDING

PART 1 - GENERAL

1.01 REFERENCES

A. N.E.C.: Article 250 "Grounding".

B. Underwriter's Laboratories (U.L.). Standard A67 - "Grounding and Bonding Equipment". STD 869 - Grounding and Bonding.

C. ITEE - Standards 142 and 241.

1.02 DESCRIPTION OF SYSTEM:

A. A permanent grounding system with methods and materials in accordance with applicable Codes and Standards, able to conduct ground fault currents to the grounded neutral of electrical distribution systems, and limit potential differences between grounding conductors, raceways and enclosures.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's data on grounding systems and accessories.

B. Shop Drawings: Submit layout drawings of grounding systems and accessories including, but not limited to, ground wiring, copper braid and bus, ground rods, and plate electrodes.

1.04 QUALITY ASSURANCE:

A. Installer qualifies with at least 3 years of successful installation experience on projects with electrical grounding experience similar to that required for project.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Handle electrical grounding accessories and components carefully to avoid damage. Store in location that will protect from dirt and weather.

PART 2 - PRODUCTS

2.01 GROUND RODS:

A. Copper clad steel, unless indicated otherwise. Minimum dimension of 5/8" diameter by 8' long or larger if indicated and sectional rods with couplings where lengths

exceeding 12' are specified or indicated, or where added driving depth is required to achieve a specified minimum resistance.

2.02 GROUNDING ELECTRODE:

A. Bare stranded copper, 3/0 AWG unless indicated otherwise, for installation in soil or embedded in concrete and cable with type TW insulation when installed in raceway. Install without splice from connection to connection.

2.03 GROUNDING CONDUCTORS:

A. Type TW insulation, unless specified or indicated otherwise with a continuous green outer insulating jacket for size #6 AWG and smaller and with green tape banding for #4 AWG and larger, marked at each access point (e.g.: Junction boxes, Enclosures).

2.04 CLAMPS AND PRESSURE CONNECTORS:

A. Cast copper, copper alloy, or bronze alloy suitable for use with aluminum and copper. Double bolt type with formed shoe and "U" cable clamp for connection to pipe or conduit; Single bolt type with cable shoe and "U" clamp for connections to flat bar or metal; and double bolt, parallel conductor split clamp type for cable to cable connections.

2.05 WELDED CONNECTIONS:

A. Exothermic process (Cadweld or Thermoweld).

2.06 EQUIPMENT ROOM GROUND TERMINAL BAR:

A. Copper 1/4" X 2-1/2" X 24", unless otherwise indicated. Two rows of holes on 1-1/2" centers for 1/2" bolt, to receive cables from two directions.

PART 3 - EXECUTION

3.01 GENERAL:

A. Ground conductive raceways, cable trays and enclosures for electrical systems wiring. Make ground circuits complete to form permanent conductive paths. Solidly ground each low voltage electrical system unless indicated or specified as ungrounded, or grounded through an impedance of a specified value. Provide bare conductors when in open air or soil and provide 600 volt, green, insulated conductors when in raceway.

3.02 MAIN GROUNDING JUMPER:

A. Install a main grounding jumper between the system neutral and the enclosure ground bus (or directly to enclosure where ground bus is not present) at each location where system grounding is required. Main grounding jumper:

1. Formed bus in switchboards and panelboards.

2. Formed bus or copper cable in transformers not coupled in unitized assembly with distribution equipment.

3.03 GROUND CONNECTIONS:

A. Make grounding electrode connections electrically ahead of any overcurrent or disconnect device or tap connection such that disconnection of neutral load conductors does not interfere with or remove the system ground connection. Use separate lugs on the transformer neutral terminals for neutral and main grounding jumpers when cable is used for transformer connections.

3.04 SEPARATELY DERIVED SYSTEMS:

A. For each separately derived system, grounded or ungrounded, install a grounding electrode conductor between each system enclosure ground bus (or bolted connection to enclosure where ground bus is not present) and a cold water pipe or building structural steel of one (1) inch size or larger near the separately derived system ground connection. Make connections to water pipes or steel accessible for easy inspection. Provide a separate ground conductor for each audio, video, isolated panels and UPS as noted on the plans.

3.05 SERVICE GROUND:

A. For each low voltage service, install a grounding electrode conductor between the system enclosure ground bus and the water service entrance to the building and install bonding jumpers around insulating unions and removable fittings in the water pipe between the grounding electrode conductor connection to the water pipe and the water service entrance.

3.06 GROUNDING ELECTRODE SYSTEM:

A. Install a complete grounding electrode system with interconnecting cables and terminations at the equipment room ground terminal bar. Make connections to the grounding electrode system accessible. Install the following grounding electrode systems:

1. Metal frame of building.

2. Grounding electrode encased by at least two inches of concrete, within and near the bottom of the building foundation or footing of the type specified in Part 2 - Products, at least 20 feet in length without splice from connection to connection.

3. Connection of other metal piping systems as required by National Electrical Code Article 250.

4. Driven ground rods.

5. Driven steel piles.

6. Connection to water service with bonding jumper around water meter.

3.07 GROUNDING ELECTRODE CONDUCTORS:

A. Install grounding electrode conductor in PVC or other non-conductive, non-metallic enclosure where a raceway system is indicated or necessary for conductor installation. Install grounding electrode conductors without splice from the enclosure ground bus to the connection at the grounding electrode system.

3.08 GROUND RODS:

A. Install a vertical position, full length below grade unless specified otherwise, and with conductor and top of rod 6" minimum below grade. Provide exotheric welds at all connections.

3.09 EQUIPMENT ROOM GROUND TERMINAL BAR:

A. Install in equipment rooms where indicated. Mount bar by anchors and bolts using 1-1/2" long segments of 1/2" rigid conduit as spacer between bar and wall. Use a minimum of two supports, 18" on center. Connect grounding electrode system conductors, system enclosure ground bus, and other indicated electrode systems to the terminal bar. Label permanently all ground conductors as to destination location, e.g. TR1, panel IPS, etcetera.

3.10 EQUIPMENT GROUND:

A. Form the equipment ground circuits with rigid metallic raceways (e.g., EMT, rigid steel conduit) unless indicated otherwise. Make all threaded coupling connections wrench tight. Install bonding jumpers for continuity around fittings and terminations where the conductive raceway is made non-continuous. Where indicated or specified, install ground conductors in raceways to augment the circuits formed by the metallic raceway system. Bond the conductors to boxes or enclosures in which access is possible. Size conductors as specified, indicated, or required by code, whichever is larger. Install grounding bushings and bonding jumpers to enclosures or ground bussing for the following: Service entrance feeder; each location where multiple ring knockouts are damaged during conduit installation; each location where conduits are stubbed up into floor mounted and each conduit termination at a painted enclosure where paint is not removed before installation of raceway.

3.11 FLEXIBLE RACEWAY GROUNDING:

A. Install a ground conductor inside all flexible raceways (e.g., Flexible steel, liquid tight) regardless of length. Bond the conductor to the enclosure or ground bus in the nearest box or access on either side of the flexible section. Size conductor as specified, indicated, or required by code, whichever is larger.

3.12 NON-CONDUCTIVE RACEWAY:

A. Install a ground conductor in raceways of non-conductive materials. Bond conductor to conductive enclosures in which access is possible. Bond non-current carrying conductive equipment contained in a non-conductive enclosure. Install insulated or bare conductors, sized as specified, indicated, or required by code, whichever is larger.

3.13 SECTIONAL RACEWAY:

A. Install a ground conductor in sectional raceways with removable covers for access (e.g., Plug-in strips, surface raceway systems, and wireways) unless specified otherwise. Size conductor in accordance with the N.E.C. for the largest phase conductor size installed in raceway, or as indicated. Bond sections of the raceway to the ground conductor. Connect receptacle ground terminals in the raceway to the ground conductor, and make other ground connections indicated on the drawings.

3.14 CABLE SUPPORT SYSTEMS:

A. Ground elements of the cable support system to panelboards, cabinets and switchboards from which their circuits originate. Install a ground conductor sized as required by code, as indicated, or #12 AWG, whichever is larger.

3.15 MULTI-CONDUCTOR CABLE, METALLIC SHEATH:

A. Use multi-conductor cable with metallic sheath or armor approved for use as ground circuit conductor or install ground conductor(s). Size ground circuit conductor as required by code, as specified, or as indicated on the drawings, whichever is larger. Terminating devices for cable using the sheath or armor as the ground circuit conductor shall be approved for use as the connecting device between the cable and the enclosure. Terminate internal ground circuit conductors by lug to the interior of the enclosure or to the contained ground bus where present. Use bare or clearly identified internal grounding conductors.

3.16 MULTI-CONDUCTOR CABLE, NON-METALLIC SHEATHED:

A. Use only non-metallic sheathed multi-conductor cables having a ground circuit conductor enclosed in the sheath the same size as the ungrounded conductors. Use bare or clearly identified internal grounding conductors. Terminate ground circuit conductor by lug to the enclosure ground bus where present or to the interior of the enclosure.

3.17 GROUND CONDUCTOR BONDING:

A. Bond grounding conductors to boxes or enclosures at each access point. Do not use building steel as equipment grounding path. Use welded ground connections, at least where such are buried in soil, installed below slabs on grade, or embedded in concrete.

END OF SECTION

SECTION 02 41 13 DEMOLITION

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The scope of this section includes but not limited labor, materials, equipment, transportation, and services necessary to complete demolition and clearing and grubbing work shown explicitly on construction drawings, or additional demolition as necessary to complete the project.

1.2 RELATED SECTIONS

A. 31 22 00 Grading

B. 31 23 33 Trenching & Backfill

C. 32 16 00 Concrete

D. 32 18 23.23 Miscellaneous Athletic Surfacing

E. 32 31 13 Chain Link Fence

F. 32 33 00 Site Furnishings

G. 32 84 00 Irrigation

H. 33 14 16 Site Potable Water Distribution

I. 33 40 00 Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards:

1. American Society for Testing and Materials (ASTM)
2. Occupational Safety and Health Standards (OSHA)
3. California Building Code (CBC), current edition.
4. State of California Department of Transportation Standard Specifications, current edition

B. Demolition and construction operations shall adhere to the requirements of the California State Water Resources Board General Permit:2009-0009-DWQ CONSTRUCTION GENERAL PERMIT.

1.4 PROJECT CONDITIONS

A. The Contractor shall verify existing site conditions before starting work.

B. The Contractor shall submit a letter to the Owner stating the location of disposal site(s) for all demolished material and certifying that he has obtained the Owner's permission for the disposal of demolished materials prior to commencement of the work.

C. The Contractor shall coordinate work to maintain utilities to and applicable on-site facilities.

D. The Contractor is responsible for the cost of material export and disposal.

E. Equipment and materials designated as salvage are to be removed by Contractor and turned over to Owner. The Contractor shall coordinate storage and transportation of salvaged materials with the Owner prior to construction.

F. The Contractor is responsible for obtaining any necessary permits for demolition work.

G. The Contractor is responsible for all temporary security fencing, gates, and locks. The Contractor is to coordinate access to site with the Owner prior to construction.

H. The Contractor is responsible for all temporary security access roads or ramps. The Contractor is responsible for removing temporary roads or ramps prior to project completion. The Contractor is responsible for temporary planking or other surface coverings required to protect existing site conditions to remain.

I. The Contractor shall protect existing structures and facilities to remain.

J. The Contractor shall not interfere with use of adjacent buildings or block access to facilities to remain open during grading operations.

K. The Contractor shall maintain free and safe passage to and from adjacent buildings and maintenance areas outside the project limits.

L. The Contractor shall prevent movement or settlement of walls and structures to remain, provide bracing or shoring, be responsible for safety and support of structures and assume liability for building movement, settlement, damage, or injury.

M. The Contractor shall cease operations and notify Owner immediately if safety of structures appears to be endangered, take precautions to properly support structures, and resume operations only after safety is restored.

N. The Contractor shall provide, and maintain barricades, lighting, and guardrails required by applicable regulatory advisory to protect passersby, workers and building occupants.

O. The Contractor shall provide all necessary shoring and safety means and methods required for stabilizing trenches and excavations to the depths indicated on the plans per OSHA requirements.

P. The Contractor shall provide and install necessary erosion control items such as silt fencing, hay bales, sediment roles, stabilized construction entrances, inlet sediment traps, etc. as required.

Q. The Contractor shall provide dust control in conformance with all environmental regulations.

R. The Contractor shall provide necessary clean and potable water for construction activities, moisture conditioning and compaction. The Contractor shall prevent movement or settlement of walls and structures, provide bracing or shoring, be responsible for safety and support of structures and assume liability for building movement, settlement, damage, or injury.

S. The Contractor shall provide and maintain, at all times during construction, the means and devises to promptly remove and properly dispose for water from any source entering low points, trenches, or other excavations at no additional cost to the Owner.

T. Contractor shall, prior to commencement of work, submit a letter to Owner stating locations of disposal sites for demolished materials, and certifying that they have obtained permission from the disposal site to accept the material.

1.5 SUBMITTALS

A. The following information shall be submitted prior to proceeding with demolition or as require per this section and Section 01 33 23:

1. Demolition procedures, items to salvage and operational sequence shall be submitted for review and acceptance by Owner.

2. Material export plans, routes and disposal sites are to be submitted as required by Local, County or State requirements.

1.6 CONTRACTOR QUALIFICATIONS

A. Contractor shall have experience with demolition and construction of facilities and of similar size and scope.

B. Contractor shall be licensed and certified as required for all protections, demolition, disposal and remediation identified in the plans or as required to complete the work.

PART 2 – PRODUCTS

2.1 NONE

PART 3 – EXECUTION

3.1 PROTECTION

A. The Contractor shall verify existing conditions before starting work.

B. The Contractor shall protect existing structures.

1. The Contractor shall not interfere with use of adjacent buildings

2. The Contractor shall maintain free and safe passage to and from adjacent buildings and maintenance areas.

3. The Contractor shall prevent movement or settlement of structures, provide bracing or shoring, be responsible for safety and support of structures and assume liability for building movement, settlement, damage, or injury.

4. The Contractor shall cease operations and notify Owner immediately if safety of structures appears to be endangered, take precautions to properly support structures and resume operations only after safety is restored.

5. The Contractor shall provide and maintain barricades, lighting, and guardrails required by applicable regulatory advisory to protect passersby, workers and building occupants.

C. Protect trees, shrubs, other vegetative growth and fencing which are not designated for removal.

D. The Contractor shall protect existing services and utilities.

1. The Contractor shall follow procedures outlined by Local, County, State and Federal regulations for utility disconnects and interruptions.

2. The Contractor shall follow procedures outlined by general conditions specification and drawings for utility disconnects and interruptions if provided.
3. The Contractor shall place markers to indicate location of disconnected services and identify service lines and capping locations on project record documents.
4. Removal or capping of existing utilities shall be coordinated with the Owner.

E. The Contractor shall use a utility location service. Any utilities shown on plans are for reference only and dimensional accuracy is not guaranteed

3.2 CLEARING & GRUBBING

A. Prior to site clearing & grubbing salvage irrigation heads, valves and controllers and provide to the Owner.

B. Remove trees as shown on the drawings.

C. Remove and dispose of trees, snags, stumps, shrubs, brush, limbs, and other vegetative growth. Remove all evidence of their presence from the surface including sticks and branches greater than 1-inch in diameter or thickness. Remove and dispose of trash piles and rubbish.

D. Remove and dispose of wood or root matter including stumps, trunks, roots, or root systems greater than 1-inch in diameter or thickness to a depth of 12 inches below the ground surface.

E. Remove and dispose of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped.

F. Stockpile existing topsoil needed for landscaping with proper dust and erosion control measures. Refer to Grading Specifications.

3.3 DEMOLITION

A. Contractor shall be responsible for determining the method or methods used to accomplish the removals and excavations indicated on the plans. Blasting is not an accepted method of demolition.

B. Contractor shall assume responsibilities to protect existing structures and facilities during the work and shall repair or replace structures or facilities damaged by them or their subcontractors at Contractor’s expense.

C. Contractor shall demolish in an orderly and careful manner items required to accommodate new work, including work required for connection to existing structures. Protect existing foundations and structural members.

D. When directed to remove existing walks, curbs, gutters, and paving, the Contractor shall saw cut concrete and/or asphaltic pavement to provide a straight line at edges of existing pavement that will remain.

E. Debris handling

F. Repair demolition not identified in the plans and specifications, at no cost to Owner.

G. The burning of materials onsite is not permitted.

H. Owner may identify specific items in addition to plans for the Contractor to salvage and delivered to Owner for future use.

I. Contractor shall provide sufficient watering to abate dust.

3.4 DISPOSAL & HANDLING

A. Remove excess debris as it accumulates, except as otherwise specified. Do not store or permit debris to accumulate on site.

B. Materials requiring removal and demolition are to be removed completely from site, unless approved otherwise.

C. If Contractor encounters unforeseen items during clearing and demolition work, they shall notify the Owner prior to removal or demolition.

D. Excess or unsuitable material, broken asphaltic concrete, broken Portland concrete, pipes, etc., shall be removed and disposed of by Contractor.

E. All demolished and salvaged materials shall be removed and handled in accordance with local and national requirements and guidelines.

F. All materials to be disposed of shall be hauled and delivered an approved disposal site.

3.5 MAINTENANCE

A. Contractor shall maintain a clean and organized site properly storing and securing all tools, equipment, and materials.

B. Contractor shall protect spoils from erosion by wind and rain.

C. All required stormwater pollution prevention and temporary construction BMPs shall be inspected daily maintained and in working order throughout the duration of demolition and construction.

D. Contractor shall inspect and maintain all measures of protection of existing facilities to remain.

E. Fencing and padding, staking, guying, and shoring shall be inspected daily and adjusted as needed to protect trees, buildings, equipment, structures and surfacing to remain.

F. Contractor shall maintain water services to irrigation to landscape areas to remain.

G. Maintain all required safety equipment and facilities in working order and access per Local, State and Federal regulations.

3.6 CLEANING

A. Remove all tools, equipment and appliances used for demolition from the site upon completion of the work.

B. Clean the project site adjacent streets and pavements to a broom-clean, strain-free condition each day during demolition and construction.

END OF SECTION

SECTION 11 68 33 SPORTS EQUIPMENT

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish labor, materials, apparatus, tools, equipment, transportation, temporary construction and special or occasional services as required to install all sports equipment.

B. Unless specifically stated otherwise, the Contractor is responsible for the purchase and installation of all sports equipment.

1.2 RELATED SECTIONS

A. 02 41 13 Demolition

B. 31 22 00 Grading

C. 31 23 33 Trenching & Backfill

D. 32 16 00 Concrete

E. 32 18 23.23 Miscellaneous Athletic Surfacing

F. 32 31 13 Chain Link Fence

G. 32 33 00 Site Furnishings

H. 32 84 00 Irrigation

I. 33 14 16 Site Potable Water Distribution

J. 33 40 00 Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards unless otherwise documented by the construction documents:

1. American Society for Testing and Materials (ASTM)
2. Occupational Safety and Health Standards (OSHA)
3. California Building Code (CBC), current edition.
4. State of California Department of Transportation Standard Specifications, current edition
5. National Collegiate Athletic Association (NCAA)
6. National Association of Intercollegiate Association (NAIA)
7. World Athletics (IAAF)

1.4 PROJECT CONDITIONS

A. All materials shall be installed per manufacturer recommendations. Contact Landscape Architect/Engineer where recommendations conflict with plans or specifications.

B. The contractor shall provide sealed Landscape Architect/Engineered drawings for structures, footings, and other applicable components as required by state law.

1.5 SUBMITTALS

A. The following information shall be submitted prior to installation of specified work.

1. Manufacturer published product cut sheets indicating the product number, dimensions, materials and finish.
2. Manufacturer warranty
3. Shop drawings for all products, as necessary.
4. Manufacture installation requirements and/or recommendations.

1.6 CONTRACTOR QUALIFICATIONS

A. Contractor shall have experience with installation of specified products and/or trained by the manufacturer prior to installation.

1.7 QUALITY ASSURANCE

A. The Contactor shall provide and install all materials as required by these specifications and shown on the project drawings.

B. The Contractor shall provide equipment from vendors or manufacturers that have been pre-approved or have been identified in writing as approved equals. The Owner is responsible for the determination of what products are considered equal.

1.8 MAINTENANCE

A. The Contractor shall service and maintain all site furnishings as necessary until the end of the contracted maintenance period and final acceptance by the owner.

1.9 WARRANTY

A. All sports equipment and site furnishings shall come with a manufacturer standard warranty.

PART 2 – PRODUCTS

2.1 SPORTS EQUIPMENT

A. The Contractor is required to provide and install all permanent and loose equipment as specified by this section, per manufacturer recommendations and as shown on drawings.

B. Beach Volleyball Net Systems shall be the following, or approved equal:

Item Listed in Plan	**Manufacturer**	**Model**	**Details/Finish**
Sand Wash Station	Most Dependable Fountain	565 SMSS + locking hose bib on back side	One-sided approach shower, ADA shower, ADA grab bars, and footwash, finish is stainless steel with clear powder coat.

Item Listed in Plan	Manufacturer	Model	Details/Finish
Volleyball Court Posts & Sleeve System	Volley Ball USA/ United Volleyball Supply, LLC.	Monson-Slider System, with (2) sleeves for POP system and (2) Sand Sleeve Covers per court	(2) 3.5" Heavy Wall Aluminum Poles with stainless steel Monson slider tracks with a powder coated white finish. Stainless steel winch. (2) 36" long POP anodized aluminum seamless sleeves (2) Neoprene sand sleeve cover (sold individually)
Volleyball Court Net	Volley Ball USA/ United Volleyball Supply, LLC.	PBN4 + Kevlar Rope + Custom ASU Branding	32' x 39" (4" Tape) Pro Beach Volleyball Net + Kevlar Rope Top & Bottom
Volleyball Court Antenna	Volley Ball USA/ United Volleyball Supply, LLC.	Antenna Set	(2) Antenna with colored Velcro holders
Volleyball Court Lines	Volley Ball USA/ United Volleyball Supply, LLC.	2" Premium Vinyl Adjustable lines + custom ASU Branding	2" Premium Vinyl Adjustable lines
Volleyball Court Post Pads	Volley Ball USA/ United Volleyball Supply, LLC.	Pro-Pad-Straight Cut + Custom ASU Branding	Professional post pad, color Light Blue
Volleyball Court Referee Stand	Volley Ball USA/ United Volleyball Supply, LLC.	Aluminum Clamp on Official stand	Aluminum clamp on official stand with padding and adjustable legs with Ref-Stand-Clamp-Monson-Slider
Concrete Edge Pad	Volley Ball USA/ United Volleyball Supply, LLC.	90 Degree Curb Pad	90 Degree Curb Pad in Light Blue

C. Back Ball Stop Net Systems shall be the following, or approved equal:

Item Listed in Plan	Manufacturer	Model	Details/Finish
10’ tall ball stop netting	Sportsfield Specialties	BSS210	Semi-permanent sleeved ball stop netting w/ 4” ball net.

2.2 MANUFACTURER PHONE NUMBERS:

A. Sportsfield Specialties: (888) 975-3343

B. Volley Ball USA/United Volleyball Supply, LLC: (425) 576-8835

PART 3 – EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Ship and transport all materials in a safe manner protecting from damage, corrosion, and wear.

B. Offload all products with appropriate equipment and care preventing any damage.

C. Store in a neat and orderly manner protected from elements to prevent damage, corrosion, or wear. Provide additional covering or conditioning as needed per manufacturer requirements.

3.2 INSTALLATION

A. Installation of the sports equipment shall follow the directions of the manufacturer and/or vendor. The Contractor shall report any discrepancies in construction plans or specification and manufacturer instructions or requirement prior to installation of equipment.

B. Shop drawings of all equipment installations are required for approval prior to installation of equipment unless specifically waived by manufacturer or Landscape Architect/Engineer.

3.3 MAINTENANCE

A. Provide all necessary maintenance per manufacturer recommendations during the maintenance period.

B. Provide all training to owner for maintenance per manufacturer recommendations.

C. Furnish all extra materials, keys, caps, tools, fittings, and components included with the product to the Owner.

3.4 WARRANTY

A. The Contractor shall verify that all documents are proper order, contain full information and are certified or notarized where required.

END OF SECTION

SECTION 31 22 00 GRADING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The scope of this section includes but is not limited to earthwork, grading operations, labor, materials, equipment, and services necessary to install subgrade, finished fill tolerances and associated work.

1.2 RELATED SECTIONS

A. 02 41 13 Demolition

B. 11 68 33 Sports Equipment

C. 31 23 33 Trenching & Backfill

D. 32 16 00 Concrete

E. 32 18 23.23 Miscellaneous Athletic Surfacing

F. 32 31 13 Chain Link Fence

G. 32 33 00 Site Furnishings

H. 32 84 00 Irrigation

I. 33 14 16 Site Potable Water Distribution

J. 33 40 00 Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards unless otherwise documented by the construction documents.

1. American Society for Testing and Materials (ASTM)

2. Occupational Safety and Health Standards (OSHA)

3. California Building Code (CBC), current edition.

4. State of California Department of Transportation Standard Specifications, current edition (Green Book)

B. Grading materials and operations shall adhere the requirements and recommendations of the Geotechnical Reports completed by Geotechniques, including all supplements, addendums, and clarifications, unless otherwise specified herein.

C. Construction operations and earthwork shall adhere to the requirements of the California State Water Resources Board General Permit:2009-0009-DWQ CONSTRUCTION GENERAL PERMIT.

1.4 DEFINITIONS

A. “Subgrade” as used herein, refers to:

1. The native material underneath a constructed surface such as sidewalk, roadway, or field.

B. "Finished Grade" as used herein, refers to:

1. Top of sand surface.
2. Top of landscape grade.

C. “Finished Surface" as used herein, refers to:

1. Top of curb or finished grade of hardscape (asphalt, concrete, pavers etc.), of which another surface will not be placed.

1.5 PROJECT CONDITIONS

A. The Contractor shall verify existing conditions before starting work.

B. The Geotechnical Engineer or Geotechnical Field Engineer shall provide observation and testing during the grading operations.

C. The Contractor shall be responsible to obtain Notice to Intent (NOI) and Notice of Termination (NOT) and maintain all observations, reporting and other requirements associated with these permits. This includes but is not limited to installing and maintaining necessary erosion control items such as silt fencing, hay bales, sediment roles, stabilized construction entrances, inlet sediment traps, etc.

D. The Contractor shall provide dust control in conformance with all environmental regulations.

E. The Contractor shall adhere to all the requirements of the project SWPPP (Stormwater Pollution Prevention Plan and erosion control plan. The Contractor is responsible for all necessary QSP (Qualified Stormwater Practitioner) services as required by the project SWPPP documents.

F. Contractor shall, prior to commencement of work, submit a letter to Owner stating locations of disposal sites for excess materials, and certifying that they have obtained property Owner's permission for disposal of surplus materials.

G. The Contractor shall protect existing structures and facilities which are to remain.

H. The Contractor shall not interfere with use of adjacent buildings or block access to facilities to remain open during grading operations.

I. The Contractor shall maintain free and safe passage to and from adjacent buildings and maintenance areas outside the project limits.

J. The Contractor shall prevent movement or settlement of walls and structures, provide bracing or shoring, be responsible for safety and support of structures and assume liability for building movement, settlement, damage, or injury.

K. The Contractor shall cease operations and notify Owner immediately if safety of structures appears to be endangered, take precautions to properly support structures, and resume operations only after safety is restored.

L. The Contractor shall provide, and maintain barricades, lighting, and guardrails required by applicable regulatory advisory to protect passersby, workers and building occupants.

M. The Contractor shall provide all necessary shoring and safety means and methods required for stabilizing trenches and excavations to the depths indicated on the plans per OSHA requirements.

N. The Contractor shall provide necessary clean and potable water for construction activities, moisture conditioning and compaction.

O. The Contractor shall provide and maintain, at all times, during construction, the means and devises to promptly remove and properly dispose for water from any source entering low points, trenches, or other excavations at no additional cost to the Owner.

P. Quantities shown on grading plans and sections are for Contractor's convenience and not guaranteed. Grading shall be done in conformance with elevations shown on plans and in accordance with specifications. Discrepancies between such mentioned quantities and/or sections, and requirements of grading plans and/or specifications, will not entitle Contractor to additional remuneration.

Q. The Contractor shall provide and pay for costs of a licensed surveyor for conformance surveys.

1.6 SUBMITTALS

A. The following information shall be submitted prior to installation of specified work or as required per this section and Section 01 33 23 Shop Drawings, Product Data and Sample Submittals.

1. Material disposal site information and approval letter
2. Soil staging and haul plans as required by Owner
3. Digital PDF conformance surveys with grid elevations at scale and orientation of the design plan drawings.
4. Particle size distribution for materials/proctor
5. As-builts

1.7 CONTRACTOR QUALIFICATIONS

A. The Contractor shall be trained and use specialized laser grading equipment, as required, for this project.

1.8 QUALITY ASSURANCE

A. An approved independent testing laboratory shall test soils and compaction for conformance with the plans and specifications. Tests shall be submitted to Engineer for review. Contractor shall schedule soils testing a minimum of 48 hours prior.

B. The Contractor is responsible to make all required corrections to meet the specified design grade tolerances at no cost to the Owner.

C. The Contractor shall be responsible for developing and implementing a Contractor Quality Control Program including but not limited to inspection and testing to assure compliance with the requirement of this section and in accordance with Special Conditions Section.

PART 2 – MATERIALS

2.1 EXCESS OR UNSUITABLE MATERIAL

A. Excess or unsuitable material, broken asphaltic concrete, broken Portland cement concrete, pipes, etc., shall be removed and disposed of by the Contractor. Materials

shall be disposed of at an approved disposal site. Contractor shall, prior to commencement of work, submit a letter to Owner stating locations of disposal sites for excess materials, and certifying that they have obtained property Owner's permission for disposal of surplus materials.

2.2 FILL MATERIALS

A. Fill materials for subgrade, whether from sources on or off site, shall be approved by the Geotechnical Engineer as suitable for intended use, and specifically for required location or purpose. Purchase and delivery of import materials, as required, will be the responsibility of the Contractor.

B. Trench spoils may be used for fill only when specifically accepted by Geotechnical Engineer and only when cut / fill requirements allow. The Contractor is responsible for spoils export as needed.

C. Fill shall exhibit uniform densities and shall be consistent and not differ in gradation or material makeup from adjacent or underlying fill material.

PART 3 – EXECUTION

3.1 GEOTECHNICAL TESTING AND INSPECTION

A. All grading operations including earthwork, subgrade preparation, and placing fill is to be tested and inspected by a Geotechnical Engineer prior to proceeding with work.

B. The Contractor shall make accommodations and provide scheduling for testing and inspection as required by the Geotechnical Engineer.

3.2 GRADE STAKES AND LINES

A. Grading, including subgrade and finished grade of paved areas, shall be controlled by such intermediate grade stakes and lines as may be necessary to obtain slopes and levels required by finished grade elevations shown on plans. Compacted subgrades and finished grade surfaces shall parallel and conform to control planes established by grade stakes and lines.

3.3 DISPOSAL OF EXCESS OR UNSUITABLE MATERIAL

A. Excess or unsuitable material, rubble, large rocks, broken asphaltic concrete, broken concrete, pipes, etc., shall be removed and disposed of at an approved disposal site by the Contractor at no additional cost to the Owner.

3.4 EXCAVATION

A. Excavate areas shown on plans or as specified herein may include cutting for paving area and construction subgrades, pipeline trenches, and turf areas.

B. Excavation shall be kept free from ponding water until compacted fills and structures are complete safe from uplift and horizontal water pressure and the backfill has been placed. De-watering equipment shall be adequate to protect against flotation.

C. Excavated material not necessary to, or suitable for, fill construction, shall be removed from site.

D. All excavations for retentions basins, detention basins, and other basins which require volume storage, shall meet the minimum volume requirements as specified in the construction documents.

3.5 FILL OPERATION

A. Geotechnical Engineer to observe and approve all fill material.

B. Unsuitable subgrade materials shall be removed and replaced with non-expansive fill under the Geotechnical Engineers observation.

C. Fill shall be placed in lifts not exceeding 8 inches in thickness and compacted to 95% dry density as determined by ASTM D-698, for under pavement, curb and gutter, roadway shoulder and areas subject to vehicle traffic.

D. Fill slopes shall not exceed 1 foot of rise per 4 feet of run.

3.6 SUBGRADE PREPARATION

A. The subgrade preparation shall be performed under observation of the Geotechnical Engineer.

B. When subgrade elevations are not shown on plan drawings they are to be calculated by the Contractor from finished grade and material thickness identified in construction details and specifications.

C. Prepare subgrade after stripping the existing natural grass, organics and existing soil to an elevation consistent with the proposed subgrade. Subgrade preparation may include but is not limited to ripping, scarifying, moisture management and compaction.

D. After the subgrade is exposed, it shall be proof rolled with a fully loaded single axle dump truck or water truck under the observation of the Geotechnical Engineer. Any areas exhibiting pumping or yielding shall be remediated by over excavating to a firm, native soil to a depth determined by the Geotechnical Engineer and backfilled with engineered fill or onsite material specifically approved the Geotechnical Engineer.

E. Preparation of subgrade shall conform to the Geotechnical Report. At a minimum all subgrade shall be scarified to a depth of 6 inches, moisture conditioned to optimum (+/- 2 percent) and compacted to at least 95 percent of maximum dry density as determined by ASTM D-698. Moisture content may be adjusted based on field conditions if approved by the Geotechnical Engineer.

F. The Contractor shall prepare the subgrade and construct all subgrade fill in a manner resulting in uniform water contents and densities after compaction.

G. Surfaces shall be finished to uniform grades and slopes per drawings, and in such a manner as to drain properly and be free of depressions, which may cause areas of standing water.

H. The presence of unsuitable soil may require supplemental preparations that may include removal of the upper 12” of subgrade and replacement with engineered fill, with recommendations by the Geotechnical Engineer.

I. During any excavation or earthmoving operations, any materials that are saturated in their native condition and cannot be brought to firm and unyielding conditions during compaction, as determined by the Engineer, shall be considered as unsatisfactory

material. Soils that are deemed unsatisfactory material for reuse shall be classified as surplus material. Surplus material shall be legally disposed of in accordance with local, state, and federal permits and licenses required for disposal of non-hazardous waste.

3.7 FINISHED GRADE

A. The tolerances for each grading operation are outlined below, this includes finished surfaces and finished grades after all materials have been placed and/or installed.

B. If a mass grade plan is provided the tolerance shall be +/- 0.1'. After completion of the mass grade operations the Contractor shall be required to provide finished grading operations which meet the tolerances as specified in this section.

C. Finished subgrades and finished landscape and planter grades shall not vary more than 0.04' from design grades.

D. Regardless of tolerances, the Contractor is responsible to provide smooth transitions where necessary to provide smooth even traffic ways and routes of travel unless otherwise specified in the construction documents.

E. Surfaces shall be finished to uniform grades and slopes per drawings, and in such a manner as to drain properly and be free of depressions, which may cause areas of standing water.

F. Unless otherwise indicated, provide uniform slopes with smooth, even transitions between points for which finished grades are indicated. As well as, between finished grades and existing grades at the limit of grading.

G. Round-off all tops of slopes and feather all toes of slopes

H. At completion of grading operations, the site shall be left in a clean and finished condition conforming to the drawings.

3.8 MAINTENANCE

A. Maintain all slopes, gradients and landforms established during grading operations for the duration of construction.

B. Inspect and adjust as necessary all BMPs and erosion control measures daily to prevent soil raveling, blowing dust and erosion.

END OF SECTION

SECTION 31 23 33 TRENCHING & BACKFILL

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and tools necessary for the complete installation of all excavations, trenching, backfill and associated compaction.

B. Excavation for appurtenant structures, such as manholes, inlets, transition structures, junctions, structures, vaults, valve boxes, catch basins, etc., shall be deemed to be in this category.

C. Trenching and backfilling and related work as shown on the project drawings and specified herein shall include but not be limited to the following:

1. Stormwater Drain Lines
2. Sanitary Sewer Systems
3. Potable/Domestic Water Lines
4. Fire Lines
5. Irrigation Lines
6. Electrical and Communication Lines
7. Utility Lines

1.2 RELATED SECTIONS

A. 02 41 13 Demolition

B. 11 68 33 Sports Equipment

C. 31 22 00 Grading

D. 32 16 00 Concrete

E. 32 18 23.23 Miscellaneous Athletic Surfacing

F. 32 31 13 Chain Link Fence

G. 32 33 00 Site Furnishings

H. 32 84 00 Irrigation

I. 33 14 16 Site Potable Water Distribution

J. 33 40 00 Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards:

1. American Society for Testing and Materials (ASTM)
2. Occupational Safety and Health Standards (OSHA)
3. California Building Code (CBC), current edition.

4. State of California Department of Transportation Standard Specifications, current edition

B. Grading materials and operations shall adhere the requirements and recommendations of the Geotechnical Reports completed by Geotechniques, including all supplements, addendums, and clarifications, unless otherwise specified herein.

1.4 PROJECT CONDITIONS

A. The Contractor shall contact Underground Services Alert (U.S.A.) 800-642-2444 or 811 and mark the limits of construction per their requirements prior to construction.

B. The Contractor shall pothole existing utilities prior to trenching or excavation to field verify locations, determine depth of existing utilities, and identify potential conflicts or obstructions.

C. The Contractor shall be responsible for all trench safety complying with Standard Specifications, OSHA and all agencies having jurisdiction.

D. The Contractor is responsible for shipping to the site and handling and storing materials in a manner that does not segregate, contaminate, or alter the material from its original manufactured state.

E. The Contractor is responsible for maintaining waterproofing, drainage, irrigation, utilities or any other system below the field during trenching and earthwork activities.

F. The Contractor shall provide necessary clean and potable water for construction activities, moisture conditioning and compaction. The Contractor must prevent movement or settlement of walls and structures, provide bracing or shoring, be responsible for safety and support of structures and assume liability for building movement, settlement, damage, or injury.

G. The Contractor must cease operations and notify Owner immediately if safety of structures appears to be endangered, take precautions to properly support structures, and resume operations only after safety is restored.

H. The Contractor must provide, and maintain barricades, lighting, and guardrails required by applicable regulatory advisory to protect passersby, workers and building occupants.

I. No trenching or excavation shall occur when excessively wet conditions exist as determined by the Engineer.

J. The Contractor to provide dewatering and surface water control systems to permit work to be completed.

K. No jetting shall be allowed.

L. The Contractor shall provide dust control in conformance with all environmental regulations.

M. The Contractor shall relocate, reconstruct, or repair surface and subsurface to condition to equal or better than the preconstruction conditions. Repairs shall include all surface or subsurface disturbances which are in the line of construction or which may be damaged or disturbed by trenching activities.

N. All materials shall be installed per Geotechnical recommendations. Contact Engineer when recommendations conflict with plans or specifications.

1.5 SUBMITTALS

A. The Contractor shall submit in a PDF digital file material data or product cut sheets within 15 days from notice to proceed for the following:

1. Pipe Bedding & Select Backfill

2. Crushed Drain Stone Backfill

B. The Contractor shall submit proposed quarry or supplier, source location and certification that the supplier can deliver the total quantity of material needed to complete the project within the constraints of the project schedule.

C. A mockup of the crushed drain stone backfill shall be performed prior to trenching. The mockup shall consist of a minimum 4’ x 4’ x 4’ trench, Contractor should plate compact stone so that the surface is firm and unyielding.

D. Test results for Crushed Drain Stone.

1.6 QUALITY ASSURANCE

A. Work shall be observed by the Engineer and all testing shall be performed by the geotechnical Engineer.

B. Testing methods for compaction may be adjusted to comply with the various types of materials specified, any adjustments require the Engineer’s approval.

1. ASTM D-698 Compaction Testing

C. An approved independent testing laboratory shall test soils and compaction for conformance with the plans and specifications. Tests shall be submitted to Engineer for approval.

D. Testing Protocol for Crushed Drain Stone

1. The Contractor must submit results for all tests listed. The Contractor must use an Owner approved third party testing laboratory to perform all material testing. The testing agent must be qualified to perform all of the following testing protocols:

a. ASTM C136 or CT 202 – Sieve Analysis of Fine and Coarse Stones

b. ASTM D854 – Specific Gravity of Soils

c. ASTM D2216 – Laboratory Determination of Water (Moisture) Content of Soil and Rock

d. ASTM D2434 – Saturated Hydraulic Conductivity (KSAT) or Constant Head Permeability

e. CT 301 – Resistance (R-Value)

f. CT 229 – Durability Index

g. ASTM D2419 or CT 217 – Sand Equivalent

h. ASTM D6928-17 – Test Method for Resistance of Course Aggregate to Degradation by Abrasion

2. The Contractor must submit all test results for review and acceptance a minimum of 45 days prior to shipping and installation. Neither the Owner nor the Engineer are

responsible for delays or costs incurred by shipping or installation of untested or rejected materials.

3. All crushed drain stone must be sourced from a single supplier and a single location. Use of multiple crushed drain stone sources is not accepted.
4. During construction, the crushed drain stone must be tested every 1000 tons by the approved testing laboratory for quality control or QC. After initial testing and source selection only sieve analysis (gradation testing) and infiltration rate testing is required for quality control (QC) testing.
5. If irregularity of materials are noted during installation, the Engineer reserves the right to request additional testing of installed material. Testing expenses shall be bore by the Contractor.

1.7 WARRANTY

A. Contractor is responsible for remediating any trench settlement for the duration of the warranty of the project, or a minimum of one year, whichever is longer.

PART 2 – PRODUCTS

2.1 NATIVE SOIL BACKFILL

A. Native Soil backfill shall be soil material excavated from the project site and processed as needed to be free of trash, debris, deleterious materials, stones larger than 3”, sticks and organics.

B. Use of native backfill must be approved by the geotechnical Engineer.

2.2 BEDDING & SELECT BACKFILL

A. Bedding / Select Backfill shall be washed concrete sand which provides a stable, consolidated base. See requirements below:

Sieve sizes	Percentage passing
No. 4	90–100
No. 200	0–5

2.3 CRUSHED DRAIN STONE BACKFILL

A. The bedding and backfill for the perimeter storm drain trench shall be a fully fractured, free draining ¾” material, an equivalent #57 stone may be used. The stone shall have no smooth or rounded edges, faces or parts.

B. The stone shall have no smooth or rounded edges, faces or parts. The material should be placed in thin lifts and compacted using vibratory means until a firm, stable surface underfoot is achieved. If a firm, stable surface is not achieved the Contractor may incorporate a washed, crushed gravel into the upper 2” – 4” of the crushed drain stone to achieve stability. The gravel may range in diameter from 1/4” – 3/8” and the Contractor shall install at their own expense. The gravel must be incorporated into the existing stone and can not overlay the crushed drain stone.

2.4 CONTROLLED LOW STRENGTH MATERIAL (CLSM / SLURRY)

A. The Contractor shall submit, to the Engineer, a mix design, including the proportions and source of materials, admixtures, and dry cubic yard batch weights. The mix shall

contain a minimum of 50 pounds of cement and 250 pounds fly ash per cubic yard, with the remainder of the volume composed of sand, water, and any approved admixtures.

B. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi when tested in accordance with ASTM D4832. There should be no significant strength gain after 28 days. Test specimens shall be made in accordance with ASTM D4832.

PART 3 – EXECUTION

3.1 MOCKUP

A. A mockup of the permeable trench backfill shall be performed prior to trenching.

B. Contractor shall schedule review of the mockup, with the Engineer, a minimum of 5 business days prior.

3.2 PREPARATION

A. Coordinate all underground locating and perform all potholing and/or video inspection necessary to locate existing utilities prior to trenching or excavations. Identify all previously undocumented utilities on plan sheets and submit to the Owner. Utilities that remain shall be included in as-builts to be provided by the Contractor.

B. Trenching in Existing Asphalt Pavement:

1. Sawcut asphalt paving with clean straight edges at least 6-inches wider than the trench on each side.

2. Where asphalt meets concrete or where curb and gutter are to be replaced, cutback asphalt at least 24-inches and replace.

C. Trenching in Concrete Pavement:

1. Sawcut concrete with clean straight edges a minimum of 2-inches below the surface prior to being broken out.

2. Remove sections no smaller than 30-inches in length. Remove sections to the nearest construction joint, control joint or edge where joints or edges are within 12-inches of the saw cut.

D. Excavated material for backfill shall be laid alongside the trench unless otherwise stockpiled per the site control plan. Excavated material shall be kept trimmed and protected from erosion.

E. Remove all material and legally dispose of all excavated material not required for backfill or that is not of value to the Owner.

F. Prior to bedding and installing utilities, trench bottom shall be firm, stable and dewatered as necessary. The Engineer shall determine the suitability of the trench bottom and determine the amount of sand, gravel, crushed aggregate, or slurry mix to stabilize the trench foundation if required.

G. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work.

H. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades as shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable.

I. Trench bottoms shall be compacted to 95% relative compaction per ASTM D1557.

J. Do not over excavate without written authorization of Engineer or approval from Geotechnical Report.

K. If rock is encountered in the trench bottom, rock shall be over excavated no less than 6 inches below the exterior bottom of the pipe. The over excavation shall be backfilled with ABC material compacted to a uniform density of not less than 95%.

L. Water jetting is prohibited in all trench work.

3.3 SAND BEDDING

A. Prior to placing bedding material, the Owner or Engineer must inspect the trench and confirm the utilities/pipe conform to the plans and specifications.

B. Install bedding material in 4-inch maximum lifts to depths and dimensions per plans. Bedding material shall completely encase utilities/pipe and fill all voids around pipe and in the trench.

C. Compact all bedding to 95% ASTM D1557.

D. Where trenches with sand bedding enter building pads, the trench shall be backfilled with an impermeable plug of compacted bentonite or CLSM. Bentonite or CLSM plug to extend a minimum of 2-feet from building foundation within specified trench.

3.4 SLURRY

A. CLSM may be placed by any reasonable means from a mixing unit into the space to be filled.

B. Agitation is required during transportation and waiting time.

C. Placement shall be performed in such a manner that structures or pipes are not displaced from their desired final position and intrusion of CLSM into undesirable areas is avoided.

D. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the Engineer. Each placement of CLSM shall be as continuous an operation as possible.

E. If CLSM is placed in more than one layer, the base layer shall be free of surface water and loose of foreign material prior to placement of the next layer.

F. If CLSM is placed over several days for the same trench, 24 hours of cure time should be given before a new layer is placed on the previous cured CLSM layer.

3.5 TRENCH BACKFILL

A. General

1. Construct backfill in two operations (initial and final).

2. Do not backfill where the foundation material in trench is already saturated, except as acceptable to the Engineer. Provide a minimum cover as may be specified.

3. If settling occurs in trenches and pits, excavate to a depth necessary to rectify the problem; then backfill and compact as specified herein and restore surface to required elevation.

4. Where trenches cut across paved surfaces and synthetic turf, place backfill in eight-inch (8”) maximum loose lifts. Compact backfill to 95 percent of ASTM D-698 maximum density.
5. Compaction of the trench shall be accomplished in such a way that rolling and compacting the completed backfill along with the adjoining subgrade material shall provide the specified density necessary to enable paving of the area immediately after backfilling has been completed.

B. Initial Backfill:

1. Prior to trench backfill, Engineer or inspector shall be notified so that they may review the condition of the trench and installation of pipe.
2. Free-draining sand backfill material shall be used as initial backfill for utilities except perforated storm pipe and irrigation piping, unless otherwise noted. After pipe has been properly installed and reviewed by Engineer, select backfill material shall be placed on both sides of the pipe and compacted to depth shown on Drawings. Initial backfill material shall be mechanically compacted in layers not exceeding eight inches (8”) in un-compacted depth and shall be brought up uniformly on both sides of pipe to avoid bending or distortional stress. Relative compaction of initial backfill material shall be at least 95% relative compaction.

C. Final Backfill:

1. If approved by the Engineer, native backfill material shall be used for final backfill, unless otherwise noted herein.
2. Final backfill compaction shall be accomplished by mechanical means with backfill material placed in layers not exceeding eight inches (8”) in loose depth. Each layer shall be thoroughly compacted before succeeding layers are placed.
3. Final backfill shall be compacted to a relative compaction of 95%.

3.6 TRENCH SURFACING

A. In landscape areas, the trench shall be restored to its original condition with a clean finished grade and any mulch or topdressing blended with that planter.

B. All trench surface conditions shall be flush with adjoining grade in a firm, unyielding condition with no visible settling for the life of the facilities.

C. Crushed drain stone backfill shall be firm and unyielding underfoot.

3.7 DELIVERY, STORAGE AND HANDLING

A. All material shall be shipped using clean trucks. Loads will be rejected if there is any foreign material.

B. All materials shall be moisture conditioned to eliminate settlement during trucking or shipping to site.

3.8 WARRANTY

A. Contractor is responsible for removing and replacing all surfacing and improvements impacted by warranty work. All work to be performed at Contractors’ own cost.

END OF SECTION

SECTION 32 16 00 CONCRETE

PART 1 – GENERAL

1.1 CONTRACT DOCUMENTS

A. “Standard Specifications” refers to State of California Department of Transportation Standard Specifications, latest edition, hereinafter referred to as “Standard Specifications”.

1.2 SCOPE OF WORK

A. Furnish labor, materials, equipment, facilities, transportation and services for reinforced concrete pavement and related work as shown on drawings and includes, but is not necessarily limited to:

1. Concrete pavement
2. Concrete sidewalks
3. Concrete curbs & landscape walls
4. Fence post footings
5. Excludes concrete mix design for building foundations and structural elements.

1.3 STANDARDS

A. Materials and procedures for forming and reinforcing concrete shall conform to sections 51, 52 and 90 of the Standard Specifications, unless otherwise noted on the drawings or in these specifications.

B. Standard Plans for Public Works Construction, American Public Works Association.

C. ASTM C-94, Specification for ready-mixed concrete

D. CI 347 Recommended Practice for Concrete Formwork

1.4 TESTS

A. An approved independent testing laboratory shall test structural concrete for conformance with the plans and specifications. Tests shall be submitted to Owner's representative for approval. Owner will pay for testing of structural concrete.

B. At the discretion of Owner, non-structural concrete like pavement may be tested by an independent testing laboratory for conformance with plans and specifications. Owner will pay testing services for non-structural concrete.

C. Concrete not conforming to requirements of plans and specifications shall be removed from site and replaced at contractor’s expense.

D. If concrete does not conform to requirements of contract documents as determined by testing, contractor shall reimburse Owner for testing costs relating to non-structural concrete.

E. Owner retains right to test replaced concrete and to require contractor to reimburse Owner for additional testing expenses.

1.5 PROJECT CONDITIONS

A. The Contractor shall provide and pay for costs of a licensed surveyor for conformance surveys.

1.6 QUALITY ASSURANCE

A. Conformance Surveys:
   1. Conformance surveys shall be performed to verify that constructed elevations meet the specified tolerances of the design grades.
   2. Conformance surveys are to be conducted and signed by licensed land surveyor.
   3. The Contractor is responsible to make all required corrections to meet the specified design grade tolerances at no cost to the Owner.

PART 2 – PRODUCTS

2.1 MINIMUM STRENGTH REQUIREMENTS

A. Contractor shall be responsible for designing concrete mixes to provide minimum requirements listed below. It is acceptable to increase cement content over that listed if necessary, to obtain the specified compressive strength. Minimum ultimate compression strength of concrete for listed items at 28 days is as follows:

Description of Work	Strength Measured In psi	Max. Slump (ASTM C-143)	Size of Aggregate	Min. Cement Content (Lbs. Per C.Y.)	W/C Ratio
Fence Post Footings	3000	4”	3/4”	517	0.40-0.45
Curbs/Walls	3000	4”	3/4”	517	0.40-0.45
Walks/Paving/Slabs	3,500	4”	3/4”	564	0.40-0.45

2.2 CONCRETE MIX

A. Concrete shall be Portland cement concrete conforming to Standard Specifications, section 90.

B. Cement shall be Type II, or Type V if required by soils engineer, cement conforming to ASTM Designation C-150 as modified by the Standard Specifications.

C. Air Entrainments shall conform to ASTM C-260, if required.

D. Water shall be clean and free from oil, acid, alkali, and organic matter.

E. Mix concrete in accordance with ACI 304.

F. Deliver concrete in accordance with ASTM C-94.

G. Select proportions for normal weight concrete in accordance with ACI 301.

H. Use accelerating admixtures in cold weather only when approved by Engineer.

I. Use of admixtures will not relax cold weather placement requirements.

J. Use set-retarding admixtures during hot weather only when approved by Engineer.

2.3 FORMING MATERIALS

A. Formwork materials shall conform to Standard Specifications, section 51-1.05, and as specifically outlined, unless otherwise noted on the drawings.

B. Exposed sharp edges shall be troweled with not less than 3/16” prevent mortar runs and to preserve smooth, straight lines, unless otherwise directed by Owner or the drawings.

C. Use forming materials that will not discolor concrete.

D. Use forming materials of sufficient strength and with appropriate backing to insure that all lines are straight, true, and plumb and that all dimensions shown on the plans will be complied with once the formwork has been removed.

1. Curved surfaces shall be formed with materials of sufficient strength to provide that all lines are straight, true, and plumb and that all dimensions shown on the plans will be complied with once the formwork has been removed.

2.4 DOWELING

A. Doweling shall be 18” Greenstreak Speed Dowel #4 or approved equal.

B. Pervious backfill shall conform to Standard Specifications, section 19.3.065.

C. Expansion joint material shall be pre-molded joint filler conforming to Standard Specifications, section 51-1.12C.

D. Expansion joint caulk shall be an approved polyurethane sealant, conforming to Standard Specifications, section 51-1.12F.

2.5 STEEL REINFORMENT

A. Reinforcing bars (re-bars) shall be intermediate grade deformed bars conforming to CalTrans Standard Specifications, section 52-1.02A. Bars shall be clean new stock, free of rust, scale or other coatings that could affect the bond between bars and concrete. Bars shall be fy’60,000.

2.6 WATER STOPS

A. Water-stops shall conform to CalTrans Standard Specifications, section 51-1.14, unless noted otherwise on drawings.

PART 3 – EXECUTION

3.1 EXCAVATION

A. In addition to general excavation required under Section 31 22 00, contractor shall excavate to the required depths in locations shown for walkways, footings, foundations and etc. Excess excavation shall be replaced with an 800 psi 2-sack slurry mix prior to placement of the wall or pavement, at no additional cost to Owner.

3.2 FORMING

A. Forming shall comply with Standard Specifications section 51-1.05 and shall result in surface finished as follows:

B. Surfaces which will be below finished grade or totally hidden from view shall conform to “Ordinary Surface Finish”, Section 51-1.18A.

C. Surfaces exposed to view shall conform to “Class I Surface Finish”, Section 51-1.18B. Contractor shall build forms with degree of care, and shall select from materials of adequate strength and smoothness to produce smooth, even surfaces of uniform textures and appearances, free of unsightly bulges, depressions, or other imperfections. Owner’s representative shall be sole judge in this respect.

D. Transition of curves to straight lines and from curves to curves shall be formed as smooth, continuous, and uninterrupted, with typical ninety-degree (90-degree) radius alignment at points of tangency.

3.3 CONCRETE JOINTS

A. Joints shall be constructed at locations specified below.

B. Where expansion material is specified, cut expansion material back and caulk exposed surfaces with an approved polyurethane joint sealant, color to match concrete, or approved by Owner.

C. Dowel expansion joints with speed dowels.

D. Construct Concrete Joints as Follows:

1. Expansion Joints

   a. Concrete slabs shall be poured in alternate sections of maximum two hundred (200) square feet each section or per plans.

   b. Joints between each section shall have reinforcing dowels at minimum three (3) feet on center with speed dowel sleeve.

   c. Edge of joints between sections of concrete slabs shall have ¼” troweled radius edge.

   d. Expansion joints shall have reinforcing joints per plans and details.

2. Control Joints

   a. Control joints shall be a 3/16” wide and minimum ¾” deep sawcut .

   b. Tooled control joints shall be minimum ¾” deep with ¼” troweled radius.

3. Contractor shall submit shop drawings of control & expansion joints for approval.

3.4 EDGING

A. Expansion joints shall be tooled with one-quarter (1/8) inch radius edging tools.

B. Edge of slabs, curbs and other structures shall be tooled with one-half (3/16) inch radius edging tools, unless otherwise specified on drawings.

C. Flange marks resulting from tooling of edges shall be carefully troweled out, unless specifically detailed otherwise on details or plans.

D. Walls & curbs shall have edges trowel or chamfered per plans and details.

3.5 REINFORCEMENT

A. Reinforcement installation shall conform to Standard Specifications as follows:

1. Cleaning – Section 52-1.05.
2. Bending – Section 52-1.06.
3. Placing – Section 52-1.07.
4. Splicing – Section 52-1.08.
5. Lapped Splices – Section 52-1.08A

3.6 OBSERVATION

A. Owner shall observe and approve forming and reinforcing prior to pouring concrete. Contractor shall notify Owner five (5) working days in advance for observation of concrete forms.

3.7 CONCRETE PLACEMENT

A. Conform to Standard Specifications, section 51-1.09.

3.8 BONDING

A. Construction joints shall conform to Standard Specifications, section 51-1.13.

3.9 PAVEMENT

A. Concrete pavement shall be constructed in accordance with Standard Specifications, section 73-1.06. Pavements shall be marked or jointed as shown on drawings. Provide weakened plane joints minimum eight (8) feet on center and/or as detailed on drawings.

3.10 SURFACE DRAINAGE

A. Pavement shall have a pitch between one half percent (1/2%) and one and one-half percent (2%). Verify with the Owner on site where pitch exceeds two percent (2%). Finish surface shall drain properly with no areas of standing water. Tops of walls and curbs shall be level unless otherwise specified.

3.11 CURING

A. Cure new concrete in accordance with Standard Specifications, section 90-7.02 (“Curing Concrete”) by “Pigmented Curing Compound Method” or “Waterproof Membrane Method”. Method used must be compatible with sealers, concrete colors, exposed aggregate (if applies), other finishes and materials specified in this and other sections of the Contract Documents.

B. Air entraining agent shall conform to Standard Specifications, section 90-4.07. Add to concrete mix at a rate of three to six (3-6) fluid ounces per cubic yard during mixing period.

3.12 PROTECTION

A. New concrete shall be protected in accordance with Standard Specifications, section 90-8, and “Protecting Concrete”. Contractor shall provide necessary security to protect concrete from vandalism before it sets and hardens. Contractor shall replace concrete

that is defaced or damaged during course of this contract at no additional cost to Owner.

3.13 CONCRETE FINISHES

A. Color shall be natural gray concrete color.

B. Concrete work shall have even surfaces of uniform texture and appearance, free of unsightly bulges, depressions, and other imperfections. The Owner and Landscape Architect/Engineer shall be the judge in this respect.

C. Patching concrete to disguise flaws, imperfections or other damage shall commence only with approval from Owner's representative. Patching color and finish shall conform to original adjacent concrete color and finish, and Owner shall be sole judge in this respect.

D. Provide concrete finishes as follows:

1. Trowel Finish Curbs:

a. Finish surface shall be smooth and clean with no obvious trowel marks.

2. Paving Light Broom Finish:

a. Concrete shall be poured to line and grade as shown on plans.

b. Trowel and work the concrete to smooth even finish.

c. Brush with bristled broom lightly across width of path to a uniformly roughened surface. Finished surface shall be clean with uniform and reasonably straight lines.

d. Broom finish shall be in accordance with the drawings and details. Broom in a uniform direction.

3.14 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of these specifications.

B. Three concrete test cylinders shall be taken for every 75 or less cubic yards of concrete placed each day.

C. One additional test cylinder shall be taken during cold weather and cured on-site under same conditions as concrete it represents.

D. One slump test will be taken for each set of test cylinders taken.

E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.15 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury or graffiti until sufficient hardening occurs.

END OF SECTION

SECTION 32 18 23.13 MISCELLANEOUS ATHLETIC SURFACING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish labor, materials, apparatus, tools, equipment, transportation, temporary construction and special or occasional services as required to install all athletic materials and surfaces identified herein.

1.2 RELATED SECTIONS

A. 02 41 13 Demolition

B. 11 68 33 Sports Equipment

C. 31 22 00 Grading

D. 32 23 33 Trenching & Backfill

E. 32 16 00 Concrete

F. 32 31 13 Chain Link Fence

G. 32 33 00 Site Furnishings

H. 32 84 00 Irrigation

I. 33 14 16 Site Potable Water Distribution

J. 33 40 00 Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards unless otherwise documented by the construction documents:

1. American Society for Testing and Materials (ASTM)
2. Occupational Safety and Health Standards (OSHA)
3. California Building Code (CBC), current edition.
4. State of California Department of Transportation Standard Specifications, current edition
5. National Collegiate Athletic Association (NCAA)
6. National Association of Intercollegiate Association (NAIA)
7. World Athletics (IAAF)

1.4 PROJECT CONDITIONS

A. All materials shall be installed per manufacturer recommendations. Contact engineer when recommendations conflict with plans or specifications.

B. The contractor shall provide sealed engineered drawings for structures, footings, and other applicable components as required by state law.

1.5 SUBMITTALS

A. The following information shall be submitted prior to installation of specified work.

1. Manufacturer published product cut sheets indicating the product number, dimensions, materials and finish.
2. One-quart bag samples of aggregate surface materials provide to the Engineer.
3. Manufacturer warranty
4. Shop drawings for all products, as necessary.
5. Manufacture installation requirements and/or recommendations.

1.6 CONTRACTOR QUALIFICATIONS

A. Contractor shall have experience with installation of specified products and/or trained by the manufacturer prior to installation.

1.7 QUALITY ASSURANCE

A. The Contactor shall provide and install all materials as required by these specifications and shown on the project drawings.

B. The Contractor shall provide equipment from vendors or manufacturers that have been pre-approved or have been identified in writing as approved equals. The Owner is responsible for the determination of what products are considered equal.

1.8 MAINTENANCE

A. The Contractor shall service and maintain all site furnishings as necessary until the end of the contracted maintenance period and final acceptance by the owner.

1.9 WARRANTY

A. All sports equipment and site furnishings shall come with a manufacturer standard warranty.

PART 2 – PRODUCTS

2.1 BEACH VOLLEYBALL SAND

A. Beach volleyball sand shall be the following approved products:

1. P.W. Gillibrand Co Inc. - M30 Bunker Sand
2. Particle Size Distribution:

Sieve/Test	**% Retained on Sieve**
Gravel	0
Very Coarse	1
Coarse	5
Medium	72
Fine	16
Very Fine	3
Silt & Clay	<3

PART 3 – EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Ship and transport all materials in a safe manner protecting from weather, damage, moisture, segregation, mold and drying out.

B. Offload all products with appropriate equipment and care preventing any damage.

C. Store in a neat and orderly manner protected from elements to prevent weather, damage, moisture, segregation, mold and drying out.

D. Provide additional covering or conditioning as needed per manufacturer requirements.

3.2 INSTALLATION OF BEACH VOLLEYBALL SAND

1. Fill volleyball court and level to 3” below the adjacent concrete court edge.

2. Depth of sand shall be installed at a depth of 12” minimum, and a depth of 18” minimum inside play areas.

3.3 MAINTENANCE

A. Provide all necessary maintenance per manufacturer recommendations during the maintenance period.

B. Provide all training to owner for maintenance per manufacturer recommendations.

C. Furnish all extra materials and components included with the product to the Owner.

3.4 WARRANTY

A. The Contractor shall verify that all documents are proper order, contain full information and are certified or notarized where required.

END OF SECTION

SECTION 32 31 13 CHAIN LINK FENCE

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The Contractor must provide all labor, materials, equipment, tools and taxes necessary for the complete installation of a new chain link fence and gates. Project requires removal of fence fabric and removal of loose paint or vinyl coating from rails and posts for preparation and application of paint.

1.2 JOB CONDITIONS

A. The Fence Installer must review and accept all existing and improved site conditions, including existing fence connection conditions and grade prior to installation.

B. All products and materials must be approved for use in the state of California.

C. Verification of Quantities:

1. Quantities and dimensions shown on plans, sections and details are for contractor's convenience only. Contractor is responsible for their own quantity take offs and must provide all materials necessary for installation of fence and gates as shown on Construction Documents.

2. Discrepancies between such mentioned quantities and/or sections, and requirements of plans and/or specifications, will not entitle contractor to additional enumeration.

1.3 REFERENCES

A. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

C. ASTM F552 Standard Terminology Relating to Chain Link Fencing

D. ASTM F567 Standard Practice for Installation of Chain Link Fence

E. ASTM F626 Specification for Fence Fittings

F. ASTM F900 Specification for Industrial and Commercial Swing Gates

G. ASTM F1043 Specification for Strength and Protective Coatings of Steel Industrial Chain Link Fence Framework

H. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

1.4 DELIVERY, STORAGE, AND HANDLING

A. The contractor must coordinate the delivery and storage of materials with the District prior to shipping.

B. Materials must be protected at the job site to ensure that they do not become damaged by other materials, vandalized or stolen.

C. Materials must not be placed in such a way to obstruct any activities adjacent to the field or any paths of travel adjacent to the installation site.

1.5 QUALITY ASSURANCE

A. Use new materials and products, unless existing materials are products are specifically indicated in the Construction documents as salvage and repair.

B. Utilize one manufacturer for all fencing products whenever possible.

C. All materials, hardware, assemblies and workman ship, including footings are subject to District's representative or inspectors review. Work not observed is subject to uncovering and if so required replacement.

1.6 QUALIFICATIONS

A. The Fence Installer must have a minimum of five (5) years experience in the installation of chain link fence.

B. The Contractor must provide an experienced site supervisor and crew. An alternate installation supervisor and crew is to be provided if for any reason the District's Representation is dissatisfied with the installation process.

1.7 SUBMITTALS

A. Material specifications and cut sheets: Contractor must provide cut sheets for all gates, mesh, and hardware.

B. Material Samples:

1. Chain link mesh with specified size, gauge, coating and color.

2. 6" section of railing with paint.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vinyl fencing chain link fabric and wires:

1. Single piece fabric widths required up to manufactures maximum standard production width.

2. 9 ga. Steel wire x 3" mesh, coated with poly-vinyl chloride permanently fused bonded to galvanized wire by fusion method with breaking strength of 1200 lbs. 9 ga thickness is for core wire and does not include coating. Color to be black unless otherwise noted.

3. Knuckled top and bottom selvage only. Twist or barb salvage is not acceptable at any location.

4. Painted finishes on fabric are not acceptable. The color for this job is the manufacturer's standard black unless otherwise directed by the District.

B. Line Posts, Gate Posts, End Posts, Top Rail and Bottom Rail

1. SCH 40 steel Hot-Dipped Zinc-Coated (Galvanized) per ASTM 1083.

2. Powder coated. Color shall be black unless otherwise stated.

3. Color to match chain link fabric unless otherwise approved by District.

4. Top and bottom rail must be Manufacturer's longest length.

C. Gates

1. Fabric to match fence
2. Frames to be SCH 40 steel per ASTM 1083.
3. Color to match chain link fabric unless otherwise approved by District.
4. All frame pipe diameters are to be specified and supplied by Contractor supplied structural calculations and detail. Calculations are to be signed and sealed by Structural Professional Engineer registered in the state of California.
5. Install diagonal bracing as required per Manufacture's recommendations.
6. Install stretcher bars as required per Manufacturer's recommendations.

D. Gate Hardware

1. Repair or replace to match new fence fabric.
2. All gate hardware shall be ADA compliant and in accordance with CBC 11B.

E. Fittings and Accessories:

1. Material:
   a. Comply with ASTM F1043-00 for SS040 galvanized steel fence tubing.
   b. Steel and Iron: Unless specified otherwise, hot-dip galvanized pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. Zinc per sq. ft. as determined by ASTM A-90.
2. Finish
   a. Apply one coat of primer and one coat of Dunn Edwards Premium Exterior paint for metal. Color shall be black unless otherwise stated.
3. Post and Line Caps:
   a. Provide weather tight closure cap for each post.
   b. Provide line post caps with loop to receive tension wire or top rail.
4. Post Brace Assembly:
   a. Manufacturer's standard adjustable brace per Contractor provided shop drawings.
5. Tension or Stretcher Bars:
   a. Manufacturer's standard per Contractor provided shop drawings.
6. Tension and Brace Bands:
   a. Manufacturer's standard per Contractor provided shop drawings.
7. Tension Wires:
   a. 9 gage minimum
   b. Manufacturer's standard per Contractor provided shop drawings.

8. Tie Wires:
    a. Manufacturer's standard per Contractor provided shop drawings.

F. Wind Screens shall be Woven vinyl coated PVC Mesh produced for Tennis and or Beach Volleyball.

G. Screen material shall be 90% visual block commercial grade woven coated with UV inhibiting blend for chain link fence windscreen. (Color TBD)

H. Screen shall have custom graphics & logos per owner direction.

I. Material weight 330 g/m2.

J. Panels shall have 2" polypropylene webbing for edge reinforcement.

K. 3/8" brass grommets at 24" min. for fence attachment.

L. FenceScreen® 351 or equal.

M. 5 year limited warranty

PART 3 – EXECUTION

3.1 PREPARATION

A. Coordinate all post locations with onsite utilities existing and proposed including landscape irrigation mainlines and laterals prior to installation.

B. Report conflicts between post locations and any other on site utility or features to District immediately.

3.2 INSTALLATION

A. Install framework, fabric, accessories, and gates in accordance with best trade practice for sports field / recreational installations.

B. Make welds neat and secure, grind off excess exposed metal.

C. Securely set posts plumb in alignment at proper depth and height.

D. Install rigid bracing where required for stable, secure fence.

E. Install fabric under tension and securely tie to posts, rails and braces.

F. Gates must move freely without sag.

G. Space line posts at intervals not exceeding 10 feet.

H. Slope top of concrete footings for water runoff.

I. Brace each gate and corner post back to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.

J. Install center and bottom brace rail on corner and gate leaves.

K. Position bottom of fabric ½" above finished grade.

L. Install fabric on the ballfield interior side of posts.

M. Fasten fabric to top rail, line posts, braces, and bottom tension wire with 11 AWG galvanized wire ties 24 inches (610 mm) maximum on centers.

N. Attach fabric to end, corner, and gateposts with tension bars and tension bar clips.

O. Install bottom rail supported at each line and terminal post in such a manner that a continuous brace between posts is formed.

P. Install gate fabric to match fence.

Q. Install tie wires with one tight turn to hold fabric firmly to frame, bend ends of wire inward to avoid person or clothing snag points.

R. Install fasteners, nuts for tension bands and hardware bolts on the side of the fence opposite fabric side. Spoil ends of bolts to prevent removal of nuts.

END OF SECTION

SECTION 32 33 00 SITE FURNISHINGS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish labor, materials, apparatus, tools, equipment, transportation, temporary construction and special or occasional services as required to install all sports equipment.

B. Unless specifically stated otherwise, the Contractor is responsible for the purchase and installation of all sports equipment.

1.2 RELATED SECTIONS

A. 02 41 13 Demolition

B. 11 68 33 Sports Equipment

C. 31 22 00 Grading

D. 32 23 33 Trenching & Backfill

E. 32 16 00 Concrete

F. 32 18 23.23 Miscellaneous Athletic Surfacing

G. 32 31 13 Chain Link Fence

H. 32 84 00 Irrigation

I. 33 14 16 Site Potable Water Distribution

J. 33 40 00 Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards unless otherwise documented by the construction documents:

1. American Society for Testing and Materials (ASTM)

2. Occupational Safety and Health Standards (OSHA)

3. California Building Code (CBC), current edition.

4. State of California Department of Transportation Standard Specifications, current edition

1.4 PROJECT CONDITIONS

A. All materials shall be installed per manufacturer recommendations. Contact Landscape Architect/Engineer where recommendations conflict with plans or specifications.

B. The contractor shall provide sealed Landscape Architect/Engineered drawings for structures, footings, and other applicable components as required by state law.

1.5 SUBMITTALS

A. The following information shall be submitted prior to installation of specified work.

1. Manufacturer published product cut sheets indicating the product number, dimensions, materials and finish.

2. Manufacturer warranty
3. Shop drawings for all products, as necessary.
4. Manufacture installation requirements and/or recommendations.

1.6 CONTRACTOR QUALIFICATIONS

A. Contractor shall have experience with installation of specified products and/or trained by the manufacturer prior to installation.

1.7 QUALITY ASSURANCE

A. The Contactor shall provide and install all materials as required by these specifications and shown on the project drawings.

B. The Contractor shall provide equipment from vendors or manufacturers that have been pre-approved or have been identified in writing as approved equals. The Owner is responsible for the determination of what products are considered equal.

1.8 MAINTENANCE

A. The Contractor shall service and maintain all site furnishings as necessary until the end of the contracted maintenance period and final acceptance by the owner.

1.9 WARRANTY

A. All sports equipment and site furnishings shall come with a manufacturer standard warranty.

PART 2 – PRODUCTS

2.1 SITE FURNISHINGS

A. The Contractor is required to provide and install all permanent and loose equipment as specified by this section, per manufacturer recommendations and as shown on drawings.

B. Drinking fountains and bottle fillers shall be the following:

Item Listed in Plan	**Manufacturer**	**Model**	**Details/Finish**
Drinking Fountain	Haws	3612	Haws Outdoor, ADA-compliant pedestal mounted bottle filler and high-low drinking fountain, matte-silver powder coating, with hose bib

C. Shower Station

Item Listed in Plan	**Manufacturer**	**Model**	**Details/Finish**
Outdoor Shower	Most Dependable Fountain	565 SM + locking hose bib on back side	One-sided approach shower, ADA shower, ADA grab bars, and footwash, power coated silver

2.1 MANUFACTURER PHONE NUMBERS:

A. Haws: (800) 260-664

PART 3 – EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Ship and transport all materials in a safe manner protecting from damage, corrosion, and wear.

B. Offload all products with appropriate equipment and care preventing any damage.

C. Store in a neat and orderly manner protected from elements to prevent damage, corrosion, or wear. Provide additional covering or conditioning as needed per manufacturer requirements.

3.2 INSTALLATION

A. Installation of the sports equipment shall follow the directions of the manufacturer and/or vendor. The Contractor shall report any discrepancies in construction plans or specification and manufacturer instructions or requirement prior to installation of equipment.

B. Shop drawings of all equipment installations are required for approval prior to installation of equipment unless specifically waived by manufacturer or Landscape Architect/Engineer.

3.3 MAINTENANCE

A. Provide all necessary maintenance per manufacturer recommendations during the maintenance period.

B. Provide all training to owner for maintenance per manufacturer recommendations.

C. Furnish all extra materials, keys, caps, tools, fittings, and components included with the product to the Owner.

3.4 WARRANTY

A. The Contractor shall verify that all documents are proper order, contain full information and are certified or notarized where required.

B. END OF SECTION

SECTION 32 84 00 IRRIGATION

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all labor; materials, tools, equipment, and services necessary for the execution and completion of the irrigation system with reclaimed water as indicated on the drawings and as described in these specifications and the General Conditions.

B. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan work accordingly, furnishing such offsets, fittings and sleeves as may be required to meet such conditions. All work called for on the drawings by notes and/or details shall be furnished and installed whether or not specifically mentioned in the specifications.

C. The work of this Section generally includes provisions of an automatic underground sprinkler system including but not limited to the following:

1. Trenching, stockpiling excavation material and backfilling trenches.
2. Complete system including but not limited to piping, valves, fittings, sprinkler heads, bubblers, drip emitters, controllers and wiring, and final adjustments to insure complete coverage.
3. Replacement of unsatisfactory materials.
4. Clean-up, inspection, and approval.
5. Testing the system to assure that all landscape areas are efficiently and uniformly irrigated and that the system performs, as required, by the plans and specifications.
6. Warranties and guaranties.

D. No irrigation work shall be performed until all areas are finished to proper grade and until soil preparation is completed and has been approved by the Owner's Representative.

E. Furnish labor, materials, apparatus, tools, equipment, transportation, temporary construction and special or occasional services as required to install automatic irrigation system.

F. Unless specifically stated otherwise, the Contractor is responsible for the purchase and installation of all specified equipment and materials.

1.2 RELATED SECTIONS

A. 02 41 13 Demolition

B. 11 68 33 Sports Equipment

C. 31 22 00 Grading

D. 32 23 33 Trenching & Backfill

E. 32 16 00 Concrete

F. 32 18 23.23 Miscellaneous Athletic Surfacing

G. 32 31 13 Chain Link Fence

H. 32 33 00 Site Furnishings

I. 33 14 16 Site Potable Water Distribution

J. 33 40 00 Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards:

1. American Society for Testing and Materials (ASTM)
2. Occupational Safety and Health Standards (OSHA)
3. California Building Code (CBC), current edition.
4. State of California Department of Transportation Standard Specifications, current edition (Green Book)

B. Perform Work in accordance with requirements and Conditions of the Contract and Specification as well as the provisions of all applicable Federal, State, and local laws, codes, ordinances, rules, and regulations.

C. Conform to the latest requirements of reference information listed below except where more stringent requirements are shown or specified in Contract Documents.

1. American Society for Testing and Materials (ASTM)-Specifications and Test Methods specifically referenced in this Specification Section.
2. Underwriters Laboratories (UL) - UL Wires and Cables.
3. American Water Works Association (AWWA)-Specifications specifically referenced in this Specification Section.
4. American National Standards Institute (ANSI)-Specifications specifically referenced in this Specification Section.
5. National Sanitation Foundation (NSF)-Specifications specifically referenced in this Specification Section.
6. American Society of Agricultural Engineers (ASAE)-Specifications specifically referenced in this Specification Section.

1.4 DEFINITIONS

A. Definitions of words that may need specific understanding (may not be any for irrigation)

1.5 PROJECT CONDITIONS

A. General requirements?

B. Special requirements:

1. Tolerances - Specified depths of mainline and lateral pipes are minimums. Settlement of trenches is cause for removal of finish grade treatment, refilling, re-compaction, and repair of finish grade treatment.

2. Coordination with Other Contracts - Protect, maintain, and coordinate Work with the Work under other Sections.

3. Damage To Other Improvements - Contractor shall replace or repair damage to grading, soil preparation, seeding, sodding, or planting done under other Sections during Work associated with installation of irrigation system at no additional cost to the Owner.

4. A licensed and bonded plumber shall execute work involving substantial plumbing for installation of backflow preventers, copper service and related work.

5. A licensed and bonded electrician shall execute Work-involving connection to, installation, or extension of 120 volt or greater electrical services.

C. Protection of Property

1. Preserve and protect all trees, plants, monuments, structures, and paved areas from damage due to Work of this Section. In the event damage does occur, items shall be completely repaired or replaced to the satisfaction of the Owner.

2. Protect buildings, walks, walls, and other property from damage. Barricade open trenches. Damage caused to asphalt, concrete, or other building material surfaces shall be repaired or replaced at no cost to the Owner. Restore disturbed areas to the original condition

D. Protection and Repair of Underground Utility Lines

1. Request proper utility company to stake exact location (including depth) of all underground water, sewer, electric, gas, cable TV or telephone lines. Take whatever precautions are necessary to protect these underground lines from damage. In the event damage does occur, the Contractor must repair all damage or must pay all costs of repairs.

E. Replacement of Paving and Curbs

1. Where trenches and lines cross under existing roadways, paths, curbing, etc., damage to these shall be kept to a minimum and shall be restored to original condition as deemed acceptable by the Owner’s Representative.

F. All materials shall be installed per manufacturer recommendations. Contact engineer when recommendations conflict with plans or specifications.

1.6 SUBMITTALS

A. Shop Drawings

1. Submit Shop Drawings if noted on the construction drawings. Include a complete materials list indicating manufacturer, model number, and description of all materials and equipment to be used. Show all appropriate dimensions and adequate detail to accurately portray intent of construction.

B. Manufacturer Literature

1. Contractor to submit manufacturer cut sheets for all material and equipment components required for installation of the irrigation system as indicated in specification or on the construction drawings, for approval by the Owner’s Representative prior to installation.

2. Provide an index sheet for each set of material cut sheets outlining; item, manufacturer, and model number in order of cut sheets.
3. Highlight or circle specific model or item to be approved on cut sheets, which feature more than one model or item.

C. Record Drawings (AS-BUILTS)

1. The Contractor must keep a full size, hard copy prints on site throughout construction for the purpose of red line – as-built drawings. At end of every day, revise prints for Work accomplished that day in red ink. Upon completion of the Project prior to final acceptance, submit for review, a final set of as-built to the Owner's Representative. Dimension from two permanent points of reference (building corners, sidewalk, road intersections or permanent structures), the location of the following items:
    a. Point-of connection.
    b. Routing of mainline pipe (dimension every 50 feet and at all angle points).
    c. Master control valves.
    d. Electric control valves.
    e. Quick coupling valves.
    f. Isolation valves.
    g. Control wire routing (if not installed with mainline pipe).
    h. Communication cable routing.
    i. Control wire and communication cable splices (if not inside field satellite unit)
    j. Flow sensors.
    k. Control wire splice boxes.
    l. All potable water line and/or service crossings (document type of extra crossing protection installed).
    m. All backflow prevention devices installed within the project boundaries (including potable water service and fire connections).
    n. All water meters installed within the project boundaries (including potable water service and fire connections).
    o. Other related equipment as directed by the Owner's Representative.
2. Owner's Representative will not certify any pay request submitted by the Contractor if the as-built drawings are not current, and processing of pay request will not occur until as-builts are up to dated.
3. Prior to scheduling the walk-through for substantial completion, the Contractor shall submit all as-built and pressure test information to Owner's Representative for approval.

D. Controller Drawings – Do not prepare controller drawings until record (as-built) drawings have been approved by the Owner's Representative.

1. Provide one controller drawing for each automatic controller installed.
    a. Controller drawings may be the same size reproduction as the record drawing, if scale permits fitting inside controller door without folding drawing. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.
    b. Controller drawings shall be blueline print of actual "as-built" system, showing area covered by that controller.
    c. Identify the areas of coverage of each remote control valve, using a distinctly different color for each zone. Highlight heads, lateral piping, and control valves.
    d. Following review of the controller drawings by Owner's Representative, hermetically seal each drawing between two layers of 20-mil thick clear plastic.
    e. Controller drawings shall be completed and approved by the Owner's Representative prior to final completion walk-through of the irrigation system.
    f. Attach approved controller drawing to the inside of each controller door using self-adhesive Velcro strips.

E. Pressure Testing
1. Contractor shall submit pressure testing certification for each mainline segment constructed to Engineer and Owner's Representative for approval. Certification shall document the test, date, time, duration, pressures and mainline segment location. All pressure testing shall conform to requirements noted in these specifications.

F. Cross-Connection Testing
1. Contractor shall submit cross - connection testing results for each mainline segment constructed to the Engineer for approval certification. Testing documentation shall include the test, date, time, duration, and mainline segment location. All cross - connection testing shall conform to requirements noted in these specifications.

G. Operation Manual
1. Index sheet stating project name, and listing company, address, phone number and contact person of Owner and Contractor, including Primary Subcontractors.
2. Written instructions for operation and maintenance of pumping equipment, fertilizer/ chemical injectors (if applicable).
3. Manufacturer Technical Manual for controllers.
4. Manufacturer cut sheets for heads, control valves, quick coupling valves, gate valves, controllers, drip irrigation components, and valve boxes.
5. Written documentation of all irrigation schedules developed for the project by the Contractor.

1.7 CONTRACTOR QUALIFICATIONS

1.8 QUALITY ASSURANCE

Installer Qualifications - Installer shall have experience and demonstrated ability in the installation of irrigation system(s) in accordance with recognized laws, codes and standards of workmanship. To demonstrate ability, experience necessary for this Project, submit if requested by the Owner, prior to contract award the following:

1. List of 3 projects completed within the last 2 years of similar complexity to this Project. Description of projects shall include the following:
    a. Name of project.
    b. Location.
    c. Owner.
    d. Description of work.

1.9 MAINTENANCE

A. Furnish the following maintenance items to Owner prior to final Acceptance:
    1. Two (2) six (6)-foot valve keys for operation of isolation valves (if applicable).
    2. Two (2) quick coupler keys and two (2) matching hose swivels for each type of quick coupling valve installed.

1.10 WARRANTY/GUARANTY

A. The Contractor shall warrant all materials against defects for a period of Two (2) year from date of Substantial Completion. The Contractor shall also guarantee workmanship for the same Two (2) year period. The Contractor shall also be responsible for coordinating all material warranty items with the manufacturer/distributor.

B. Settling of backfilled trenches, which may occur during the guaranty period, shall be repaired by contractor at no expense to Owner, including complete restoration of damaged property

C. Expenses due to vandalism before substantial completion shall be borne by the Contractor.

D. The Owner or Representative Maintenance Company shall maintain all turf and planting areas during the warranty period.

PART 2 – PRODUCTS

2.1 MATERIALS

A. All irrigation pipes and fittings shall be for reclaimed watercolor purple where applicable.

B. Mainline Pipe and Fitting
    1. Irrigation mainline pipe – Reclaimed Purple SCH 40 PVC solvent weld (1" through 2 1/2") with SCH 80 solvent weld PVC fittings

C. Plastic Pipe and Fittings
    1. Identification Markings: - All pipe shall be identified with the following indelible markings:
        a. Manufacturer's name.

b. Nominal pipe size.

c. Schedule or class.

d. Pressure rating.

e. NSF (National Sanitation Foundation) seal of approval.

f. Date of extrusion.

g. Note: When installed, markings shall be face up.

D. Isolation Valves

1. Isolation valves (Control Valves) for ¾-inch through 2-Inch Pipe – Bronze two-piece full port construction with PTFE seats rated at rated at 400 PSI.

E. Quick Coupling Valves

1. Brass two-piece body designed for working pressure of 150 PSI. Type and size shown on the drawings with purple caps.

F. Valve Boxes

1. As indicated in drawings with purple lids

G. Pipe bedding material

1. Clean native soil as approved by Owner's Representative and Landscape Architect except where construction grade pipe bedding sand is required per construction details.

PART 3 – EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Product, Storage and Handling - Deliver, unload, store, and handle materials, packaging, bundling and products, in dry, weatherproof, waterproof conditions to prevent damage, breakage, deterioration, intrusion, ignition, and vandalism. Deliver in original unopened packaging containers prominently displaying manufacturer name, volume, quantity, contents, and instructions in conformance with local, state, and federal laws. Remove and replace cracked, broken, or contaminated items prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire, or jobsite damage.

B. Handling of PVC Pipe - Exercise care in handling, loading and storing of PVC pipe. All PVC pipe shall be transported in a vehicle, which allows length of pipe to lie flat so as not to subject it to undue bending or concentrated external loads. All sections of pipe that have been dented or damaged shall be discarded, and if installed, shall be removed and replaced with new piping.

3.2 INSPECTION

A. The Contractor is to examine all areas and conditions under which Work of the Section is to be performed. The Contractor may not proceed with Work until any unsatisfactory conditions have been corrected. Conditions to be considered include but are not limited to rough grading, new or existing utility installations that directly conflict with proposed work, excavations not related to current work, hardscape or landscape and potential safety hazards.

3.3 PREPARATION

A. Staking and marking must be done with flags, powdered lime or marking paint.

B. The Contractor must mark the routing of mainline pipe, lateral pipe, heads and control valve locations as directed by Owner's Representative. Contact Owner's Representative 48 hours in advance and request review of staking. Owner's Representative and Engineer will review staking and direct changes if required. Staking review does not relieve installer from coverage problems due to improper placement of heads after staking.

C. The Contractor must install sleeving under asphalt paving and concrete walks, prior to concreting and paving operations, to accommodate all piping and wiring. Compact backfill around sleeves to 95% Standard Proctor Density within three (3) percent of optimum moisture content in accordance with ASTM D1557.

1. Refer to design drawings for sleeving schedule and sizing requirements.
2. At a minimum the diameter of all sleeve pipes must be 2 times larger than the nominal diameter of carrier pipe or 3-inch, whichever is greater.
3. No single sleeve is to contain more than a single carrier pipe.
4. Pipes and control wires must be installed in separate sleeves.

D. Trench excavation must follow, as much as possible, layout shown on the drawings. Dig trenches straight and support pipe continuously on the bottom of the trench. Trench bottoms shall be clean and smooth with all rock and organic debris removed. Mainline trenches shall be over-excavated as required to allow for bedding material. Trench depth shall be uniform as required to meet minimum depth requirements for type of piping.

E. Boring will be permitted only where pipe must pass under obstruction(s), which cannot be removed, and must be approved by the Owner's Representative if not specifically indicated on construction drawings. Final density of backfill shall match that of surrounding soil. Use of sleeves of suitable diameter is acceptable if installed first by jacking or boring, and pipe laid through sleeves. Observe same precautions as though pipe were installed in open trench.

3.4 INSTALLATION

A. PVC Piping

1. Snake pipe in trench to allow for expansion and contraction.
2. When pipe laying is not in progress, or at end of each day, close pipe ends with tight plug or cap. Perform work in accordance with good practices prevailing in piping trades.
3. Lay pipe and make all plastic-to-plastic joints in accordance with manufacturer's recommendations.
4. For piping 3-inches and larger, trenches must be a minimum of 12-inches or large enough to properly assemble and position pipe in trench.
5. For piping smaller than 3-inches, trenches must be a minimum of 6-inches or large enough to properly assemble and position pipe in trench.

6. The Contractor must install minimum pipe clearances of 6-inches between irrigation lines or 12-inches between lines of other trades. The contractor must increase line clearance as required by local, county, state or utility service regulations.

B. Gasketed End Pipes

1. Lay pipe and make pipe to fitting or pipe to pipe joint following pipe manufacturer's recommendations.

C. Thrust Blocks

1. Contractor must use joint restraints as required on drawings and details. Thrust blocks are allowable only with written approval from engineer.
2. If allowed, the Contractor must install thrust blocks behind all gasketed fittings, tees, bends, reducers, line valves, and caps in accordance with pipe manufacturer's recommendations.
3. If allowed, thrust block sizing requirements will be provide to contractor.
4. If allowed, all thrust block installations are to be reviewed by Owner’s Representative or Engineer prior to backfill. The Contractor must provide adequate notice (3 – business days) to call for review of thrust blocks.

D. Low Voltage Wiring

1. Bury control wiring between controller and electric valves in mainline trenches, with wires consistently located below and to one side of pipe, on top of initial pipe bedding.
2. Control wire not installed in mainline trench must be installed in PVC conduit. Conduit to be sized to allow for wire pulling.
3. Bundle all 24 volt wires at ten (10)-foot intervals with electrical or duct tape.
4. Provide an expansion loop at pressure supply line angle fittings, every electric control valve location (in valve box), and at minimum 500 feet intervals. Form expansion loop by wrapping wire at least eight (8) times around a 3/4-inch pipe and withdrawing pipe.
5. Control wire connections and splices shall be made with waterproof, below grade rated splice kits.
6. Splices in control wire outside of remote control valve are not accepted. In the event of two wire path damage during installation the contractor is to notify the engineer and installed repair splice in dedicated valve box. Record all repair splice locations on record drawings.
7. Install one control wire for each control valve.
8. Run two spare #12-1 control wires from controller pedestal to last electric control valve operated by controller on each and every leg of mainline pipe. Label spare wires at controller and wire stub box. Loop a minimum of 24" from all spare wires inside every control valve box operated by controller.
9. Grounding and lightning protection is to be installed per manufacturer’s recommendations and requirements.

E. Communication Cable

1. Installed as per manufacturer's specifications and the plan details.
2. Splices to occur only at controller pedestal and at designated wire splice boxes

F. Line Voltage Wiring

1. Provide 120-volt power connection to automatic controller. A licensed Electrician must make 120-volt power connection.

G. Irrigation Satellite Controller

1. Install controller in accordance with manufacturer's instructions as detailed and where shown on the drawings.
2. Connect remote control valves to the controller in numerical sequence as shown on the drawings.
3. The Owner's Representative shall approve final location of irrigation controllers prior to installation.
4. Each controller shall have a dedicated separate ground wire, installed per manufacturer's recommendations and requirements.
5. Above ground conduit shall be rigid galvanized with appropriate fittings. Below ground conduit shall be schedule 80 PVC.
6. Label each controller with a letter or number designation (indicated on drawings) with four (4)-inch high vinyl adhesive letters on inside of front panel cover.

H. Electric Control Valves

1. Install cross handle two 2-inches below finished grade where shown on the drawings and as detailed.
2. When grouped together, allow at least twelve (12) inches between valve box sides.
3. Install each remote control valve in a separate valve box unless construction details specifically indicate multi-valve boxes.
4. When parallel to roadway, sidewalk, or other permanent element or structure, control valve and box to be installed perpendicular to element or structure, spaced equally.

I. Quick Coupling Valves

1. Install quick couplers on prefabricated swing-joint assemblies plumb to grade. Angled nipple relative to pressure supply line shall be no more than 60 degrees and no less than 30 degrees. Quick coupling valves must be installed in separate dedicated valve box unless construction details specifically indicate alternate installation.

J. Valve Boxes

1. Valve box extensions are not acceptable except where specifically called for in construction details.
2. All valve boxes are to be set on 2x4 inch stabilization bricks.

3. Install gravel sump after compaction of all trenches. Place final portion of gravel inside valve box after valve box is backfilled and compacted.
4. Install valve boxes relative to finished grade as indicated in construction details.
5. Brand all valve box lids.
    a. Quick Coupling Valves – Brand quick coupling valve box lids with letters "Q.C."
    b. Isolation Gate Valves – Brand all isolation gate valve box lids with letters "G.V.".
6. Valves installed below synthetic turf must be installed in aluminum comboxes with synthetic turf infill retention system as indicated in the drawings.

K. Isolation Valves

1. Isolation valves 3-inch and larger are to be ductile, resilient wedge, square nut, non-rising stem.
2. Separate isolation valves from thrust or bearing blocks with polywrap. Do not encase valves in concrete.
3. Isolation valves smaller than 3 inch are to be bronze. PVC ball valves are not accepted unless specifically called for on construction details.

L. Backfilling

1. Do not begin backfilling operations until required system tests have been completed. Center loading is required for mainline pressure testing. Backfill shall not be done in freezing weather except with prior approval Owner's Representative. Leave trenches slightly mounded to allow for settlement after backfilling is completed. Trenches shall be finish graded prior to walk-through of the irrigation system by the Owner's Representative.
2. All mainline pipe shall be bedded with clean on-site soil 4-inches below invert of pipe, to 6-inches above top of pipe and width of trench except where plans and details specifically call for construction grade sand pipe bedding.
3. Materials - Excavated material is generally considered satisfactory for backfill purposes after completing bedding requirements. Backfill material shall be free of rubbish, vegetable matter, frozen materials, and stones larger than one (1) inches in maximum dimension. Do not mix subsoil with topsoil. Material not suitable for backfill shall be hauled away. Contractor shall be responsible for providing suitable backfill if excavated material is unacceptable
4. Open excavations must be protected in accordance with OSHA regulations.
5. Compact backfill to 90% maximum density in 6-inch lifts, determined in accordance with ASTM D155-7 utilizing the following methods:
    a. Mechanical tamping.
    b. Puddling or ponding. Puddling or ponding and /or jetting is prohibited within 10'- 0" of building or foundation walls.

M. Piping Under Paving

1. Provide for a minimum cover of 30-inches between the top of the pipe and top of asphaltic concrete or concrete paving.
2. Piping shall be bedded with construction grade sand 6-nches below pipe to 6-inches above pipe and width of excavation.
3. Compact backfill material in 6-inch lifts at 95% maximum density determined in accordance with ASTM D1557 using manual or mechanical tamping devices.
4. Set in place, cap, and pressure test all piping under paving, in presence of the Owner's Representative prior to backfilling and paving operations.
5. Piping under existing walks or concrete pavement shall be done by jacking, boring, or hydraulic driving, but where cutting or breaking of walks and/or concrete is necessary, it shall be done and replaced at no cost to Owner. Obtain permission and prior approval to cut or break walks and/or concrete from the Owner's Representative.

3.5 FIELD QUALITY CONTROL

A. Flushing

1. After piping, risers, and valves are in place and connected, but prior to installation of sprinkler heads, quick coupling valves, and air release valves, thoroughly flush piping system under full head of water pressure from dead end fittings. Maintain flushing for ten (10) minutes through furthermost valves. Cap risers after flushing.

B. Pressure Testing

1. Conduct tests in presence of the Owner's Representative. Arrange for presence of reviewer a minimum of 48 hours in advance of testing. Supply force pump and all other test equipment.
2. After center load backfilling, (All pipe joints and fittings shall remain uncovered) and installation of all control valves, quick coupling valves, drain valves, and air release valves, fill mainline pipe with clean clear water, and pressurize to 50 psi over the designated static pressure or 125 psi, whichever is greater, for a period of 6 hours.
3. The contractor must wait for initial small pressure loss due to air release prior to recordings starting pressure. No pressure loss after recording starting pressure for the duration of the test is accepted.
4. If leaks or pressure loss are detected than the Contractor is to repair and retest system until test pressure can be maintained for duration of pressure test.
5. No more than 2,000 feet of mainline is to be tested in a single pressure test.
6. Before substantial completion, all mainline pipe shall remain under pressure for a minimum period of 48 hours.

C. Walk-Through for Substantial Completion

1. Arrange for the Owner's Representative's presence a minimum of 5 business days in advance of the walk-through.

2. Entire system shall be completely installed and operational prior to scheduling of walk-through. All sodded areas shall be complete with head height and valve boxes adjusted accordingly.
3. Operate each zone in its entirety from the controller for the Owner's Representative at time of walk-through and open all valve boxes.
4. Owner's Representative shall generate a list of items to be corrected prior to Final Completion.
5. Furnish all materials and perform all Work required to correct all inadequacies due to deviations from Contract Documents, and as directed by the Owner's Representative.

D. Walk-Through for Final Completion

1. Arrange for the Owner's Representative's presence a minimum of 5 business days in advance of walk-through.
2. Show evidence to the Owner's Representative that Owner has received all accessories, charts, record drawings, and equipment as required before the Final Completion walk-through is scheduled.
3. Operate each zone identified as deficient at the Substantial Completion walk-through for Owner's Representative at time of the Final Completion walk-through to insure correction of all incomplete items.
4. Items deemed not acceptable to the Owner's Representative shall be reworked to the complete satisfaction of the Owner's Representative.
5. If after request to the Owner's Representative for walk-through for Final Completion of the irrigation system, the Owner's Representative finds items during the walk-through that have not been properly adjusted, reworked, or replaced as indicated on the list of incomplete items from the Substantial Completion walk-through, the Contractor shall be charged for all subsequent walk-throughs. Funds will be withheld from the Final payment and/or Retainage to the Contractor, in the amount equal to the additional time and expenses required by the Owner's Representative to conduct and document further walk-throughs as deemed necessary to insure compliance with the Contract Documents.

3.6 ADJUSTING

A. Upon substantial completion of installation, "fine-tune" the entire irrigation system by regulating valves, adjusting patterns and break-up arms/screws, and setting pressure reducing valves or throttling control valve flow controls at proper pressure to provide optimum and efficient coverage

B. Areas that do not conform to designated operation requirements due to unauthorized changes or poor installation practices shall be immediately corrected at no additional cost to the Owner.

3.7 CLEANING

A. Maintain continuous cleaning operations throughout the duration of Work. Dispose of, off-site at a legal dumpsite and at no additional cost to Owner, all trash or debris generated by the installation of the irrigation system.

END OF SECTION

SECTION 33 14 16 - SITE POTABLE WATER DISTRIBUTION PIPPING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish labor, materials, equipment, facilities, transportation and services to complete domestic water systems and related work as shown on contract documents.

B. The general extent of water lines and structures are shown on the drawings and include, but are not necessarily limited to, the following:

1. Trenching and backfill of domestic water pipe
2. Pipes & pipe fittings
3. Appurtenances
4. Restraints
5. Valves
6. Risers
7. Cover boxes

1.2 RELATED SECTIONS

A.	02 41 13	Demolition
B.	11 68 33	Sports Equipment
C.	31 22 00	Grading
D.	32 23 33	Trenching & Backfill
E.	32 16 00	Concrete
F.	32 18 23.23	Miscellaneous Athletic Surfacing
G.	32 31 13	Chain Link Fence
H.	32 33 00	Site Furnishings
I.	32 84 00	Irrigation
J.	33 40 00	Storm Drainage Utilities

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards:

1. American Society for Testing and Materials (ASTM)
2. Occupational Safety and Health Standards (OSHA)
3. California Building Code (CBC), current edition.
4. State of California Department of Transportation Standard Specifications, current edition (Green Book)

B. Grading materials and operations shall adhere to the requirements and recommendations of the Geotechnical Reports completed by Geotechniques, including all supplements, addendums, and clarifications, unless otherwise specified herein.

1.4 PROJECT CONDITIONS

A. Prior to trenching, the Contractor shall check invert elevations of existing drain structures and pipes to which connections are to be made and report discrepancies to Owner representative.

B. The Contractor shall verify existing conditions before starting work.

C. The contractor shall flush all existing drain lines to remain within the project area to the nearest junction or outfall and collect all flushed water and debris.

D. The Geotechnical Engineer or Geotechnical Field Engineer shall provide observation and testing during the trenching operations.

E. The Contractor shall provide dust control in conformance with all environmental regulations.

F. Contractor shall, prior to commencement of work, submit a letter to owner stating locations of disposal sites for excess materials, and certifying that they have obtained property owner's permission for disposal of surplus materials.

G. The Contractor shall protect existing structures and facilities which are to remain.

H. The Contractor shall not interfere with use of adjacent buildings or block access to facilities to remain open during grading operations.

I. The Contractor shall maintain free and safe passage to and from adjacent buildings and maintenance areas outside the project limits.

J. The Contractor shall prevent movement or settlement of walls and structures, provide bracing or shoring, be responsible for safety and support of structures and assume liability for building movement, settlement, damage, or injury.

K. The Contractor shall cease operations and notify owner immediately if safety of structures appears to be endangered, take precautions to properly support structures, and resume operations only after safety is restored.

L. The Contractor shall provide, and maintain barricades, lighting, and guardrails required by applicable regulatory advisory to protect passersby, workers and building occupants.

M. The Contractor shall provide all necessary shoring and safety means and methods required for stabilizing trenches and excavations to the depths indicated on the plans per OSHA requirements.

N. The Contractor shall provide necessary clean and potable water for construction activities, moisture conditioning and compaction.

O. The Contractor shall provide and maintain, at all times, during construction, the means and devises to promptly remove and properly dispose for water from any source entering low points, trenches, or other excavations at no additional cost to the Owner.

P. Quantities shown on grading plans and sections are for Contractor's convenience and not guaranteed. Grading shall be done in conformance with elevations shown on plans

and in accordance with specifications. Discrepancies between such mentioned quantities and/or sections, and requirements of grading plans and/or specifications, will not entitle Contractor to additional remuneration.

Q. All materials shall be installed per manufacturer recommendations. Contact Engineer when recommendations conflict with plans or specifications.

1.5 SUBMITTALS

A. The following information shall be submitted prior to installation of specified work.

1. Product Data: Provide data on pipe, pipe fittings, grates, manholes, lids, catch basins, trench drains, slot drains and storm sewer appurtenances.

2. Certificates of inspection, as applicable.

3. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.

4. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

5. Warranty information, as applicable.

B. The following information shall be submitted at the time of project closeout.

1. Accurately record actual locations of pipe runs, valves, boxes and risers.

2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 MAINTENANCE

A. The Contractor shall keep valves and exposed appurtenances free and clear of soil and debris throughout the course of the construction process.

B. The Contractor shall maintain water service to existing facilities throughout the duration of construction.

PART 2 – PRODUCTS

2.1 PIPE MATERIALS

A. Distribution Pipe will be Class 200 PVC and Schedule 80 PVC.

B. Pipe fittings will be shall be Schedule 80 PVC.

2.2 APPURTENANCES

A. Valves 3-in., 2 ½-in., and 2-in. shall be resilient-seated gate valves conforming to AWWA C509 with the added requirement that the gate valve shall be rated at 250 psi.

1. Gate valve shall be non-rising stem.

2. 3-in., 2 ½-in., and 2-in gate valves shall be Nibco T-113 Gate Valve or acceptable equal.

B. Valve boxes shall be concrete traffic type with cast iron ring and cover.

1. Cover shall be marked "Water". Valve boxes and valve box risers shall be provided for all line valves.

2. The valve boxes shall be concrete Old Castle, or approved equal.

C. Identification tape shall be 3 inch wide, 4-mil thick, manufactured specifically for warning and identification of buried utility lines.

1. Identification tape for potable water shall be blue in color and shall bear the legend "CAUTION - BURIED WATER LINE" (legend may vary to suit manufacturer's standard).

D. The layout and details shown on utility plans are schematic only. The Contractor shall submit appropriate design calculations and details in a shop drawing.

E. Thrust blocks shall be constructed of concrete as specified in Section 03000.

1. Dimensions of thrust blocks shall be in accordance with the Standard Specifications.

2. All fittings shall be restrained joint as well as restrained by thrust blocking.

PART 3 – EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Ship and transport all materials in a safe manner protecting from damage, corrosion, and wear.

B. Offload all products with appropriate equipment and care preventing any damage.

C. Store in a neat and orderly manner protected from elements to prevent damage, corrosion, or wear. Provide additional covering or conditioning as needed per manufacturer requirements.

D. All aggregate material shall be shipped using clean trucks. Loads will be rejected if there is any foreign material.

E. All aggregate materials shall be moisture conditioned to eliminate settlement during trucking or shipping to site.

3.2 EXISTING CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Uncover and expose existing utility and sewer lines where they are to be crossed above or below by new work being constructed to verify clearance is sufficient to meet required codes. Pipe shall not be installed until crossings have been verified for clearance. If the Contractor fails to follow this procedure, the Contractor will be solely responsible for extra work or material required if modifications to the design are necessary.

C. Contractor shall take special care in locating and protecting existing utilities. Verify with Owner’s representative, existing utilities to be relocated, or removed, or preserved. Correct damage done to existing utilities at no cost to Owner.

D. FIELD MEASUREMENTS

E. Make necessary field measurements to assure precise fit in accordance with approved design.

F. Confirm box location, alignment, rotation in paved surfaces with the Landscape Architect or Engineer prior casting or permanently paving.

3.3 TRENCHING

A. Excavate trench and trench bed for water pipe in accordance with pertinent provisions of the codes and standards listed in section 1.3 or 31 23 33 Trenching and Backfilling.

B. Unless otherwise shown, provide separate trenches for pipelines. Minimum cover shall be twelve inches (18").

C. Lay pipe in open trenches except when Owner's representative gives permission for tunneling.

D. Excavate trenches to widths no greater than necessary for proper installation of the work and per manufacturers published documents.

E. Material excavated for utility trenches shall be non-classified and shall include earth or other material encountered. Contract price is understood to cover removal of such materials to depths and extents indicated in contract documents and necessary to complete the work.

F. Grade bottom of trenches evenly in preparation for placement of bedding and to ensure uniform bearing for full length of pipes. Cut holes as necessary for joints and joint-making. Excavate cemented gravel, old masonry, or other hard material to at least six inches (6") below pipe points. Refill such space and other cuts below grade with bedding & select backfill.

G. Sheet and brace trenches and remove water as necessary to fully protect workers and adjacent structures and permit proper installation of the work. Comply with OSHA regulations. Under no circumstances lay pipe or install appurtenances in water and keep trenches free from water until pipe joint material has hardened.

H. Prior to placing pipe, trench shall be clear of all debris.

3.4 PIPE INSTALLATION

A. General: Carefully examine each pipe prior to placing.

B. Promptly set aside defective pipe and damaged pipe.

C. Do not install defective pipe or damaged pipe.

D. Continually remove extraneous material from pipe.

E. Do not place pipe in water, nor place when trench or weather is unsuitable for such work.

F. Pipe of size and type noted on drawings shall be laid on firm bearing, aligned, and graded in direction of flow. Suitable fittings shall be provided where various lines connect and where changes in pipe size occur. Connections shall be made to catch basins etc. as indicated.

G. Make required connections to existing drains ensuring systems are connected and flowing correctly.

H. Commence pipe installation at lowest point in system and install pipe with bell end upgrade. Clean interior and joint surfaces and test pipe for soundness before lowering pipe into trench.

I. Lay pipe in straight lines and on uniform grades between points where changes in alignments or grades are shown. Fit pipes to form a smooth uniform invert. Keep a stopper in pipe mouths when pipe installation is not in progress

J. Flush closed lines with water in sufficient volume to obtain free flow through each line. Remove obstructions and correct defects discovered. Remove silt and trash from catch basins and inlets prior to inspection of work.

K. Backfill trenches only after piping has been inspected, tested and the location of pipes and appurtenances has been recorded. Backfill material, placement and compaction shall conform to the requirements of Section 31 23 33 Trenching and Backfilling.

L. Install valve boxes and structures per section the codes and standards listed in section 1.3.

M. Trenching, Bedding and Backfilling: Shall be accomplished in accordance with the Standard Specifications and as shown on the Drawings. All piping shall have a 3-inch sand bedding underneath and sand cover over top. Compaction shall be a minimum of 95% of the maximum density as determined by ASTM D 1557. Identification tape shall be installed above each pipeline, buried approximately 12 inches below the finished surface above. Backfilling of the joints cannot occur until after inspection of the joints under pressure. The pipe in between the joints shall be backfilled prior to the test to prevent pipe movement during the pressure test.

N. Underground Piping: Pipe shall be laid to the required lines and grades. Valve stems shall be plumb and all joints centered. Pipe and accessories shall be carefully handled at all times. Foreign matter or dirt shall be removed from inside the pipe and the pipe shall be kept clean during and after laying. All pipe and joints shall be installed in accordance with the manufacturer's instructions.

O. Joint restraint: Joint restraint shall be per pipe manufacturer’s recommendations.

P. Connections to Existing Facilities. Make all required connections to existing supply lines. Only properly authorized Owner’s personnel shall operate, open, or close any valve in the existing system.

Q. Temporary Fittings: Water lines shall have 1 inch cocks or valves installed at each end of line and/or at other locations as may be required for venting, filling, chlorinating, testing and drainage. Temporary valves may be installed using saddles, tapped sleeves or other approved methods. When work has been completed, temporary valves shall be removed and all holes plugged and secured in an approved manner.

R. Thrust Blocks: Thrust blocks shall be constructed of concrete as specified in Section 03000 and shall be provided for all bends, tees, crosses, reducers, and where indicated on the plans. Thrust blocks shall be placed against undisturbed earth. If in the opinion of the Owner's Representative the earth against which the anchor bears is unsuitable to support the imposed load, Contractor shall provide such additional anchorages as may be required by the Owner's Representative. Ground against which concrete is to be placed shall be moistened prior to placing so that it will not absorb excessive moisture

from the fresh concrete. Forms shall be smooth, mortar tight, and of sufficient strength to maintain shape during the placement of the concrete. Placing methods shall be such that the concrete will be placed in its final position without segregation. All concrete shall be placed to ensure smooth surfaces along form lines and to eliminate air pockets. The use of mechanical vibrators may be required on thrust blocks. Thrust blocks shall be placed in such a manner that pipe and fitting joints will be accessible for repair. Thrust blocks shall be in contact with the fitting and not with the pipe. Thrust blocks shall cure at least 5 days before backfilling or allowing pressure into the main.

S. Tracer Wire and Warning Tape: Tracer wire shall be installed on the top of all PVC pipe. Tracer wire shall come up into the valve boxes as shown on the Drawings. Plastic warning tape shall be installed above water lines.

3.5 FLUSHING AND TESTING

A. All new water lines shall be flushed, pressure tested and disinfected prior to connecting them to the Campus system. Prior to testing, the Contractor shall submit a plan indicating isolating valves, fill taps and discharge taps. Contractor shall furnish and install all necessary fittings and appurtenances for flushing and pressure testing and shall remove such fittings and appurtenances after testing is complete. Only properly authorized Owner's personnel shall operate, open, or close any valve in the existing system.

B. All water lines shall be flushed, and pressure tested in the presence of the Owner's Representative. Notify Owner's representative at least 10 days prior to the planned test. Project inspector will schedule Campus Representatives attendance as close as possible to Contractor's requested date. Flushing and testing shall be accomplished before pipe joints are backfilled. The trench shall be backfilled between joints before testing to prevent movement of pipe.

C. Flush all lines prior to testing to remove dirt or foreign matter inside the pipe and fittings. Flush the pipeline until the water runs clear as required by NFPA 24. This requires a minimum flow rate not less than the water demand rate for the system as determined by the system design, or not less than that necessary to provide a velocity of 10 ft/s, whichever is greater. NFPA provides a table for flow required to produce a velocity of 10 ft./s for various pipe sizes. The flushing operation shall continue for a sufficient time to ensure thorough cleaning. The Campus Representative shall be the sole judge of what is a sufficient time. When planning the flushing operations, consideration shall be given to the proper disposal of the flushing water in such a way not to cause damage to existing improvements, equipment, the environment, or cause a major inconvenience in the use of roads, parking areas or sidewalks. The Contractor at no additional cost shall provide all labor, equipment, material and services to the Owner.

D. Pipe Leakage and Pressure Test. Each section of the pipe to be tested shall be slowly filled with water, and all air shall be expelled from the pipe. The release of the air can be accomplished by opening hydrants, air release valves, and service line cocks at the high points of the system and the blowoffs at all dead ends. The valve controlling the admission of water into the section of pipe to be tested should be opened wide before closing the hydrants, air release valves, blowoffs, and service cocks. After the system has been filled with water and all air expelled, all the valves controlling the section to be

tested shall be closed. The test shall subject the pipe for a duration of two hours of sustained pressure of not less that 200 pounds per square inch. The leakage shall be accurately measured during this period by pumping from a calibrated container to determine the rate of leakage. The maximum allowable leakage at the joints shall not exceed two quarts per hour per 100 gaskets or joints irrespective of pipe diameter. The amount of allowable leakage shall be permitted to be increased by one fluid ounce per inch valve diameter per hour for each metal-seated valve isolating the test section. If hydrants are in the test section and are under pressure, an additional five ounces per minute leakage is permitted for each hydrant. The Contractor at no additional cost shall provide all labor, equipment, material and services to the Owner.

E. All water mains, services and appurtenances shall pass testing and disinfection prior to acceptance of the work by the Owner.

END OF SECTION 33 14 16

SECTION 33 40 00 STORM DRAINAGE UTILITIES

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish labor, materials, equipment, facilities, transportation and services to complete drainage and related work as shown on contract documents.

B. Work Included: The general extent of drains lines and structures are shown on the drawings and include, but are not necessarily limited to, the following:

1. Solid corrugated high-density polyethylene (CHDPE) storm drain lines
2. Perforated corrugated high-density polyethylene (CHDPE) storm drain lines
3. Drainage cleanouts
4. Connections to drainage structures
5. Catch basins and drain structures
6. Trench/Slot drains
7. Geotextile fabric
8. Drain stone

1.2 RELATED SECTIONS

A. 02 41 13 Demolition

B. 11 68 33 Sports Equipment

C. 31 22 00 Grading

D. 32 23 33 Trenching & Backfill

E. 32 16 00 Concrete

F. 32 18 23.23 Miscellaneous Athletic Surfacing

G. 32 31 13 Chain Link Fence

H. 32 33 00 Site Furnishings

I. 32 84 00 Irrigation

J. 33 14 16 Site Potable Water Distribution

1.3 CODES AND STANDARDS

A. All work shall be performed in accordance with the latest edition of the following codes and standards:

1. American Society for Testing and Materials (ASTM)
2. Occupational Safety and Health Standards (OSHA)
3. California Building Code (CBC), current edition.
4. State of California Department of Transportation Standard Specifications, current edition (Green Book)

5. National Collegiate Athletic Association (NCAA)
6. National Association of Intercollegiate Association (NAIA)
7. World Athletics (IAAF)

B. Grading materials and operations shall adhere to the requirements and recommendations of the Geotechnical Reports completed by Geotechniques, including all supplements, addendums, and clarifications, unless otherwise specified herein.

C. Construction operations and earthwork shall adhere to the requirements of the California State Water Resources Board General Permit:2009-0009-DWQ CONSTRUCTION GENERAL PERMIT.

1.4 PROJECT CONDITIONS

A. Prior to trenching, the Contractor shall check invert elevations of existing drain structures and pipes to which connections are to be made and report discrepancies to Owner representative.

B. The Contractor shall verify existing conditions before starting work.

C. The contractor shall flush all existing drain lines to remain within the project area to the nearest junction or outfall and collect all flushed water and debris. All flushing operation shall adhere to the requirements of the California State Water Resources Board General Permit:2009-0009-DWQ CONSTRUCTION GENERAL PERMIT.

D. The Geotechnical Engineer or Geotechnical Field Engineer shall provide observation and testing during the trenching operations.

E. The Contractor shall be responsible to obtain Notice to Intent (NOI) and Notice of Termination (NOT) and maintain all observations, reporting and other requirements associated with these permits. This includes but is not limited to installing and maintaining necessary erosion control items such as silt fencing, hay bales, sediment roles, stabilized construction entrances, inlet sediment traps, etc.

F. The Contractor shall provide dust control in conformance with all environmental regulations.

G. The Contractor shall adhere to all the requirements of the project SWPPP (Stormwater Pollution Prevention Plan and erosion control plan. The Contractor is responsible for all necessary QSP (Qualified Stormwater Practitioner) services as required by the project SWPPP documents.

H. Contractor shall, prior to commencement of work, submit a letter to owner stating locations of disposal sites for excess materials, and certifying that they have obtained property owner's permission for disposal of surplus materials.

I. The Contractor shall protect existing structures and facilities which are to remain.

J. The Contractor shall not interfere with use of adjacent buildings or block access to facilities to remain open during grading operations.

K. The Contractor shall maintain free and safe passage to and from adjacent buildings and maintenance areas outside the project limits.

L. The Contractor shall prevent movement or settlement of walls and structures, provide bracing or shoring, be responsible for safety and support of structures and assume liability for building movement, settlement, damage, or injury.

M. The Contractor shall cease operations and notify owner immediately if safety of structures appears to be endangered, take precautions to properly support structures, and resume operations only after safety is restored.

N. The Contractor shall provide, and maintain barricades, lighting, and guardrails required by applicable regulatory advisory to protect passersby, workers and building occupants.

O. The Contractor shall provide all necessary shoring and safety means and methods required for stabilizing trenches and excavations to the depths indicated on the plans per OSHA requirements.

P. The Contractor shall provide necessary clean and potable water for construction activities, moisture conditioning and compaction.

Q. The Contractor shall provide and maintain, at all times, during construction, the means and devises to promptly remove and properly dispose for water from any source entering low points, trenches, or other excavations at no additional cost to the Owner.

R. Quantities shown on plans are for Contractor's convenience and not guaranteed. Discrepancies between such mentioned quantities and requirements of grading and drainage plans and/or specifications, will not entitle Contractor to additional remuneration.

S. All materials shall be installed per manufacturer recommendations. Contact Engineer where recommendations conflict with plans or specifications.

1.5 SUBMITTALS

A. The following information shall be submitted prior to installation of specified work.

1. Product Data: Provide data on pipe, pipe fittings, grates, manholes, lids, catch basins, trench drains, slot drains and storm sewer appurtenances.

2. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.

3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

4. Warranty information, as applicable.

5. Samples

6. Mockup of subdrain and crushed stone as described in specification 31 23 33 Trenching & Backfill, item 1.5 C.

B. The following information shall be submitted at the time of project closeout.

1. Accurately record actual locations of pipe runs, connections, manholes, catch basins, cleanouts, and invert elevations with tie in distances from at least two surface features.

2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 MAINTENANCE

A. The Contractor shall keep drainage structures free and clear of soil and debris throughout the course of the construction process.

B. The Contractor shall maintain drainage system to meet local storm water pollution regulations.

PART 2 – PRODUCTS

2.1 CEMENT MORTAR

A. Mortar shall be composed of one (1) part Portland cement and two (2) parts sand by volume.

2.2 CORRUGATED HIGH DENSITY POLYETHYLENE DRAIN LINE (CHDPE), SOLID AND PERFORATED

A. CHDPE pipe, couplings and fittings shall be high density corrugated polyethylene smooth interior pipe, manufactured by Advanced Drainage Systems, Inc., Model ADS N-12; or equal.

1. 4-inch through 10-inch diameters shall meet the strength requirements of AASHTO M252.

2. 12-inch through 36-inch diameters shall conform to AASHTO M294 Type S. Material shall conform to ASTM D1248 Type III, Category 4, Grade P33, Class C, or ASTM D3350 cell classification 324420 C.

3. Minimum conveyance factors shall be 7.3 for 6" pipe and 293.9 for 18" pipe.

4. All fittings shall be watertight.

5. Pipe to concrete drain basin connections shall be A-LOK water-stop connectors or approved equal. Grout in per manufacture recommendations.

2.3 FRAMES, COVERS AND GRATES

A. Provide all covers from the same manufacturer. Where required, provide “Pedestrian Safe” covers to meet ADA requirements.

B. Provide iron frames and covers as a total unit, sized as shown on the Drawings, and with the wording "STORM DRAIN" cast into the cover for storm drain manholes.

C. All manhole covers and grates shall be heavy duty with bolt down or locking devices.

2.4 DRAINAGE CLEANOUTS

A. Provide medium traffic weight covers and frames where cleanouts are within pavement, with the letters "SDCO" cast into the cover. Where required provide “Pedestrian Safe” covers to meet ADA requirements.

B. Size of cleanout shall be equal to the size of the drainpipe on which it is installed, up to 8”.

C. Drainage cleanouts and installation shall conform to requirements of the International Plumbing Code. Cleanout plug shall be a non-corrosive metallic type to allow future detection with a metal detector. Cleanout plugs shall be installed per plans.

2.5 CATCH BASINS AND DRAINS

A. Catch Basins and Drains shall be Oldcastle precast drain structures.

2.6 TRENCH DRAINS

A. Trench drain shall be ACO Klassik K100/KS100 with 4” internal width.

B. In-line catch basin of drain shall include Trash Bucket.

2.7 NON-WOVEN GEOTEXTILE FILTER FABRIC

A. Non-woven Geotextile Filter Fabric for subdrains drain shall be Tencate, Mirafi 140N, or approved equal.

2.8 WOVEN GEOTEXTILE LINER FABRIC

A. Woven-geotextile fabric for structural soil support and liners shall be Tencate, Mirafi 600x, or approved equal.

2.9 SOLID PIPE BEDDING

A. Solid drainpipe bedding shall be washed concrete sand per specification 31 23 33 Trenching & Backfill.

2.10 CRUSHED DRAIN STONE

A. See Specification 31 23 33 Trenching & Backfill for more information.

PART 3 – EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

A. Ship and transport all materials in a safe manner protecting from damage, corrosion, and wear.

B. Offload all products with appropriate equipment and care preventing any damage.

C. Store in a neat and orderly manner protected from elements to prevent damage, corrosion, or wear. Provide additional covering or conditioning as needed per manufacturer requirements.

A. All aggregate material shall be shipped using clean trucks. Loads will be rejected if there is any foreign material.

B. All aggregate materials shall be moisture conditioned to eliminate settlement during trucking or shipping to site.

3.2 EXISTING CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Contractor shall verify existing invert elevations for storm drain construction prior to site work. Work for storm drain installation shall begin at downstream connection point. This will allow for necessary adjustments to be made prior to installation of entire line. If the Contractor fails to begin at the downstream connection point and works up-stream, Contractor shall be responsible for necessary adjustments.

C. Uncover and expose existing utility and sewer lines where they are to be crossed above or below by new work being constructed to verify grades and to assure sufficient clearance. Pipe shall not be installed until crossings have been verified for clearance. If the Contractor fails to follow this procedure, the Contractor will be solely responsible for extra work or material required if modifications to the design are necessary.

D. Contractor shall take special care in locating and protecting existing utilities. Verify with Owner's representative, existing utilities to be relocated, or removed, or preserved. Correct damage done to existing utilities at no cost to Owner.

3.3 FIELD MEASUREMENTS

A. Make necessary field measurements to assure precise fit in accordance with approved design.

B. Confirm box location, alignment, rotation in paved surfaces with the Landscape Architect or Engineer prior casting or permanently paving.

3.4 GENERAL CONSTRUCTION

A. Trenches

1. Excavate trench and trench bed for storm drains in accordance with pertinent provisions of the codes and standards listed in section 1.3 OR 31 23 33 Trenching and Backfilling.

2. Unless otherwise shown, provide separate trenches for pipelines. Minimum cover shall be twelve inches (12").

3. Lay pipe in open trenches except when Owner's representative gives permission for tunneling.

4. Excavate trenches to widths no greater than necessary for proper installation of the work and per manufacturers published documents.

5. Material excavated for utility trenches shall be non-classified and shall include earth or other material encountered. Contract price is understood to cover removal of such materials to depths and extents indicated in contract documents and necessary to complete the work.

6. Grade bottom of trenches evenly in preparation for placement of bedding and to ensure uniform bearing for full length of pipes. Cut holes as necessary for joints and joint-making. Excavate cemented gravel, old masonry, or other hard material to at least six inches (6") below pipe points. Refill such space and other cuts below grade with bedding & select backfill.

7. Install geotextile fabric in trench according to manufacturer's instruction. Line the trench bottom and walls, leaving 12" of fabric as overlap with field geotextile fabric on both sides of the trench.

8. Sheet and brace trenches; remove water as necessary to fully protect workers and adjacent structures and permit proper installation of the work. Comply with OSHA regulations. Under no circumstances lay pipe or install appurtenances in water and keep trenches free from water until pipe joint material has hardened.

9. Presence of ground water in soil or the necessity of sheeting or bracing trenches shall not constitute a condition for which any extra remuneration may be claimed.
10. Prior to placing pipe, trench shall be clear of all debris.

B. Pipe Installation

1. General: Carefully examine each pipe prior to placing.
2. Promptly set aside defective pipe and damaged pipe.
3. Do not install defective pipe or damaged pipe.
4. Continually remove extraneous material from pipe.
5. Do not place pipe in water, nor place when trench or weather is unsuitable for such work.
6. Pipe of size and type noted on drawings shall be laid on firm bearing, aligned, and graded in direction of flow. Suitable fittings shall be provided where various lines connect and where changes in pipe size occur. Connections shall be made to catch basins etc. as indicated.
7. Make required connections to existing drains ensuring systems are connected and flowing correctly.
8. Commence pipe installation at lowest point in system and install pipe with bell end upgrade. Clean interior and joint surfaces and test pipe for soundness before lowering pipe into trench.
9. Flush closed lines with water in sufficient volume to obtain free flow through each line. Remove obstructions and correct defects discovered. Remove silt and trash from catch basins and inlets prior to inspection of work.
10. Backfill trenches only after piping has been inspected, tested and the location of pipes and appurtenances has been recorded. Backfill material, placement and compaction shall conform to the requirements of Section 31 23 33 Trenching and Backfilling.
11. If using CLSM / SLURRY as backfill, CHDPE shall be secured via tie downs.
12. Install area drains and cleanouts per section the codes and standards listed in section 1.3.

C. Geotextile Fabric Installation:

1. Overlap joints a minimum of twelve (12) inches. Joints shall be overlapped in direction the stone aggregate is to be spread.
2. Joints shall be securely held in place in accordance with geotextile manufacturer’s recommendations. Joint bonding may be delayed until aggregate placement is completed to minimize joint stress.
3. Place suitable amount of ballast on liner to prevent movement by wind. Ballast shall be in a form that will not damage fabric.
4. Direct traffic loading on fabric will not be allowed.

5. Overlapping additional fabric and jointing shall be in accordance with manufacturer’s recommendations. Repair punctured or torn fabric.
6. Fabric shall completely cover sub-grades under crushed aggregated and inside trenches.

3.5 JOINTS

A. General
   1. Before making pipe joints, clean and dry surfaces of pipe to be joined.
   2. Use lubricants, primers and adhesives recommended by pipe manufacturer.
   3. Place, fit, joint, and adjust joints to obtain degree of water tightness required.

B. Flexible Watertight Joints:
   1. Equal materials may be used when specifically approved in advance by Owner’s representative.
   2. Install gaskets and joint materials in accordance with manufacturer's recommendations as approved by Owner’s representative.
      a. Protect from sun, blowing dust and other deleterious agents.
      b. Align pipe with previously installed pipe and pull joints together. If gasket or joining material becomes loose and can be seen through exterior joint recess when joint is pulled to within 1" of closure, remove pipe and remake joint.
      c. Inspect gaskets and replace loose and improperly affixed gaskets and joining materials.

3.6 EXISTING MANHOLES, INLETS AND CLEANOUTS

A. Storm drains and structures including, but not limited to, manholes, catch basins and cleanouts that lie within areas affected by work on this project shall be adjusted to grade by Contractor except where noted otherwise in contract documents. Install per manufacturer’s requirements.

3.7 TESTING AND INSPECTING

A. Provide personnel and equipment necessary, and perform tests required to demonstrate that work of this section has been completed in accordance with specified requirements.

B. Do not allow or cause any work of this section to be covered up or enclosed until after it has been inspected, tested, and approved.

3.8 DRAWINGS OF RECORD

A. Contractor shall provide and keep up-to-date completed "as-built" record on blue line prints that show every change from the original contract documents, including exact locations, sizes, and kinds of equipment. “As-built” set shall be kept on job site and used only as a record set.

B. These drawings will also serve as work progress sheets, and Contractor shall make neat and legible annotations thereon daily as the work proceeds, showing the work as

actually installed. These drawings shall be available for inspection and shall be kept in a location designed by the Owner's representative.

C. On or before the date of final review, Contractor shall deliver corrected and completed "as- built" drawings to Owner's representative. Delivery of the drawings will not relieve Contractor of their responsibility of furnishing any required information.

3.9 MAINTENANCE

A. Maintain all BMP's until completion of the project as required by the stormwater pollution prevention plan.

B. Flush the system upon project completion, collecting and disposing of all sediment and debris.

END OF SECTION