

Technical Specifications— 100% CD Submittal

G11 Parking Lot, 1 Harpst Street, Arcata,
Humboldt County, California

Prepared for:

California State Polytechnic
University, Humboldt

April 2026

025150



Phone: (707) 441-8855 **Email:** info@shn-engr.com
Web: shn-engr.com • 812 W. Wabash Avenue, Eureka, CA 95501-2138

THIS PAGE LEFT INTENTIONALLY BLANK.

Technical Specifications— 100% CD Submittal

G11 Parking Lot, 1 Harpst Street, Arcata, Humboldt County, California

Prepared for:

California State Polytechnic University, Humboldt

Prepared by:



812 W. Wabash Ave.
Eureka, CA 95501-2138
(707) 441-8855

April 2026

QA/QC:JOB__

Reference: 025150

THIS PAGE LEFT INTENTIONALLY BLANK.

TABLE OF CONTENTS

Project: G11 Parking Lot, 1 Harpst Street, Arcata, Humboldt County, California

Section	Title
00 01 07	SEALS PAGE
01 11 00	SUMMARY OF THE WORK
01 14 00	WORK RESTRICTIONS
01 22 00	UNIT PRICES
01 23 00	ALTERNATES
01 25 00	SUBSTITUTION PROCEDURES
01 26 13	REQUESTS FOR INTERPRETATION AND INFORMATION
01 31 13	PROJECT COORDINATION
01 31 19	PROJECT MEETINGS
01 31 26	ELECTRONIC COMMUNICATIONS PROTOCOL
01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
01 33 00	SUBMITTAL PROCEDURES
01 35 00	SPECIAL PROCEDURES
01 35 43	ENVIRONMENTAL PROCEDURES HAZARDOUS MATERIAL
01 35 50	SAFETY PROCEDURES
01 35 53	SECURITY
01 41 00	REGULATORY REQUIREMENTS
01 42 00	REFERENCE STANDARDS AND ABBREVIATIONS
01 43 39	MOCK-UPS
01 45 00	QUALITY CONTROL
01 45 29	TESTING LABORATORY SERVICES
01 51 00	TEMPORARY UTILITIES
01 52 00	CONSTRUCTION FACILITIES
01 55 00	VEHICLE AND PEDESTRIAN CONTROLS
01 55 29	CONSTRUCTION STAGING AREAS
01 56 39	TEMPORARY TREE AND PLANT PROTECTION
01 57 00	TEMPORARY CONTROLS
01 57 10	EXISTING FINISH PROTECTION
01 57 23	STORM WATER POLLUTION PREVENTION
01 58 00	TEMPORARY PROJECT SIGNAGE
01 60 00	PRODUCT REQUIREMENTS
01 71 00	EXAMINATION AND PREPARATION
01 73 00	EXECUTION REQUIREMENTS
01 73 29	CUTTING AND PATCHING REQUIREMENTS
01 74 00	CLEANING REQUIREMENTS
01 74 19	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
01 75 00	STARTING AND ADJUSTING PROCEDURES (NOT USED)
01 77 00	CLOSEOUT PROCEDURES
01 78 10	SURVEY AND LAYOUT DATA
01 78 23	OPERATION AND MAINTENANCE DATA
01 78 36	WARRANTIES
01 78 39	PROJECT RECORD DOCUMENTS
05 70 00	ORNAMENTAL METAL AND RAILING



26 00 00	ELECTRICAL
31 00 00	EARTHWORK
31 23 33	TRENCHING AND BACKFILL
32 01 90	LANDSCAPE MAINTENANCE
32 12 16	ASPHALT PAVING
32 13 13	SITE CONCRETE
32 17 23	PAVEMENT MARKINGS
32 17 26	TACTILE WARNING SURFACES
32 84 00	IRRIGATION
32 91 13	SOIL PREPARATION AND SOIL MIXES
32 91 19	LANDSCAPE FINISH GRADING
32 93 00	PLANTING
32 94 00	PLANTING ACCESSORIES
33 42 11	STORMWATER GRAVITY PIPING



THIS PAGE LEFT INTENTIONALLY BLANK.



CPH G11 Parking Lot G11 Improvements
Project No. 025150

April 2026

SECTION 00 01 07
SEALS PAGE

Cal Poly Humboldt XPL344 Parking Lot G11 Improvements

Prepared for: California State Polytechnic University, Humboldt

1 Harpst Street

Arcata, CA 95521

Tel. 707-826-3646

DESIGN PROFESSIONALS OF RECORD:

Architect (AOR)

Cal Poly Humboldt

1 Harpst Street

Arcata, CA 95521

Tel: 707-826-5076

Howard F. Maxwell, C-37414

Civil Engineer (CEOR)

SHN Engineers & Geologists

812 W. Wabash Ave.

Eureka, CA 95501-2138

Tel: 707-441-8855



A handwritten signature in blue ink, appearing to read "Jared O'Barr", written over a horizontal line.

Jared Scott O'Barr, PE 76125, expiration: June 30, 2026

CPH G11 Parking Lot G11 Improvements
Project No. 025150

April 2026

Landscape Architect (LAOR)

Groundworks Office

1792 5th Street

Berkeley, CA 94710

Tel: 510-833-2111



Brennan Cox Landscape Architect 5/31/27

Electrical Engineer (EEOR)

Frontier Consulting Engineers

2727 Bechelli Lane

Redding, CA 96002

Tel. 530-232-6160



Nathaniel Warner, PE E25042, 6/30/26

END OF SECTION

Section 01

General Requirements

SECTION 01 11 00
SUMMARY OF THE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, Special Conditions, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The following subjects are included in this section:
 - 1. Project Description
 - 2. Project Phasing
 - 3. Contractor Use of Premises / Work Restrictions
 - 4. Superintendent / Supervisory Staff
 - 5. Special Project Requirements
 - 6. Protection of Work
 - 7. Owner Furnished / Contractor Installed
 - 8. Permits, Licenses, & Fees
 - 9. Partnering

1.3 PROJECT DESCRIPTION

- A. Work Included in the Contract: The G11 project proposes to improve the east portion of the existing University parking lot G11, as well as adjacent pedestrian walkways and street crossings. The project includes new Americans with Disabilities Act accessible parking stalls, path of travel upgrades, and a new accessible shuttle stop. Improvements include, but are not limited to, clearing and grubbing, excavation, grading, demolition and removal of existing features, installation of engineered fill, asphalt pavement, concrete flatwork, reinstallation of site amenities, lighting, storm drain piping and inlets, landscaping, striping, and signage. The Work shall include all labor, materials, equipment, and services necessary to complete the improvements shown or reasonably implied by the 100% Construction Documents and Specifications.
- B. Contract Time: The contract time shall begin upon issuance of NTP. For G11, onsite construction shall be substantially complete no later than August 14, 2026. Total completion shall be no later than August 28, 2026. Weekend and/or holiday work is acceptable to the University.
- C. Liquidated Damages: \$1,000.00 per day.

1.4 PROJECT PHASING

- A. Phasing Plan/Sequence of Work: Refer to bid documents for phasing and sequence of work.
- B. Owner Occupancy: Work will occur in an operating University environment.
- C. Maintenance and Operation: Contractor to maintain access to service areas and not impact building utilities for duration of project, except as necessary to complete the Work and as approved by the University.
- D. Work Under Separate Contract:
 - 1. The Trustees reserve the right to award separate contracts for performance of work within or adjacent to the project site. Work may be conducted simultaneously with work under this contract. Contractor shall cooperate fully with separate contractors and coordinate work so that work under separate contract may be carried out efficiently, without interfering or delaying Contractor's work.
 - 2. Disagreements between Contractor and entities performing work under separate contract concerning concurrent use of work areas and access to site which are not resolved by the participants shall be referred to the University Representative. Contractor agrees to abide by the University Representative's determination as to concurrent use or priority of access, and to perform work in compliance with the University Representative's resolution at no additional cost.
 - 3. Relationship to Work Under the Contract: Work under the Contract shall include all provisions necessary to make such concurrent work under separate contracts complete in every respect and fully functional, including field finishing. Provide necessary backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection, as shown on Drawings and specified herein. See Section 01 31 13 - Coordination for additional requirements.
 - 4. Documents for Work Under Separate Contracts: University's Representative will make available, in a timely manner, drawings and specifications of work under separate contracts for coordination and further description of that work.
 - a. If available, such information will include drawings, specifications, product data, lists and construction schedules for such work.
 - b. Information concerning work under separate contracts or directly by the University will be provided for convenience only and shall not to be considered Contract Documents.
 - 5. Permits, Notices and Fees for Work under Separate Contracts: Notices required by and approvals required of authorities having jurisdiction over work under separate contracts and related fees, will be solely the responsibility of University.

1.5 CONTRACTOR USE OF PREMISES / WORK RESTRICTIONS

A. General (Also refer to Contract General Conditions)

1. Contractor shall at all times conduct the work so as to impose no hardship on the Trustees or others engaged in the Trustees' work nor cause any unreasonable delay or hindrance thereto.
2. Construction activities will be scheduled to minimize disruption to the University and to Campus users.
 - a. Work will generally occur during extended business hours, between 6:00 AM and 6:00 PM Monday through Friday.
 - i. Quiet hours: 6:00 AM to 8:00 AM (applicable during the academic year or when working within 150 feet of off-campus residential structures).
 - ii. Standard noise generating work permitted: 8:00 AM to 6:00 PM
 - b. Work will be performed while classes are not in session.
3. The Contractor may not interrupt any Campus utilities without prior written permission from the Trustees. Requests for utility shutdowns shall be submitted a minimum of 14 calendar days in advance of the requested shutdown date.
4. The Work of the Project is to be completed within an operating University, and that University operations and construction activities by others will be in progress at the Work Site during the course of this Contract. Refer to Section 01 14 00 – Work Restrictions for additional requirements.

B. Surrounding Site Condition Survey

1. Prior to commencing the work, the Contractor and the University Representative shall tour the Project Site together to examine and record damage to existing buildings, landscape, hardscape and other improvements, both on and adjacent to the project site. The resulting record shall serve as a basis for determination of subsequent damage due to Contractor's operations and shall be signed by parties involved in the tour using Site Survey form 702.08 which is part of the contract documents. Any damage to existing improvements not noted in the original survey, but subsequently discovered, shall be reported to the University Representative immediately.

C. Protection of Existing Structures and Utilities (also refer to Contract General Conditions)

1. Locate all known existing utility installations before proceeding with construction operations which may cause damage to such installations. The existing utilities shall be protected and maintained in continual service at the Contractor's expense. Where existing utilities cross or are adjacent to the work of this contract, the Contractor shall notify the University Representative a minimum of 48 hours in advance of commencement of work and receive approval for the method of uncovering the utility. The Contractor shall locate the existing

utility(s) by hand digging, pot holing, locator device, ground penetrating radar, X-ray, or other methods recommended by the Contractor and approved by the Construction Administrator. Repair of damage to existing utility(s) shall be at the Contractor's expense.

2. In the event that undocumented existing structures or utilities are encountered, the contractor shall immediately notify the University Representative and request direction concerning how to proceed with the work.
3. Should the Contractor damage any existing structure or utility, the Contractor shall take immediate action to ensure the safety of both persons and property.
4. Contractor shall visit existing building(s) and grounds and thoroughly familiarize itself with existing conditions. Existing record drawings are available for Contractor review at Cal Poly Humboldt's FacilitiesLink Web Site: <https://humboldt.metabim.com/login/Welcome.htm>
5. Contractor shall include all necessary pipe offsets, fittings, etc. as required to complete the work in the base bid. No additional costs due to the Contractor's failure to survey existing conditions and review available record drawings will be allowed.
6. Contractor shall note all utility items (utility meters, junction boxes, valve boxes, post indicator valves, utility covers, etc.) at or above grade in the vicinity of the project site prior to commencing with trenching operations. These items indicate the presence of underground utilities in the area which shall be located and kept in continual service. This requirement shall apply regardless of inclusion of these utilities on existing record documents.
7. When cutting, removal or alteration of existing work is required to form connections with new work or otherwise to meet the requirements of the contract documents, perform such work so as not to damage the work that will remain in place. Refer to sections for cutting, patching and repair requirements.
8. Contractor shall provide all necessary materials, equipment, and labor to adequately protect existing structures, floors, architectural finishes, utilities, landscape and hardscape which may be impacted by the work of this contract.

D. Allowable Work Schedule

1. Normal construction activities shall be performed Monday through Friday between the hours of 6:00 am and 6:00 pm, excluding holidays.
2. Shutdown of existing utilities or other activities which impact Campus operations shall be scheduled in advance with the University Representative in accordance with paragraph 1.05.A.3 above and shall be scheduled during off-hours at the discretion of the University and at no additional cost to the University.

3. Contractor shall submit an "Off-hours work Schedule Request" a minimum of 72 hours prior to any anticipated weekend or holiday work. A request must also be submitted for work outside of normal working hours.
4. Sound allowance and noise control is covered in Special Procedures - 01 35 00 Section 1.6.

E. Site Decorum

1. Contractor is to control the conduct of labor forces and prevent unwanted interaction initiated by workers with the University staff, students or other individuals other than those associated with the project.
2. In the event that any worker initiates unwanted interaction, utilizes profanity, or (in the opinion of the University Representative) conducts him/herself in an offensive or unprofessional manner, the Contractor shall immediately remove the worker from the project and replace said worker with another of equivalent technical skill at no additional cost to the University.
3. No smoking is allowed on the University Campus. Reference the University Smoke and Tobacco Free Environment Systemwide Policy: <https://policy.humboldt.edu/eo-1108-policy-systemwide-smoke-and-tobacco-free-environment>
4. No radios, other than 2-way communication type, shall be allowed on the project site.
5. Contractor shall provide an ANSI Class II - Heavy Duty Safety Vest and Hard Hat for every employee, every subcontractor, every sub-tier subcontractor, and subcontractor employee working on-site. Vests are not optional. Failure to comply with this requirement will result in a \$500.00 credit to the University via credit change order. Contractor shall maintain an adequate supply of vests on site at all times.
6. Photograph limitations for specific areas: No dormitory rooms or common areas occupied by students

F. University Keys

1. Contractor shall provide a written request to the University for keys to existing facilities. Upon completion of work, contractor shall return all keys back to the University. If the Contractor fails to return a key, a lost key fine shall be charged for the actual cost of re-keying campus locks up to a maximum of \$5,000 per building.
2. Site fences shall be locked with the University standard lock in order to allow the University 24 hour access for maintenance and inspection, or response to an emergency condition. Should Contractor wish to use a different lock, it shall be double locked with the University standard lock at all times that the site is secured.

1.6 SUPERINTENDENT / SUPERVISORY STAFF

- A. The following requirements are in addition to the requirements of the Contract General Conditions:
 - 1. The Contractor shall employ a competent Superintendent able to read, write and communicate fluently in English. The Superintendent shall be on site at all times during which work occurs on the project site and shall be fully authorized to represent Contractor in all matters pertaining to the work of this contract. All communications and agreements with the Superintendent shall be binding upon Contractor. The Superintendent shall be acceptable to the University and shall continue in the capacity of Superintendent for the duration of the project unless the Superintendent ceases employment with Contractor or the University otherwise agrees. The Superintendent shall not be employed on any other project by the Contractor during the course of this project.
 - 2. Work shall not occur on the site except under the direct supervision of the Superintendent. Failure to maintain a Superintendent on the Project site at all times that work is occurring will result in the issuance of a stop work notice by the University Representative. Any schedule impact resulting from said stop work order shall be the responsibility of the Contractor; no additional costs for delay will be due Contractor, nor will assessment of liquidated damages be suspended to account for the work stoppage.
 - 3. In addition to the Superintendent, Contractor shall assign a full time project manager solely dedicated to the work of this project for the duration of the project.

1.7 SPECIAL PROJECT REQUIREMENTS

- A. Work will occur during extended business hours, between 6am and 6pm Monday through Friday.
 - i. Quiet hours: 6am-8am
 - ii. Loud work permitted: 8am-6pm

1.8 PROTECTION OF WORK

- A. The Contractor shall protect the work from theft, vandalism, and unauthorized entry. The Contractor shall have the sole responsibility for job site security.
- B. During all hours that Work is not being prosecuted, Contractor shall furnish such watchman's services as Contractor may consider necessary to safeguard materials and equipment in storage on the Project site, including Work in place and in process of fabrication, against theft, acts of malicious mischief, vandalism, and other losses or damages.

1.9 OWNER-FURNISHED/CONTRACTOR-INSTALLED PRODUCTS

- A. Owner-Furnished/Contractor-Installed (OFCI) Products: University will furnish, for installation by Contractor, products which are identified on the Drawings and in the Specifications as "OFCI (Owner

Furnished/Contractor-Installed)", "installed by General Contractor," or similar terminology. See Drawings for identification of such products.

- B. Relationship to Work under the Contract: Work under the Contract shall include all provisions necessary to fully incorporate such products into the Work, including, as necessary, fasteners, backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection, and field finishing, as shown on Drawings and specified herein.

1.10 PERMITS, LICENSES AND FEES

- A. Permits, Licenses and Fees, General: Refer to Contract General Conditions.
- B. Licenses: Contractor shall obtain and pay all licenses associated with construction activities, such as business licenses, contractors' licenses and vehicle and equipment licenses. All costs for licenses shall be included in the Contract Amount.
- C. Parking Fees: Contractor shall obtain and pay for all parking permits and fees for vehicles parked off of the Construction Site. Refer to Section 01 55 00, Vehicular and Pedestrian Controls for additional parking requirements.

1.11 PARTNERING

- A. The Trustees intend to encourage the foundation of a cohesive partnership with the Contractor and its Subcontractors, the Architect and its consultants, and the Trustees. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient Contractor performance, intended to achieve completion within budget, on schedule, and in accordance with the Contract Drawings and Specifications.

END OF SECTION

SITE SURVEY AND ACCEPTANCE FORM

PROJECT _____

PROJECT No. _____

CONTRACTOR _____

CONTRACT NO. _____

ARCHITECT _____

DATE _____

[illegible]

CONTRACTOR _____

DATE. _____

INSPECTOR _____

DATE _____

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. The following subjects are included in this section.
 - 1. Submittals
 - 2. Work Plans
 - 3. Contractor's use of Premises
 - 4. Contractor's Use of Project Area
 - 5. Time Restrictions
 - 6. Noise and Vibration Restrictions
 - 7. University's use of Site and Premises

1.3 SUBMITTALS

- A. Submit each Work Plan for review and approval a minimum of 21 calendar days prior to the start of construction in areas affecting University operations. Participate in review of proposed Work Plan with the Construction Manager, Architect and University. Within 7 calendar days after joint review, submit revised Work Plan.
- B. Format/Submittal Requirements
 - 1. Contractor's Work Plans shall be in the form of marked-up drawings, sketches and/or original drawings that clearly convey the nature and location of Contractor's planned activities. Drawings shall be supplemented by written descriptions of the work. Work Plans shall be submitted in written narrative form where deemed adequate by the Construction Administrator to fully describe construction activities, impacts and protectionary measures.
 - 2. Work Plans shall be submitted in accordance with the requirements of Section 01 33 00.

1.4 WORK PLANS

- A. Contractor shall submit comprehensive written work plans for all activities affecting University operations, including but not limited to, the following:
 - 1. Barricade and Fencing locations.
 - 2. Haul routes.
 - 3. Routing of vehicular and pedestrian traffic around specific construction area(s).
 - 4. Utility shutdowns/tie-in to existing utilities.

5. Disabled access routes.
 6. Fire Department access to University buildings.
 7. Vehicular traffic access to buildings.
 8. Parking spaces impacted.
 9. Construction site and contractor parking access.
 10. Large equipment access (cranes, loaders, backhoes, etc.)
 11. Work within pedestrian thoroughfares and campus roads.
 12. Work within the inner-Campus area.
- B. The Work Plans shall be used to communicate Project impacts to the campus community.
- C. Contractor shall cooperate with the University to minimize conflicts and facilitate University operations.
1. Off-hours and weekend work may be required for existing utility shutdowns and other work of major impact to the University. No additional costs shall be paid by the University due to this requirement.

1.5 CONTRACTOR'S USE OF PREMISES (Also refer to Contract General Conditions)

A. General

- 1 Contractor shall at all times conduct the work so as to impose no hardship on the Trustees or others engaged in the Trustees' work nor cause any unreasonable delay or hindrance thereto.
2. Construction activities will be scheduled to minimize disruption to the University and to Campus users.
3. The Contractor may not interrupt any Campus utilities without prior written permission from the Trustees. Requests for utility shutdowns shall be submitted a minimum of 7 calendar days in advance of the requested shutdown date in writing to the Construction Administrator.

B. Surrounding Site Condition Survey

1. Prior to commencing the work, the Contractor and the University Representative shall tour the Project Site together to examine and record damage to existing buildings, landscape, hardscape and other improvements, both on and adjacent to the project site. The documentation shall be turned over to the University within 21 days of receiving Notice to Proceed. The Site Survey and Acceptance Form (# 702.08) shall accompany this submittal.
2. The resulting record shall serve as a basis for determination of subsequent damage due to Contractor's operations and shall be signed by all parties involved in the tour. Any damage to existing improvements not noted in the original survey, but subsequently discovered, shall be reported to the University Representative immediately.

C. Protection of Existing Structures and Utilities (also refer to Contract General Conditions)

1. Locate all known existing utility installations before proceeding with construction operations that may cause damage to such installations. The existing utilities shall be protected and maintained in continual service at the Contractor's expense. Where existing utilities cross or are adjacent to the work of this contract, the Contractor shall notify the University Representative a minimum of 48 hours in advance of commencement of work. The Contractor shall locate the existing utility(s) by hand digging; repair of damage to existing utility(s) shall be at the Contractor's expense.
2. In the event that undocumented existing structures or utilities are encountered, the Contractor shall immediately notify the University Representative and request direction concerning how to proceed with the work.
3. Should the Contractor damage any existing structure or utility, the Contractor shall take immediate action to ensure the safety of both persons and property.
4. Contractor shall visit existing building(s) and grounds and thoroughly familiarize itself with existing conditions. Existing record drawings are available for Contractor review at Cal Poly Humboldt's FacilitiesLink Web Site: <https://humboldt.metabim.com/login/Welcome.htm>
5. Contractor shall include all necessary pipe offsets, fittings, etc. as required to complete the work in the base bid. No additional costs due to the Contractor's failure to survey existing conditions and review available record drawings will be allowed.
6. Contractor shall note all utility items (utility meters, junction boxes, valve boxes, post indicator valves, manhole covers, etc.) at or above grade in the vicinity of the project site prior to commencing with trenching operations. These items indicate the presence of underground utilities in the area that shall be located and kept in continual service. This requirement shall apply regardless of inclusion of these utilities on existing record documents.
7. When cutting, removal or alteration of existing work is required to form connections with new work or otherwise to meet the requirements of the contract documents, perform such work so as not to damage the work that will remain in place. Refer to Sections 01 35 00 and 01 73 29 for cutting, patching and repair requirements.
8. Contractor shall provide all necessary materials, equipment, and labor to adequately protect existing structures, floors, architectural finishes, utilities, landscape, and hardscape that may be impacted by the work of this contract.
9. Trenching and/or installing new utilities (water, power, data, telecommunications, gas, etc.): The Contractor shall layout proposed utility trenches 14 days prior to doing work. The Contractor will layout and mark all utilities shown on the drawings and examine the site for other potential utilities which may cross the site. After which Humboldt Physical Plant Management will verify and mark additional utilities. After which the Contractor shall hire a ground penetrating radar firm to scan the entire trench line and determine all utility locations; GPR cost will be paid for by the Contractor. After GPR scanning has been completed, the Contractor shall hire a vacuum utility locating service to physically pothole and physically locate all utilities identified on the drawings, through Physical Plant Management review, and GPR scanning. After all of the above has been completed the contractor may proceed with trenching operations.

D. Allowable Work Schedule

1. Normal construction activities shall be performed Monday through Friday between the hours of 7:00 am and 6:00 pm, excluding holidays.
2. Shutdown of existing utilities or other activities which impact Campus operations shall be scheduled in advance with the University Representative in accordance with paragraph 1.4-A-3 above and shall be scheduled during off-hours at the discretion of the University and at no additional cost to the University.
3. Contractor shall submit a written request to the University a minimum of 72 hours prior to any anticipated weekend or holiday work. This request must also be submitted for work outside of normal working hours.

E. Site Decorum

1. Contractor is to control the conduct of labor forces and prevent unwanted interaction initiated by workers with the University staff, students or other individuals other than those associated with the project.
2. In the event that any worker initiates unwanted interaction, utilizes profanity, or (in the opinion of the University Representative) conducts him/herself in an offensive or unprofessional manner, the Contractor shall immediately remove the worker from the project and replace said worker with another of equivalent technical skill at no additional cost to the University.
3. No smoking is allowed on the University Campus. Reference the University Smoke and Tobacco Free Environment Systemwide Policy: <https://policy.humboldt.edu/eo-1108-policy-systemwide-smoke-and-tobacco-free-environment>
4. No radios, other than 2-way communication type, shall be allowed on the project site.
5. Contractor shall provide an ANSI Class II - Heavy Duty Safety Vest and Hard Hat for every employee, every subcontractor, every sub-tier subcontractor, and subcontractor employee working on-site. Vests are not optional. Failure to comply with this requirement will result in a \$500.00 credit to the University via credit change order. Contractor shall maintain an adequate supply of vests on site at all times.

F. University Keys

1. Contractor shall provide a written request to the University for keys to existing facilities. Upon completion of work, contractor shall return all keys back to the University. If the Contractor fails to return a key, a lost key fine shall be charged for the actual cost of re-keying campus locks up to a maximum of \$5,000 per building.
2. Site fences shall be locked with the University standard lock in order to allow the University 24-hour access for maintenance and inspection, or response to an emergency condition. Should Contractor wish to use a different lock, it shall be double locked with the University standard lock at all times that the site is secured.

1.3 CONTRACTOR'S USE OF PROJECT AREA

- A. Location of Work: The Work shall be accomplished within areas indicated on Drawings as Project Area or, if not indicated, to areas as directed by University's Representative. Use of other areas, including parking areas, shall be subject to approval by University's Representative. Refer to Section 01 55 29 - Construction Staging Areas and Section 01 55 00 - Vehicular and Pedestrian Controls for additional requirements.
1. Contractor shall not unreasonably encumber the site with materials or equipment.
 2. Contractor shall assume full responsibility for protection and safekeeping of products stored on the premises.
 3. Contractor shall move any stored products which interfere with operations of University or contractors performing work under separate contracts for University.
 4. Temporary closures or restrictions of use of public thoroughfares, necessary to accomplish the Work, shall be made only as approved in advance by public safety and parking authorities having jurisdiction, as directed in writing by the University's Representative.
 5. Refer to Drawings for trenching work limitations.
 6. Once the Contractor begins Work on a trenching heading, the Work shall proceed on a minimum 8 hours per day continuous basis, as weather permits, without stopping until the open trenches are backfilled and the surfaces are re-established.
- B. Unless otherwise specified or indicated on the Drawings, during the construction period the Contractor shall have full use of the designated Project Area for construction operations, including use of the site. Contractor's use of Project Area shall be limited only by University's right to perform construction operations with its own forces or to employ separate contractors on portions of the Project in accordance with the Contract General Conditions.
- C. Continued Use of Existing Building: Maintain existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.
- D. Cooperation with Others:
1. The Contractor shall at all times cooperate with, coordinate the Work with and provide access to the University, University Contractors, and buildings operating in the vicinity of the Project Site to the extent necessary for the Work and ongoing operations at the University may progress in an orderly manner. The Contractor shall implement measures to minimize disruption to ensure the Contractor's actions and methods of operation will not result in interference with ongoing operations at the University. The Contractor shall have no claim against the University as result of these other activities. If Contractor's Work causes disruption to ongoing campus operations, Contractor shall work irregular hours and/or implement other measures, at the Contractor's expense, to avoid any disruption to ongoing University operations.

2. The Contractor agrees and acknowledges that the Work of the Project is to be completed within an operating University, and that University operations and construction activities by others will be in progress at the Work Site during the course of this Contract.
 3. The Contractor shall coordinate construction activities with the Construction Manager to minimize interference with all parties concerned.
- E. Protection of Existing Improvements and Facilities: Contractor shall protect property adjacent to the Project Area and all existing improvements and facilities within the Project Area, including paving and landscaping indicated to remain.
1. All existing improvements and facilities, except those specifically indicated for removal or reconstruction shall be protected with temporary barriers, enclosures, and passageways.
 2. After completion of Work, existing improvements and facilities shall be restored to original condition and location. Project Area shall be cleaned and restored to presentable condition, equivalent to or better than the condition prior to start of Work.
 3. Should existing improvements and facilities be damaged or soiled beyond renovation or repair, new products shall be provided by Contractor equivalent to existing products, as directed by University's Representative.
- F. Project Area Access: Limit access to site to indicated routes and access points as identified. If routes and access points are not indicated, access shall be as approved and as directed by University's Representative. Do not restrict access to adjacent facilities and do not restrict access for those performing work under separate contracts for University.
1. Access to and egress from Project Area shall be in strict conformance to prearranged routes approved by University's Representative, with the understanding that curtailment of construction traffic or revision of access routes may be required on short notice if University's operations mandate such changes because of excessive noise or problems of safety, service, or supply.
 2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to service and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- G. Emergency Access: Provide pathways, drives, gates, directional signage, and other provisions as required by authorities having jurisdiction for emergency access to Project Area and adjoining campus facilities.
- H. Emergency Egress: Maintain all pathways, drives, gates, and other means of egress during construction as required by public safety authorities having jurisdiction.

1.4 TIME RESTRICTIONS

- A. Contractor's Work Hours: Work shall be limited to Monday through Friday, except University-observed holidays and periods when classes are not in session, during hours of 7:00am to 6:00pm.
 - 1. Work on other days and at other hours shall be only with written approval of University's Representative.
 - 2. Work during final exam periods at ends of class sessions shall be restricted to minimize noise, vibrations and other distracting and inhibiting activities.
 - 3. If it becomes necessary to perform Work on weekends and holidays, in order to meet milestone and final completion dates, Work shall be performed at no change in Contract Amount unless authorized by written Change Order or Field Instruction by the Construction Administrator.
- B. Utility Outages and Shutdown: Schedule utility outages and shutdowns to nights, weekends, school holidays or times and dates acceptable to and approved by University's Representative. University to approve shutdown of utility services during normal business hours
 - 1. Time and duration of outages and shutdowns shall not hinder normal campus activities except as authorized in writing by University's Representative.
 - 2. Provide 7 calendar days' notice in writing to University's Representative of all utility outages and shutdowns. Describe Work to be performed, which utilities will be interrupted and time and duration of interruption.
 - 3. Contractor shall provide temporary utilities to occupied facilities and adjacent properties when utilities must be interrupted for more than two hours, unless otherwise directed by University's Representative.
 - 4. Power interruptions beyond the authorized time shall be subject to liquidated damages in the amount of \$5,000 per day.
 - 5. Refer also to requirements for temporary utilities specified in Section 01 51 00, Temporary Utilities.

1.5 NOISE AND VIBRATION RESTRICTIONS

- A. Noise Restrictions: Minimize noise from construction activities. Limit loud construction activities to times when classes are not in session in adjacent spaces.
- B. Vibration Restrictions: Do not perform activities that cause vibrations in adjacent occupied spaces, including spaces above and below location where Work is performed. If vibrations transmit through structure, perform Work at times when University activities are not being conducted.

1.6 UNIVERSITY'S USE OF SITE AND PREMISES

- A. University's Use of Site and Premises: University reserves the right to occupy and to place and install equipment in completed or partially completed areas of buildings and site. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. Full University Occupancy: University will occupy site and existing buildings during entire construction period. Cooperate with University during construction operations to minimize conflicts and facilitate University usage. Perform the Work so as not to interfere with University's operations.
2. Partial University Occupancy: University reserves the right to occupy and to place and install equipment in completed areas of building provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
3. Before University occupancy, mechanical, electrical, and fire safety systems shall be fully operational, and required tests and inspections shall be successfully completed. Any occupancy of a building is contingent upon a certificate of temporary or final occupancy provided by the Office of State Fire Marshal. Unless otherwise agreed, University will provide operation and maintenance of mechanical and electrical systems in portions of the building used by University. Unless otherwise agreed in writing by the University, warrantee periods shall not begin until date established by Notice of Completion filed at Contract closeout.
4. Upon occupancy, University will assume responsibility for maintenance and custodial service for occupied portions of building.

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Administrative and procedural requirements for unit prices specified or indicated on the bid proposal form.

1.3 RELATED SECTIONS

- A. The following documents and sections additionally pertain to this section.
 - 1. Construction Drawings
 - 2. Section 01 21 00 - Allowances: Procedures for using unit prices to adjust quantity allowances.
 - 3. 01 23 00 - Alternates: Procedures for measurement and payment of alternative or substitution materials.
 - 4. Section 01 45 00 - Quality Control: General testing and inspecting requirements, including those tests and inspections based on unit prices.

1.4 DEFINITIONS

- A. Unit Price: An amount proposed by Bidder and stated on the Bid Proposal as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.
 - 1. Unit prices quoted in the Bid Proposal are for additions or deletions of approved items of Work.
 - 2. All unit prices quoted shall be for the items completely installed, furnished, and operable in accordance with the Contract Documents, and shall include profit, overhead, taxes, cost of coordinating the unit price work with adjacent work, compensation for risk of loss or damage to the work regardless of cause, all expenses due to delays in performance, so they are the complete price to the University.
 - 3. Unit prices shall not apply to work the Contractor elects to do for its own convenience or to correct errors committed by the Contractor.
 - 4. All unit prices shall remain in effect for the full term of the Contract.
 - 5. Quantities listed in the Contract Documents are approximate only. Contract Amount shall be adjusted by change order using unit prices listed for actual quantities of Work performed.

1.5 PROCEDURES

- A. Measurement and Payment Procedures: As stated in General Conditions of the Contract. Refer to individual product Specification Sections for Work that requires establishment of unit prices. Basis of each unit price is specified in those Sections.
1. Measure: University reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this Work measured, at University's expense, by an independent surveyor.
 2. Unit Prices are for various units of work to be added to or deducted from the quantities required for the Work as indicated and specified.
 3. Unit Prices will be exercised as a right of the Trustees and shall remain in effect until Notice of Completion. Assume no change in time for performance of the Contract, unless provided in Change Order.
 4. The Trustees retain the right to reject the quoted unit price. Changes in quantity and time will be made an item of a Change Order.
 5. When accepted, coordinate related work, and modify surrounding work as required to accommodate the units listed below.
 6. Contractor shall be responsible to determine the unit price quantities of material required, and to have it verified by the inspector prior to submitting a claim for a contract adjustment. Geotechnical Engineer to monitor and determine final length.
 7. Unit prices shall not apply to work the Contractor elects to do for its own convenience or to correct errors committed by the Contractor.
- B. List of Unit Prices: A list of unit prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.
- C. The Trustees are not obligated to use the unit prices.

PART 2 – PRODUCTS (NOT USED)

Not applicable to this section.

PART 3 – EXECUTION

3.1 LIST OF UNIT PRICES

- A. Unit Price No.01: Asphalt paving.
1. Description: Provide a price per square foot that is inclusive of all equipment, materials, and labor necessary to install new drivable asphalt paving in accordance with Section 32 12 16 (Asphalt Paving) and 7/C8.1.
 2. Unit of measurement: square foot.
- B. Unit Price No.02: Concrete paving (vehicular).

3. Provide a price per square foot that is inclusive of all equipment, materials, and labor necessary to install new drivable concrete in accordance with Section 32 13 13 (Site Concrete) and 3/C8.0.
4. Unit of measurement: square foot.
- C. Unit Price No.03: Concrete paving (pedestrian).
 5. Provide a price per square foot that is inclusive of all equipment, materials, and labor necessary to install new concrete walkway (without a thickened edge) in accordance with Section 32 13 13 (Site Concrete) and 2/C8.0.
 6. Unit of measurement: square foot.
- D. Unit Price No.03: Concrete curb and gutter.
 7. Provide a price per linear foot that is inclusive of all equipment, materials, and labor necessary to install new concrete curb and gutter in accordance with Section 32 13 13 (Site Concrete) and 6/C8.1.
 8. Unit of measurement: linear foot.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes Administrative and procedural requirements for Alternates.
 - 1. Acceptance or rejection of each Alternate is at discretion of the Trustees. None, any, or all Alternates may be accepted or rejected by the Trustees in order of precedence.
- B. Requirements and descriptions for products and scopes of Work identified as Alternates in the Drawings and Specifications and listed as "Bid Alternative" on the Bid Proposal Form.
- C. Included in this Section: non-technical descriptions of Alternates listed by number only on the Bid Proposal.
- D. Included in other Sections: technical specifications for work revising or adding/deducting from Base Bid work by Alternates.
- E. Unless otherwise specifically provided, the work described in Alternates shall be completed with no increase in Contract Time.
- F. The additional cost or credit for each Alternate shall represent the total adjustment to the contract sum associated with said Alternate.
- G. Refer to the Bid Proposal Form for information concerning order of acceptance of alternates.
- H. All labor, material, equipment, accessories, and incidental items required for a complete installation shall be included, whether or not specifically mentioned as part of the Alternate. Contractor shall perform necessary modifications or adjustments to affected adjacent work, whether new or existing, in order to fully and properly integrate the Alternate work into the Project. These necessary modifications and adjustments shall be included in the Alternate

1.3 QUALITY ASSURANCE

- A. The Base Bid specifications shall govern work of Alternates unless otherwise noted.

1.4 GENERAL REQUIREMENTS FOR ALTERNATES

A. Coordination:

1. Determine the full effect on the Work of implementing each Alternate, including coordination, modification or adjustment of portions of the Work. Contract Amount included on the Bid Form for each Alternate includes the cost for all work required to incorporate the Alternate.
2. To enable University to compare total costs where alternative materials and methods might be used or where scope of Work might be altered, Bid Alternate Work items have been established as described in this Section.
3. Unless otherwise noted, Alternates will be accepted in the order listed until the Construction Budget is reached.

- A. Contract Amount included in Base Bid and as stated in executed Agreement shall include all costs for Work described in Contract Documents.
- C. Bid Proposal Form or other means prescribed for submission of proposed cost of Work shall include line items for each Alternate described in this Section. No Alternates other than as described in this Section shall be submitted, except in accordance with product options and substitutions provisions specified in Section 01 25 00, Substitution Procedures.
- D. Each Alternative is identified herein by number. This identification shall be used whenever referring to Work described in Alternate and when submitting cost proposals and payment requests.
- E. Alternative construction described in Alternates and revised scopes of Work shall be performed only when such Alternate is made a part of the Work by specific provision in the University-Contractor Agreement, if selected by University prior to execution of the Agreement, or by Change Order or Change Directive if selected subsequent to execution of the Agreement.
- F. Costs for Alternates shall be valid for no less than 90 calendar days from date of Notice to Proceed and University may select any or all Alternates during that time. Once an Alternate is selected and the Contract modified for Work as described in the Alternate, changes to return to original scope of Work will be made only by Change Order or Change Directive in accordance with provisions of the Contract General Conditions for changes.

PART 2 - PRODUCTS AND EXECUTION

2.1

- A. If University elects to proceed on the basis of one or more of the described Alternates, Contractor shall make all modifications to Work as required to provide products complete, in place and fully functional, including all labor, equipment, services and incidental consumables necessary to apply, install and finish Work described in Alternate in accordance with requirements specified in related product Sections of these Specifications.
- B. Cost for Alternates shall be complete and include all net increases and decreases in Contract Amount for Work described in Alternate and for all changes in related Work. No claims for additional costs to University will be honored other than as stated in cost proposal for each Alternate.

2.2 SCHEDULE OF ALTERNATES (NOT USED)

- A. Additive Alternate Bid No. 1 - [*Title*].
 - 1. Base Bid condition: [*Brief Description*].
 - 2. Alternate Bid condition: [*Brief Description*].
 - 3. Location in contract documents [*Spec Section and / or Drawing Sheet No.*]

- A. Deductive Alternate Bid No. 1 [*Title*]
 - 1. Base Bid condition: [*Brief Description*].
 - 2. Alternate Bid condition: [*Brief Description*].
 - 3. Location in contract documents [*Spec Section and / or Drawing Sheet No.*]

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. General requirements applicable to substitutions of materials, products, equipment and systems.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by Contractor after award of Contract are considered to be requests for substitutions. Following are not considered to be requests for substitutions:
 - 1. Substitutions requested during bidding period, and accepted by Addendum prior to award of Contract, are included in Contract Documents and are not subject to requirements specified in this Section for Substitutions.
 - 2. Revisions to Contract Documents requested by University Representative or Architect.
 - 3. Specified options of products and construction methods included in Contract Documents.
 - 4. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBSTITUTION OF MATERIALS AND EQUIPMENT

- A. Substitutions, General: Catalog numbers and specific brands or trade names are used in materials, products, equipment and systems required by the Specifications to establish the standards of quality, utility and appearance required. Alternative products which are of equal quality and of required characteristics for the purpose intended may be proposed for use provided the Contractor complies with provisions of Supplementary General Conditions and Contract General Conditions, subject to the following provisions.
 - 1. See Section 01 60 00 - Product Requirements for requirements regarding product options.
 - 2. Substitutions will only be authorized by properly executed Change Order or Field Instruction.
 - 3. Product and Material Substitution period will end 35 days after issuance of NTP. The University has no obligation to entertain substitutions.

1.5 SUBMITTALS

- A. Requests for substitutions will not be considered before selection of Contractor. Substitutions will not be considered when:
 - 1. Indicated on shop drawings or product data submittals without separate formal "Substitution Request by the Contractor.
 - 2. Requested directly by subcontractor or supplier.
 - 3. Acceptance will require revision of Contract Documents.
 - 4. Proposed changes are not in compliance with general intent of Contract Documents.
- B. Requests for substitutions will be considered only as allowed in the Supplementary General Conditions and Contract General Conditions. Other requests will be considered after Notice to Proceed only when:
 - 1. Specified product or method of construction cannot be provided within Contract Time. Architect or University Representative will not consider request if product or method cannot be provided as result of failure to pursue Work promptly or coordinate activities properly.
 - 2. Subsequent information or changes indicate specified product will not perform as intended.
 - 3. Requested substitution offers University substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities University must assume. University's additional responsibilities include compensation to Architect for redesign and evaluation services, compensation to University Representative for additional processing and evaluation services, increased cost of other construction by University, and similar considerations.
 - a. University Representative and Architect's time shall be compensated as specified for compensation of time in paragraph 01 25 00-H-3-a.
 - 4. Specified product or method of construction cannot receive necessary approval by governing authority, and requested substitution can be approved.
 - 5. Specified product or method of construction cannot be provided in manner that is compatible with other materials and where Contractor certifies that substitution will overcome incompatibility.
 - 6. Specified product or method of construction cannot be coordinated with other materials and where Contractor certifies that proposed substitution can be coordinated.
 - 7. Specified product or method of construction cannot provide warranty required by Contract Documents and where Contractor certifies that proposed substitution provides required warranty.
- C. Do not order or install substitute products without written acceptance from the University.
- D. Only 1 request for substitution for each product will be considered. When substitution is not accepted, provide specified product.

- E. Architect will determine acceptability of substitutions.
- F. Submit each request to Architect for approval through University Representative on Substitution Request Form. Submit separate form for each substitution.
 - 1. Identify products by Specification Section and Article numbers.
 - 2. Provide manufacturer's name and address, trade name of products, and model or catalog number.
 - 3. List fabricators and suppliers as appropriate.
 - 4. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents including independent laboratory testing reports, approval numbers, listings, and approved assembly descriptions as requested by Campus Construction Manager or Architect, or as required by agencies having jurisdiction.
 - 5. Attach product data as specified in Section 01 33 00.
 - 6. Give itemized comparison of proposed substitution with specified product, listing variation, and reference to Specification Section and Article numbers.
 - 7. Give quality and performance comparison between proposed substitution and specified product.
 - 8. Submit written certification from manufacturer that proposed substitution is appropriate for this application.
 - 9. List availability of maintenance services and replacement materials.
 - 10. State effect of substitution on construction schedule, and changes required in other Work or products.
- G. By making requests for substitutions, Contractor:
 - 1. Represents that Contractor has personally investigated proposed substitute product and determined that it is equal to or superior in all respects to that specified.
 - 2. Represents that Contractor will provide same warranty for substitution that Contractor would for the specified product.
 - 3. Will coordinate installation of accepted substitute, making such changes as may be required for Work to be compatible with substrates and adjacent materials, and complete in all respects.
 - 4. Waives claims for additional time related to substitution that may later become apparent.
 - 5. Certifies that cost data presented is complete and includes related costs under this Contract, including redesign costs, and waives claims for additional costs related to substitution which may later become apparent.
- H. Modification of Documents: Where substitution requires changes to design of Work as indicated on accepted Shop Drawings for proper installation; furnish drawings and specifications prepared by and bearing seal of licensed Architect and Architects as appropriate, revising Shop Drawings.
 - 1. Submit revised Documents for acceptance in accordance with Section 01 33 00.

2. Revised Drawings shall be sufficiently complete for proper installation of substitution and related Work.
 - a. Include details of connection to and relationship with adjacent materials.
3. If, in Architect's sole judgment, proposed substitution is of such significance or deals with product or system affecting basic design or aesthetics, pay Architect for changes required to Contract Documents as follows:
 - a. Reimburse Owner for Architect's account for time spent in changing Contract Documents at rate of 3.2 times rate of Direct Personnel Expense (DPE). Direct Personnel Expense is defined as direct salaries of Architect's personnel engaged on Project and portion of costs of mandatory, and customary contributions and benefits related thereto, including employment taxes and other statutory employee benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.
4. Contractor is responsible for cost of revised Documents, obtaining and paying for review and plan check by authorities having jurisdiction, and cost of revised construction.
5. Submit revised drawings with Record Documents in accordance with Section 01 78 39.

1.6 SUBMITTAL PROCEDURES

- A. Architect's and University Representative's Action: If necessary, Architect through University Representative will request additional information or documentation for evaluation within 1 week of receipt of request for substitution. Architect will notify Contractor of acceptance or rejection of substitution within 2 weeks of receipt of request, or 1 week of receipt of additional information or documentation, whichever is later. Acceptance will be in form of Change Order, should a change in Contract cost or time be associated with the substitution.
 1. Architect or University Representative will not make exhaustive attempt to determine products proposed for substitution are equivalent to, or can be modified in order to be equivalent to specified products.
 - a. Where extensive investigation is required by University Representative or Architect, as determined by University Representative or Architect, Contractor shall reimburse University for University Representative's or Architect's account for time spent in processing additional resubmittals at rate of 3.2 times rate of Direct Personnel Expense (DPE). Direct Personnel Expense is defined as direct salaries of Architect's or University Representative's personnel engaged on Project and portion of costs of mandatory, and customary contributions and benefits related thereto, including employment taxes and other statutory employee benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.
 2. Use product specified if Architect and University Representative couldn't make decision on use of proposed substitute within time allocated.

3. If accepted by Architect and University Representative, products proposed for substitution are accepted subject to modifications by manufacturer, if necessary, to meet detailed requirements of Drawings and Specifications.
- B. For Accepted Products: Submit shop drawings, product data, and samples in accordance with Section 01 33 00.
- C. Contractor's submittal, and Architect's and University Representative's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with Contract Documents do not constitute acceptable or valid request for substitution, nor do they constitute approval.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 26 13

REQUESTS FOR INTERPRETATION AND INFORMATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Procedures for submitting requests for interpretation and/or information (RFI).
- B. Limitations on use of RFI to obtain interpretation and clarification.

1.3 RELATED SECTIONS

- A. Section 01 31 13 - Coordination: Requirements for organizing and coordinating the Work.
- B. Section 01 31 26- Electronic Communications Protocol
- C. Section 01 33 00 - Submittal Procedures: Restriction on use of submittals for changes in materials, products, equipment and systems.
- D. Section 01 60 00 – Product Requirements: Procedures for requesting substitutions of materials, products, equipment and systems.

1.4 DEFINITIONS

- A. Request for Interpretation: A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as an RFI.

1.5 CONTRACTOR'S REQUESTS FOR INTERPRETATION (RFIs)

- A. Contractor's Requests for Interpretation (RFIs): Should Contractor be unable to determine from the Contract Documents the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of Work is described differently at more than one place in the Contract Documents; the Contractor shall request that the Architect make an interpretation of the requirements of the Contract Documents to resolve such matters. Contractor shall comply with procedures specified herein to make Requests for Interpretation (RFIs).
- B. Submission of RFIs: RFIs shall be prepared and submitted electronically by the Contractor for review and approval by the University.
 - 1. Forms shall be completely filled in and submitted via an Electronic Project Management (EPM) System or other method agreed upon by the University.
 - 2. Each RFI shall be given a discrete, consecutive number.
 - 3. Each page of the RFI and each attachment to the RFI shall bear the University's project name, project number, date, RFI number and a descriptive title.
 - 4. Contractor shall sign all RFIs attesting to good faith effort to determine from the Contract Documents the information requested for interpretation. Electronic signatures are acceptable

and subject to authentication. Frivolous RFIs shall be subject to reimbursement from Contractor to University for fees charged by Architect, Architect's consultants and other design professionals engaged by the University.

- C. Subcontractor-Initiated and Supplier-Initiated RFIs: RFIs from subcontractors and material suppliers shall be submitted through, be reviewed by and be attached to an RFI prepared, signed and submitted by Contractor. RFIs submitted directly by subcontractors or material suppliers will be returned unanswered to the Contractor.
 - 1. Contractor shall review all subcontractor- and supplier-initiated RFIs and take actions to resolve issues of coordination, sequencing and layout of the Work.
 - 2. RFIs submitted to request clarification of issues related to means, methods, techniques and sequences of construction or for establishing trade jurisdictions and scopes of subcontracts will be returned without interpretation. Such issues are solely the Contractor's responsibility.
 - 3. Contractor shall be responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.
- A. Requested Information: Contractor shall carefully study the Contract Documents, in particular, the Contract General Conditions, to ensure that information sufficient for interpretation of requirements of the Contract Documents is not included. RFIs that request interpretation of requirements clearly indicated in the Contract Documents will be returned without interpretation.
 - 1. In all cases in which RFIs are issued to request clarification of issues related to means, methods, techniques and sequences of construction, for example, pipe and duct routing, clearances, specific locations of Work shown diagrammatically, apparent interferences and similar items, the Contractor shall furnish all information required for the Architect or University's Representative to analyze and/or understand the circumstances causing the RFI and prepare a clarification or direction as to how the Contractor shall proceed.
 - 2. If information included with this type RFI by the Contractor is insufficient, the RFI will be returned unanswered.
- B. Unacceptable Uses for RFIs: RFIs shall not be used to request the following:
 - 1. Approval of submittals (use procedure specified in Section 01 33 00 - Submittals Procedures)
 - 2. Approval of substitutions (refer to Section 01 60 00 - Product Requirements)
 - 3. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Contract General Conditions)
 - 4. Different methods of performing Work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Contract General Conditions).
- C. Disputed Requirements: In the event the Contractor believes that a clarification by the University's Representative results in additional cost or time, Contractor shall comply with the Contract General Conditions.
- D. RFI Log: Contractor shall prepare and maintain a log of RFIs, and at any time requested by the University's Representative, the Contractor shall furnish copies of the log showing all outstanding RFIs.
- E. Review Time: Architect will return RFIs to Contractor and University's Representative within 14 calendar days of receipt. RFIs received after 5:00 pm shall be considered received on the next regular working day for the purpose of establishing the start of the fourteen-calendar day response period.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 13

PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Requirements for Project Coordination and electrical and mechanical coordination or "tight" conditions involving Work under Contract.

1.3 RELATED SECTIONS

- A. Section 01 11 00 - Summary of the Work: Various types of Work to be coordinated, including Owner-Furnished/Contractor-Installed products and work under separate Contracts.
- B. Section 01 60 00 - Product Requirements: Coordination of products, especially general requirements for system completeness and product substitutions.

1.4 COORDINATION

- A. Coordination, General:
 - 1. Coordinate the Work according to provisions stated in Contract General Conditions. Do not delegate responsibility for coordination to any subcontractor.
 - a. Anticipate the interrelationship of all subcontractors and their relationship with the total work.
 - b. Resolve differences or disputes between subcontractors and materials suppliers concerning coordination, interference, or extent of work between sections. The Contractor's decisions, if consistent with the Contract Documents, shall be final. The Architect is not required to coordinate work between sections and will not do so.
 - c. Coordinate the work of subcontractors and material suppliers, so that their work is performed in a manner to minimize interference with, and to facilitate the progress of the work.

- d. Provide detailing for a complete project.
 2. Coordinate Work under the Contract with work under separate contracts by University.
 3. Coordinate utility and building services shutdowns and closures of vehicular and pedestrian thoroughfares, including access to buildings and parking areas, to minimize disruption of University activities.
 4. Be responsible for providing anchorage, blocking, joining and other detailing as required to provide complete project.
 5. Do not obstruct spaces required by Code in front of electrical equipment, access doors, etc.
 6. Do not cover any Work (piping, wiring, ducts, etc.), until properly inspected and approved.
 7. Remove and replace any and all Work under any Section which is not in accordance with the Contract Documents with other materials and Work which is in conformance with the Contract Documents. Repair or replace all other Work damaged by these operations at no increase in contract price.
 8. This work shall be coordinated with all associated Work in a manner that will ensure that all work will be accomplished as rapidly as the progress of the project will permit and so that no work will be delayed for want of associated work.
- B. Coordination of OFCI Products: Contractor shall cooperate with University and others as directed by University's Representative in scheduling and sequencing the incorporation into the Work of Owner Furnished/Contractor Installed (OFCI) products identified in the Contract Drawings and Specifications.
- C. Relationship of Contract Documents: Drawings, Specifications and other Contract Documents in the Project Manual are intended to be complementary. What is required by one shall be as if required by all. What is shown or required, or may be reasonably inferred to be required, or which is usually and customarily provided for similar work, shall be included in the Work.
- D. Discrepancies in Contract Documents: In the event of error, omission, ambiguity or conflict in Drawings or Specifications, Contractor shall bring the matter to attention of the Architect in a timely manner during the bidding period, for determination and direction by the Architect in accordance with provisions of the Contract General Conditions.
- E. Construction Interfacing and Coordination: Layout, scheduling and sequencing of Work shall be solely the Contractor's responsibility.
1. Contractor shall verify, confirm and coordinate field measurements so that new construction correctly and accurately interfaces with conditions existing prior to construction.
 2. Contractor shall bring together the various parts, components, systems and assemblies as required for the correct interfacing and integration of all elements of Work. Contractor shall coordinate Work to correctly and accurately connect abutting, adjoining, overlapping and related elements, including work under separate contracts by University, utility agencies and companies.

1.5 COORDINATION OF SUBCONTRACTS AND SEPARATE CONTRACTS

- A. Superintendence of Work: Contractor shall appoint a field superintendent and a project manager, who shall directly, and full time supervise and coordinate all Work of the Contract.
- B. Subcontractors, Trades and Materials Suppliers: Contractor shall require all subcontractors, trades, crafts and suppliers to coordinate their portions of Work with the Contractor's field superintendent to prevent scheduling, sequencing, dimensional and other conflicts and omissions.
- C. Coordination with Work under Separate Contracts: Contractor shall coordinate and schedule Work under the Contract with work being performed for Project under separate contracts by University, serving utilities and public agencies. Contractor shall make direct contacts with parties responsible for work of the Project under separate contracts, in order to provide timely notifications and to facilitate information exchanges.

1.6 MECHANICAL AND ELECTRICAL COORDINATOR

- A. Mechanical and Electrical Coordinator: Contractor shall employ and pay for services of a person, technically qualified and administratively experienced in field coordination for the type of mechanical and electrical Work required for this Project, for the duration of the Work. This role may be filled by the Contractor's onsite superintendent, if the superintendent meets the qualification requirements.
 - 1. Work out all "tight" conditions involving work of various sections in advance before installation. If necessary, and before work proceeds in these areas, prepare supplementary drawings for review showing all work in "tight" areas.
 - 2. Provide supplementary drawings and additional work necessary to overcome "tight" conditions at no increase in contract price. Refer to Section 01 33 00, "Submittal Procedures."
 - 3. Coordinated layout shop drawings shall be dimensionally accurate and detailed, giving complete dimensions of all locations, elevations, and clearances. Show exact locations of the following:
 - a. Ductwork
 - b. Piping, including fire protection systems.
 - c. Valves and piping specialties, including all air vents and drains.
 - d. Dampers
 - e. Access doors
 - f. Control and electrical panels
 - g. Adjustable frequency controllers
 - h. Motor control centers and transformers
 - i. Disconnect switches
 - j. Elevator equipment
 - k. Electrical and communication cable trays and main conduits

- I. Owner-furnished, Contractor-installed equipment.
4. Coordinated layout shop drawings shall show actual architectural and structural constraints and site conditions such as: Structural footings, walls, beams, columns, etc. which pose potential conflicts with required and/or specified horizontal and vertical dimensions; Architectural elements or elevation requirements conflicting with available interstitial space between ceilings and structure above.
5. Coordination:
 - a. Fully coordinate work between trades with actual architectural, structural, and site conditions.
 - b. Coordinate all adjustments required. Clearly identify by circling these adjustments on the coordinated layout shop drawings.
 - c. If Contractor has specific questions regarding coordination of the installation with structural, architectural and site conditions and work between trades, submit same with appropriate shop drawings documenting areas in question with Contractor's proposed installation.
6. Submission and review of coordinated layout shop drawings:
 - a. Prepare reproducible drawings.
 - b. Submit to each trade for review of space allocated to all trades.
 - c. Revise drawings to compensate for review by each trade.
 - d. Review revisions with each trade.
 - e. Submit to Architect for review.
 - f. Review of coordinated layout shop drawings is only for verification that Contractor has performed coordination work as specified herein.
 - (1) Review does not include verification of exact dimensions, clearances, arrangements and/or compliance with codes.
7. Final coordinated layout shop drawings shall show that all trades affected have made reviews and shall be signed by each trade at completion of coordination.
 - a. General Contractor is to assure that each trade has coordinated work with other trades.
 - b. Include stamp with labeled space for each trade to sign on each submittal indicating that layout shop drawing has been coordinated.
 - c. No layout shop drawing will be reviewed without stamped and signed coordination assurance by General Contractor.
8. Coordinated layout shop drawings showing work of all trades are required. Individual trade layout shop drawings will not be accepted.
9. Verify that utility requirement characteristics of all operating equipment including associated work by others are compatible with the building utilities. Coordinate the Work of

various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

1.7 SUBMITTALS

- A. Coordination Documents: Coordinate shop drawings, diagrams and other specified in various product Sections of the Contract Specifications. Submit coordination drawings and schedules as specified below, prior to submitting shop drawings, product data, and samples.

PART 2 - PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

3.1 COORDINATION REQUIRED

- A. Coordinate Work specified in Division 13 - Special Construction, Division 23 – Heating, Venting, and Air Conditioning and Division 26 - Electrical within each Division, between these Divisions and with Work specified in other Divisions.
- B. Coordinate progress schedules, including dates for submittals and for delivery of products.
- C. Conduct meetings with suppliers, installers and others concerned with the Work, to establish and maintain coordination of layout, sequencing and completion of various elements of Work.
- D. Conduct meetings with installers and others concerned with the Work, to properly integrate various mechanical and electrical systems, to facilitate construction and to provide proper access and work space for maintenance, renovation and improvement of system components. Include participation by representatives of University, including maintenance personnel.
- E. Assist in resolution of conflicts by providing technical advice, coordination drawings and three dimensional representations of integrated system components, including computer and physical models as necessary.
- F. At construction progress meetings, report on progress of Work to be adjusted under coordination requirements and any necessary changes in sequencing and scheduling of Work.
- G. Transmit minutes of coordination meetings and reports to University's Representative, Architect, Architect's consultants (as applicable) and to meeting participants.

3.2 COORDINATION DOCUMENTS

- A. Coordination Drawings and Models: Contractor shall prepare coordination drawings and three-dimensional models, in computer form and in physical form as necessary, to organize layout and installation of mechanical and electrical products for efficient use of available space, for proper sequence of installation, for integration with building structure, for future maintenance and renovation, and to identify potential conflicts between systems and elements.
- B. System Services: Contractor shall identify on coordination drawings and models all plumbing and electrical power and signal services required for each component of each system.

1. Contractor shall certify that characteristics of services and controls are correct for each component.
 2. Certification shall be in written form and signed by Contractor and mechanical and electrical coordinator.
- C. Responsibility and Services Matrix: Contractor shall prepare schedule matrix identifying elements of mechanical and electrical Work requiring coordination, as specified in each Section in division of the Contract Specifications.
1. Include identification of parties having responsibilities related to each element of Work and describe what that responsibility shall be.
 2. Include required off-site and on-site tests and inspections for various elements of Work.
 3. Include identification of administrative activities related to each element of mechanical and electrical Work, such as product data, shop drawings, coordination drawings, samples, mock-ups, test reports for each element of Work.
 4. Include identification of elements of Work requiring temporary services.
- D. Maintenance and Disposition of Coordination Documentation: Maintain coordination documents, including models, for duration of the Work, recording all changes. After review of original and revised documents and models by University's Representative and Architect, submit documents and models as part of Project record documents. See Section 01 78 39, Project Record Documents.

3.3 COORDINATION OF SUBMITTALS

- A. Submittal Reviews by Mechanical and Electrical Coordinator: In addition to specified review actions by Contractor, specified in Section 01 33 00 - Submittals Procedures, all product data, shop drawings and samples shall be reviewed by the mechanical and electrical coordinator for proper coordination of various elements of Work, as described in the preceding Article titled "Coordination Documents."
1. Include Owner-furnished/Contractor-installed (OFICI) products.
 2. Include products to be provided (furnished and installed) under separate contracts by University, to the extent that information is provided in the Contract Documents and supplemental instructions from University's Representative.
 3. Review by Contractor shall be completed prior to submission of product data, shop drawings and samples to Architect for review.
 4. Indicate review actions by Contractor by signed review stamp and other appropriate notations on submittals.
 5. Coordinate with other review actions to be taken by Contractor, as specified in Section 01 33 00 - Submittals Procedures.
- B. Field Conditions: Contractor shall verify field dimensions and clearances and relationship to available space and anchoring provisions. Report conflicts in writing to the Architect and the University's Representative.

C. Product Characteristics: Contractor shall:

1. Verify compatibility of equipment and other elements requiring plumbing, HVAC and electrical services and signals with services to be provided.
2. Verify motor voltages and control characteristics.
3. Coordinate controls, interlocks, wiring of pneumatic switches, and relays.
4. Coordinate wiring and control diagrams.
5. Review the effect of changes in one element of the Work of other elements of the Work. Identify conflicts and report conflicts in written and graphic form to the Architect and the University's Representative.
6. Verify information provided in maintenance and operating instructions and coordinate preparation of maintenance and operation data. See Section 01 78 23 - Operation and Maintenance Data.

3.4 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

- A. Review of Proposed Substitutions: See Section 01 25 00- Substitution Procedures. Product Substitution Contractor shall review Contractor's proposals and requests for substitution prior to submission to Architect.
1. Contractor shall verify compliance with Contract Documents and shall certify compatibility with other elements of the Work, including proper integration with building structure, load limitations, operating and maintenance space and accessibility provisions, and suitability for available building services, including plumbing and electrical power and signal systems.
 2. Contractor shall prepare and submit recommendation for action regarding proposals, including identification of related changes in other elements of the Work.

3.5 SYSTEM AND EQUIPMENT START UP

- A. Observations of System and Equipment Activation and Start-Up: Contractor shall observe activation and start-up of systems and equipment, including all Work specified in Divisions 2 through 48 with connections to utilities, building services and controls.
1. Contractor shall verify that utilities, building services and control systems are properly connected, complete and functional within criteria of manufacturer and criteria indicated in the Contract Documents.
 2. Contractor shall verify that activated elements are properly anchored and that operating components operate properly according to the component's intended design.
 3. Contractor shall verify that activated elements of the Work are in operable condition according to normal operating characteristics required by the manufacturer and the Contract Documents.
 4. Should adjustments be necessary to activated elements, Contractor shall advise the Architect and University's Representative of necessary actions and shall observe that proper actions are performed to achieve required operating characteristics.

- B. Observations of System and Equipment Demonstrations: Contractor shall observe performance demonstrations including equipment demonstrations to Architect and University's Representative. Record times and additional information required for operation and maintenance manuals.
- C. Documentation of Observations of Activation, Start Up, Adjustment and Demonstration: Contractor shall keep written record of activation, start-up, operational tests and inspections and necessary adjustments and re-tests and re-inspections.
 - 1. Documentation shall include record of time and date of activation, start up, operational tests and inspections and shall include measured results of tests and inspections.
 - 2. Documentation shall be submitted to University's Representative and Architect.

3.6 INSPECTION AND ACCEPTANCE OF EQUIPMENT

- A. Contract Completion Review:
 - 1. Prior to Contract Completion review, Contractor shall verify that each component and system has been properly adjusted, cleaned, lubricated, inspected and tested, and is ready for operation and use.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 REQUIREMENTS INCLUDED

- A. Preconstruction meeting.
- B. Construction progress meetings.
- C. Pre-installation conferences.
- D. Change Order review meetings
- E. Monthly Progress Payment Meetings
- F. Contract Closeout Meeting
- G. Partnering

1.3 RELATED REQUIREMENTS

- A. Section 01 45 00 - Quality Control: General requirements for construction quality, to be reviewed at construction progress meetings.
- B. Section 01 32 00 - Construction Progress Documentation: General requirements for construction progress reports and schedules, to be reviewed at construction progress meetings.
- C. Section 01 33 00 - Submittal Procedures: Status of submittals to be reviewed at construction progress meetings.
- D. Section 01 77 00 - Contract Closeout Procedures: Contract Completion Review.

1.4 PRECONSTRUCTION MEETING

- A. Preconstruction Meeting: University's Representative will administer a preconstruction meeting immediately prior to Contractor mobilization onto the project site.
 - 1. Representatives of the Trustees, the Contractor, selected Subcontractors [OPTIONAL], Architect, and Architect's Consultants [OPTIONAL], and OTHER campus representatives, as appropriate, will attend.
- B. Schedule: Contractor shall schedule preconstruction meeting within five days of construction start date established in the Notice to Proceed.
- C. Location: Preconstruction meeting will be held at a location as directed by the University's Representative.
- D. Agenda: Preconstruction meeting shall cover the following topics as a minimum.

1. Special Project Procedures: Site access restrictions, if any, and requirements to avoid disruption of operations at adjoining facilities. Present University's requirements for use of premises.
2. Designation of Key Personnel: The Trustees, Architect, and Contractor shall designate key personnel and provide a name and address list that includes the following.
 - a. The Trustees: The University Representative, Inspector of Record, and others authorized to act in certain capacities for the University.
 - b. Architect: Principal and Project Administrator as appropriate.
 - c. Contractor: Project Manager and Superintendent.
 - d. Major subcontractors (as applicable): Principal/Project Manager and Superintendent.
 - e. Major materials suppliers (as applicable): Contact person.
3. Subcontractors List: Distribute and discuss list of subcontractors and suppliers.
4. Coordination: Review requirements for Contractor's coordination of Work. Review sequence and schedule for work being performed for University under separate contracts. Discuss coordination of construction to minimize impacts on continuing Campus operations.
5. Project Communication Procedures: Review administrative requirements for written and oral communications.
6. Construction Schedule: Distribute and discuss preliminary schedule, initial baseline construction schedule and critical work sequencing of major elements of Work, including coordination of Owner-Furnished/Contractor-Installed (OFCI) products and work under separate contracts by serving utility agencies and companies and University.
7. Campus and Site Security: Review requirements for Contractor to develop and implement site security.
8. Safety Program: Review requirements for Contractor to develop and implement safety program in compliance with Contract General Conditions, the Owner Controlled Insurance Program (OCIP), and OFS required site safety plan.
9. Site Access by University's Representative and Architect: Review requirements and administrative procedures Contractor may wish to institute for identification and reporting purposes.
10. Permits and Fees: Review Contract requirements and review schedule and process for obtaining permits and paying fees.
11. Project Layout: Review requirements for laying out of Work, including surveying requirements.
12. Construction Facilities: Designate storage and staging areas, construction office areas and parking areas and review site access requirements.
13. Temporary Utilities: Requirements for establishing and paying for temporary water, power, lighting and other utility services during construction, including metering and allowances. Refer to Section 01 51 00 - Temporary Utilities.
14. Construction Progress Schedules: Review requirements for preparation and submittal of updating of construction progress and submittals schedules.

15. Payment Procedures: Review requirements for preparation and submission of applications for progress payments and for final payment.
16. Change Procedures: Review requirements and administrative procedures for Change Orders, Field Instructions and Contractor's Requests for Interpretation (RFI).
17. Submittals Administration: Review administrative procedures for shop drawings, product data and samples submittals and review of preliminary Submittals Schedule.
18. Materials and Equipment: Review substitution or equal product requirements; review schedule for major equipment purchases and deliveries; review materials and equipment to be provided by University (OFCI products).
19. Operation and Maintenance Data: Format and content of operation and maintenance manuals. Refer to Section 01 78 23 - Operation and Maintenance Data.
20. Instruction of University's Personnel: Review requirements and scheduling of instruction of personnel specified for Demonstration and Training and in various Sections in Divisions 2 through 17 of the Specifications.
21. Testing and Inspection: Review tests and inspections to be performed by the following.
 - Independent testing and inspection agencies.
 - Manufacturers and installers.
 - Service utilities and public agencies.
 - Authorities having jurisdiction (i.e.: State Fire Marshal, Health Dept., etc.).
22. Starting and Adjusting Procedures: Review requirements of starting and adjusting operating components. Refer to Section 01 75 00 - Starting and Adjusting.
23. Project Record Documents: Review requirements and procedures for preparing, reviewing and submitting project record drawings and specifications.
24. Construction Cleaning: Review requirements for progress and final cleaning specified in Section 01 74 00 - Cleaning Requirements.
25. Contract Closeout: Review requirements specified in Section 01 77 00 - Contract Closeout Procedures, including procedures for filing of Notice of Completion, final payment and submittals.

1.5 CONSTRUCTION PROGRESS MEETINGS

- A. Construction Progress Meetings: Meetings will be held to review progress and quality of construction. The essence of the discussion of each meeting shall be entered into the written record (minutes) of the meeting by the Architect or the University Representative designee.
- B. Schedule: Construction progress meetings shall be periodically scheduled throughout progress of the Work. Frequency shall be as determined necessary for progress of Work. Generally, it is intended that construction progress meetings be held at weekly intervals.
- C. Administration: The University's Representative shall make physical arrangements for meetings. Architect shall prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within two working days to University's Representative, Contractor, participants and those affected by decisions made at meetings (theses duties may be shared with the University's Representative or their designee and shall be determined at the preconstruction

meeting). Each discussion item at construction progress meetings shall be numerically identified and carried through subsequent meeting minutes until resolved.

- D. Attendance: Contractor's project manager and jobsite superintendent shall attend each meeting. Contractor's subcontractors and suppliers may attend as appropriate to subject under discussion. University's Representative will attend each meeting. Architect's consultants will also attend, as appropriate to agenda topics for each meeting and as provided in University-Architect Agreement.
- E. Suggested Agenda for Each Construction Progress Meeting:
 - 1. Meeting Minutes: Review and correct, if necessary, minutes of previous meeting.
 - a. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
 - b. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
 - c. Challenge to minutes shall be settled as priority portions of "old business" at the next regularly scheduled meeting.
 - 2. Progress of the Work: Since last meeting and proposed progress.
 - a. Identify potential problems which might impede progress.
 - b. Develop corrective measures and procedures, including but not necessarily limited to additional manpower to regain planned schedule.
 - c. Review three-week "look ahead" construction schedule (current week plus two weeks ahead), including identification of conflicts and delays.
 - 3. Ordering Status: Review status of long-lead time equipment and materials delivery affecting construction progress.
 - 4. RFI Status: Review status of Requests for Interpretation (RFI) status.
 - 5. Submittals Status: Review shop drawings, product data and samples submission and review status.
 - 6. Contract Modifications: Pending Change Orders and Field Instructions. Review status of proposed substitutions.
 - 7. Old Business: Active discussion topics carried over from previous meetings.
 - 8. New Business: New topics of discussion affecting construction progress and quality.
 - 9. Quality Control: Review maintenance of quality standards and identification of non-conforming Work, including proposed remedial measures to be taken by Contractor.
 - 10. Project Record Documents: Status of project record drawings and specifications.
 - 11. Environmental and Safety Issues.
 - 12. Other items affecting progress and quality of the Work.
- F. Meeting Time and Location: As mutually agreed by the Architect, the Contractor, and the University's Representative at on-site location.

- G. Special Meetings: As necessary, the Architect, the Contractor, or the University's Representative may convene special meetings to discuss specific construction issues in detail and to plan specific activities.

1.6 PRE-INSTALLATION CONFERENCES

- A. Pre-Installation Conferences: When specified in individual product specification Sections, convene a pre-installation conference prior to commencing Work specified in individual product Sections.
 - 1. Require attendance by representatives of firms whose activities directly affect or are affected by Work specified in the Section.
 - 2. Review conditions of installation, preparation and installation procedures and coordination with related Work and work under separate contracts.
 - 3. Distribute written notice of agenda, meeting time, and location a minimum of 4 calendar days in advance.
 - A. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - 1. Contract Documents.
 - 2. Options.
 - 3. Related Change Orders.
 - 4. Review of mockups.
 - 5. Possible conflicts.
 - 6. Compatibility problems.
 - 7. Time schedules.
 - 8. Weather limitations.
 - 9. Manufacturer's written recommendations.
 - 10. Installation procedures.
 - 11. Warranty requirements.
 - 12. Compatibility of materials.
 - 13. Acceptability of substrates.
 - 14. Testing and inspecting requirements.
 - 15. Required performance results.
 - B. Contractor to record significant conference discussions, agreements, and disagreements.
 - C. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

1.7 CHANGE ORDER REVIEW MEETING

- A. Subsequent to the weekly project meeting, a Change order review meeting shall be held to discuss in detail the status of all project change documents. The Contractor, University Representative and Architect (as necessary) shall be in attendance. The following items shall be reviewed at this meeting:
 - 1. Cost Request Bulletins (both previously issued and necessary for progress of construction).

2. Change Orders.
3. Contractor Change Order Requests.
4. Field Instructions (both previously issued and necessary for progress of construction).

1.8 MONTHLY PROGRESS PAYMENT MEETING

- A. A meeting shall be conducted by the University Representative each month prior to Contractor's submission of the Payment Application. This meeting shall be held subsequent to the regular project meeting which precedes the required date for submission of the Payment Application.
 1. Each line item of the payment application shall be reviewed to confirm agreement with the stated percentage complete for the specific item of work. The University Representative will advise Contractor of percentages which are not acceptable and will red-line a copy of the draft payment application indicating necessary revisions required in order for processing of the payment application.
 2. The Contractor shall make necessary revisions in accordance with the red-line comments provided by the University Representative prior to official submission of the payment application.

1.9 CONTRACT CLOSEOUT MEETING

- A. Contract Closeout Meeting: As specified in Section 01 77 00 - Closeout Procedures.
- B. Approximately four (4) to six (6) weeks prior to the scheduled completion of the Project, for the convenience of the contractor, the University Representative will include in the standard meeting agenda a Project Close-out meeting.

The purpose of the close-out meeting is to produce an action list of major items required to be completed prior to the issuance of the Notice of Completion.

1. The action list shall assign an action responsibility and a projected action completion date to each item.
2. The contractor shall be solely responsible for the timely completion of all required close-out items. Items to be considered include:
 - Punch list
 - O & M manuals
 - HVAC Balance Report
 - Spare Parts/Materials
 - Keys/Keying
 - Warrantees
 - As-built Drawings and Specifications
 - As-built Schedule
 - State Fire Marshal Inspection
 - Elevator Inspection
 - Other Required Regulatory Inspections

- Removal of Temporary Facilities
- Final Cleaning and Pest Control
- Landscape Maintenance
- Commissioning/Equipment Startup
- Acceptance
- Notice of Completion
- Final Payment
- Occupancy

1.10 PARTNERING

- A. The Trustees intend to encourage the foundation of a cohesive partnership with the Contractor and the Architect. This partnership will be structured to draw on the strengths of each organization in order to identify and achieve reciprocal goals. The objectives are effective and efficient contractor performance, intended to achieve completion within budget, on schedule, and in accordance with the plans and specifications.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 26
ELECTRONIC COMMUNICATIONS PROTOCOL

PART 1- GENERAL

1.1 DESCRIPTION

- A. This Section is in addition to the Contract General Conditions.
- B. The Contractor shall be required to use an Electronic Project Management (EPM) system for electronic construction management document control and communications between the University, Architect of Record, other project-related consultants, and the Contractor (aka the Project team). Unless otherwise designated by the University, the system will be maintained and owned by the Contractor but operated collaboratively by the Project Team. The EPM that the Contractor chooses shall be approved by the University. The Contractor shall be responsible for training the members of the Project team on how to use the EPM at no additional costs to the contract.
- C. The Contractor shall be primarily responsible for the scanning, uploading, and logging of all electronic documents for the project as indicated below.
- D. The Contractor shall provide personnel and equipment as required by their employees to electronically submit all necessary documents.
- E. The EPM system shall contain the following information which shall be made available by the Contractor for the project team:
 - 1. Submittal Information (shop drawings, product data, etc.) and Logs
 - 2. Requests for Information and Logs
 - 3. Inspection Requests / Reports
 - 4. Non-Compliance Inspection Reports
 - 5. Project Photographs
 - 6. Project Meeting Minutes
 - 7. Project FTP Site
 - 8. Contract Documents (including specifications, drawings, reference materials, sketches, ASIs, etc.)
 - 9. Other Documentation as determined by the University's Representative and the Project team.
- F. All Request for Information (RFIs) and Inspection Requests shall be submitted by the Contractor to the University electronically through the EPM.
- G. The University will NOT accept faxed and/or hand written documentation of RFIs, RFI Sketches, and/or Inspection Requests.
 - 1. The Contractor shall be solely responsible for data entry via the chosen EPM Website for the generation of RFIs.

2. The Contractor shall be solely responsible for the scanning of sketches / drawings as necessary for the electronic submittal and attachment of necessary information related to RFIs.
 3. Contractor shall supply field personnel all necessary computer equipment necessary to enter RFIs and other documentation electronically.
- H. Submittals shall be submitted via Section 01 33 00 Submittals.

1.2 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall have sufficient computer(s) with capabilities to access the EPM system at their on-site and off-site project offices. At the pre-construction meeting, the Contractor shall provide to the University's Representative the contact information (including email addresses) of all Contractor personnel that the Contractor chooses to provide coordination for the EPM system and information. At a minimum, this will include the Contractor's Project Engineer and/or other technical staff as required. These personnel shall have sufficient computer skills required to access the Internet and do basic trouble shooting of the EPM system. The Contractor shall provide training and technical support to the Project team personnel for use of the EPM system. The Contractor shall plan on an average of 4-hours training for each of the Project team personnel who will be using the system. Having the above capability in place onsite is a condition precedent to processing the Contractor's first payment request.

1.3 OFFICIAL RECORDS

- A. The documentation and records maintained on the EPM system will be the "Official Records" for the project (not including as-builts created by the Architect). At the conclusion of the project all records shall be made available via Adobe "pdf" and/or other electronic filing methods approved by the University Representative for import/export.

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Section Includes:
 - 1. Requirements for CPM schedules and associated reports.
 - 2. Requirements for Contractor Work Plans.

1.3 CPM CONSTRUCTION SCHEDULES AND REPORTS

- A. General: Comply with the Contract General Conditions.
- B. Submittals:
 - 1. Initial Construction Schedule
 - 2. Submit a "Draft" 3-Week Look-ahead Schedule at the Pre-construction Meeting.
 - 3. Within 30 calendar days after issuance of Notice to Proceed, Contractor shall submit a detailed Initial Construction Schedule that includes all construction activities, from Notice to Proceed through Project completion.
 - 4. Within 15 calendar days, the Construction Administrator will review the Initial Construction Schedule and provide comments.
 - 5. Contractor shall revise the Initial Construction Schedule in accordance with University comments and resubmit within 15 calendar days. Upon approval by the University, the schedule shall be designated as the Contract Construction Schedule.
 - 6. No change to the content or CPM logic of the Contract Construction Schedule shall be made by Contractor without prior approval by the Construction Administrator.
- C. Schedule Updates
 - 1. The Contract Construction Schedule shall be updated and submitted monthly in accordance with the Contract General Conditions.
- D. The updated Contract Construction Schedule shall accurately represent the as-built condition of all completed and in-progress work activities as of the schedule data date.
 - 1. The Contract Construction Schedule shall use activity codes that allow for logical summarization of like activities. A Summary Schedule of not less than 20 activities shall be submitted monthly with the detailed Contract Construction Schedule.
 - 2. Prior to preparing the first update of the approved Contract Schedule, Contractor shall designate the approved Contract Schedule as the baseline, or "target schedule". All schedule

updates shall include the original (i.e. target) information, including start dates, finish dates, durations, successors, predecessors, etc. for each activity. The actual progress for each activity shall be shown directly below the target bar.

3. Monthly submittals shall include the following items.
 - a) Schedule electronic files
 - b) Detailed network diagram (D size)
 - c) Summary schedule (8-1/2" x 11")
 - d) Detailed bar chart graphics (8-1/2"x 11")
 - e) Tabular reports (8-1/2" x 11")
 - f) A 3-week look-ahead schedule (current week plus two weeks forward), derived directly from the Contract Construction Schedule, shall be updated and submitted for review during each weekly progress meeting. The 3-week look-ahead schedule shall be a sub-network of the Contract Construction Schedule; hand drawn schedules, marked-up versions of previous schedules, or schedules generated using alternate scheduling software will not be accepted.
- E. Basic Requirements of Contractor's Scheduling System
 1. The Contract Construction Schedule shall be prepared, updated and maintained using the latest version of Primavera Project Planner for Windows (or equal). Should Contractor request the use of an alternate scheduling software system, a formal Request for Substitution shall be submitted in accordance with section 01 25 00. Should the University approve use of an alternate system, Contractor shall be required to provide two legally licensed copy of the software to the Construction Administrator, as well as necessary training in the use of the system, at no additional cost.
 2. The system shall be operated by on-site personnel at terminals located in Contractor's site office. On-site management shall be capable of using the system to address all project activities and resources on a real time interactive basis, and capable of rapidly evaluating alternative means and methods in response to job conditions and as required to optimize project management. Contractor's scheduling system shall be capable of providing the following minimum on-site reporting functions:
 3.
 - a) Precedence Diagram Method (PDM) schedules
 - b) Progress reports in tabular formats
 - c) Network comparisons
 - d) Super and sub-networks
 - e) Resource reporting
 - f) Report writer allowing flexible formatting and summarization
 - g) Graphic output to a laser jet printer or full size plotting device
- F. C.P.M. Schedule Format
 1. Activities shall be coded in a logical manner to allow for sorting and grouping of like characteristics, including but not limited to such items as: phase, work shift, project area, activity type (i.e. submittal, agency review, const. activity, etc.), trade, etc.

2. Include activities and milestones as requested for work completed by University under separate contract, University furnished materials, move in, etc.
 3. The schedule duration shall be calculated using Critical Path Method for the Initial Construction Schedule, Contract Construction Schedule, and all schedule updates.
 4. Work activities shall be divided so that no schedule activity shall be less than 1 nor more than 30 calendar days.
 5. A minimum of 5% of the schedule activities shall be designated as milestone activities.
 6. Identify work days and non-work days on the schedule.
 7. Contractor shall work in conjunction with each subcontractor and supplier to ensure that all relevant submittal, procurement, delivery and installation dates for the various trades are accurately represented in the Initial Construction schedule and each subsequent schedule update.
 8. Contractor's Superintendent shall be integrally involved in production of the Initial Construction Schedule and each subsequent update.
 9. Include activities for all project submittals as required under Section 01 33 00 and the technical specifications (Divisions 2 through 33).
 10. Failure by Contractor to include any element of the work required for performance of the Contract shall not relieve Contractor of the obligation to complete the entire Work of the Contract in accordance with the Contract Completion Date.
- G. Construction Analysis
1. The Contractor shall provide the University the following minimum information in the Initial Construction Schedule and subsequent Monthly Updates:
 - a) Activity identification code keyed to Summary and Detailed Construction Schedules.
 - b) Activity description
 - c) Status date and remaining duration
 - d) Activity duration
 - e) Early start/early finish and late start/late finish
 - f) Total float
 - g) Free float
 - h) Predecessor and successor activity for each individual activity
 - i) A listing of all constraints for each individual activity
 - j) A comparison between the current update and the Initial Construction Schedule (baseline schedule).
 - k) No more than 20% of the total project activities shall be critical or near critical (less than 5 working days of total float).
 2. The Initial Construction Schedule and subsequent Monthly Schedule Updates shall include, but not limited to, the following major milestones:
 - a) NTP Date, mobilization, coordination review and detailing activities.
 - b) Submittal preparation by Contractor and review and approval by the Architect and Construction Administrator, including shop drawings, technical manuals and all other submittals. Contractor shall allow at least 21 calendar days for review of submittals.

- c) Order, manufacture, fabrication, delivery and checkout of all long lead and major construction material.
 - d) Off-site improvements
 - e) Demolition of existing structures
 - f) Earthwork – excavation, backfill and compaction
 - g) Foundation
 - h) Structural – columns and beams, deck, roof
 - i) Masonry
 - j) Waterproofing
 - k) Elevator superstructure, support
 - l) Rough-outs – mechanical, plumbing, electrical, telecommunications, HVAC, fire-alarm, sprinkler system
 - m) Exterior finishes – walls, roof
 - n) Building Dried-In
 - o) Miscellaneous metals and equipment installation
 - p) M/E/P finishes - mechanical, plumbing, electrical, telecommunications, HVAC, fire-alarm, sprinkler system, elevator motors
 - q) Elevator cabs
 - r) Interior drywall/plaster
 - s) Interior finishes – painting, flooring, finish cabinetry, hardware
 - t) Sitework – curbs, gutters, hardscape, roads
 - u) All utility interfaces
 - v) Landscaping
 - w) Punch List
 - x) Performance and acceptance testing
 - y) Contractor close-out documentation and training
 - z) Contractor punch list corrective work
 - aa) Final cleanup
 - bb) Identification of all holidays and non-working days.
3. The Contractor shall show all tasks and milestones applicable for the project. The Construction Administrator shall be the final arbitrator on the tasks and milestones that should be included in the Initial Construction Schedule and subsequent updates.
- H. Submittal Schedule
1. The University Representative will provide a schedule of all required submittals at the Pre-construction Meeting. Contractor shall input anticipated submission dates for each submittal item. Within 21 calendar days after award of Contract, and before submitting items for review, submit the completed submittal schedule for University review. The submittal numbers designated by University Representative shall be used for identification of all submittals.
- I. Responsibility for Completion
1. Should any monthly or weekly update of the Contract Construction Schedule indicate that the critical path has been extended, thus impacting the Contract Completion Date,

Contractor shall submit a written action plan for bringing the schedule into compliance with the Contract Completion Date. Contractor shall initiate corrective actions, as approved by the Construction Administrator, at no additional cost. These actions shall include, but not be limited to, one or more of the following:

- a) Increase construction manpower in certain or all trades in order to bring the completion date into compliance with Contract requirements.
 - b) Increase the number of labor shifts, working hours per shift, or working days per week as required to bring the completion date into compliance with Contract requirements.
 - c) Reschedule activities in order to achieve the maximum number of concurrent work activities.
 - d) Arrange and pay for acceleration of fabrication schedules for long lead material items.
 - e) Arrange and pay for alternate shipping or delivery methods in order to expedite material procurement.
2. Comments provided by the Construction Administrator concerning the Initial Construction Schedule, Contract Construction Schedule, or any schedule update shall not relieve Contractor from the responsibility for compliance with the entire requirements of the Contract Documents.

1.4 CONSTRUCTION PROGRESS REPORTS

- A. Daily Log: Contractor shall maintain a written daily log at the job site with the following information as a minimum:
1. Date.
 2. Weather conditions.
 3. Subcontractors and trades performing Work under the Agreement on the Site, and number of workers each and number of hours worked by each worker.
 4. Others on the Site performing work for University under separate contracts.
 5. List of visitors to site, giving name, company or agency affiliation and telephone number.
 6. Descriptions of situations and circumstances which could delay normal progress of Work or which could be basis of claim for change in Contract Time or Contract Sum.
 7. Changes to Work and who authorized changes.
 8. Comments as Contractor determines are appropriate for Project record.
 9. Reports shall include photos and/ or videos as needed to illustrate a particular circumstance more accurately.
- B. Submission of Logs: Submit one copy of daily logs to University's Representative and Architect at weekly intervals, for review at Construction Progress Meetings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.
2. [Submittal Transmittal Template](#)

1.2 SECTION INCLUDES

- A. Administrative requirements
- B. Construction Progress Schedule Submittal
- C. Contractor's review of submittals
- D. Architect's review of submittals
- E. Product data submittals.
- F. Shop drawing submittals
- G. Sample submittals.
- H. Manufacturer's Instructions
- I. Reports of results of tests and inspections.
- J. Operations and Maintenance Data submittals
- K. Certificates

1.3 RELATED SECTIONS

- A. Section 01 31 13 – Project Coordination
- B. Section 01 31 26 – Electronic Communications Protocol
- C. Section 01 45 00 - Quality Control: Test and inspection reports.
- D. Section 01 77 00 - Closeout Procedures: Submittals for occupancy, Acceptance and Final Payment.
- E. Section 01 78 23 - Operation and Maintenance Data: Requirements for preparation and submission.

1.4 DEFINITIONS

- A. Shop Drawings, Product Data and Samples: Instruments prepared and submitted by Contractor, for Contractor's benefit, to communicate to Architect the Contractor's understanding of the design intent, for review and comment by Architect on the conformance of the submitted information to the general intent of the design. Shop drawings, product data and samples are not Contract Documents. Drawings, diagrams, schedules and illustrations, with related notes, are specially prepared for the Work of the Contract, to illustrate a portion of the Work.
- B. Product Data: Standard published information ("catalog cuts") and specially prepared data for the Work of the Contract, including standard illustrations, schedules, brochures, diagrams, performance charts, instructions and other information to illustrate a portion of the Work.

- C. Samples: Physical examples that demonstrate the materials, finishes, features, workmanship and other characteristics of a portion of the Work. Accepted samples shall serve as quality basis for evaluating the Work.
- D. Other Submittals: Technical data, test reports, calculations, surveys, certifications, special warranties and guarantees, operation and maintenance data, extra stock and other submitted information and products shall also not be considered Contract Documents but shall be information from Contractor to Architect to illustrate a portion of the Work for confirmation of understanding of design intent.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Administrative Requirements for Submittals: Submittals shall be made in accordance with requirements specified herein and in other Divisions of the Specifications. See also the Contract General Conditions for additional requirements; especially those regarding requests for alternatives or equals and for substitutions.

- 1. All required submittals, with the exception of O&M manuals, close-out submittals, and mock-ups required to be installed concurrent with specific construction activities, shall be submitted as detailed in the approved submittal schedule submission.

- B. Contractor Coordination of Submittals: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

- 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

- a. The Architect will return without action submittals requiring coordination with other submittals until related submittals are coordinated.

- C. Submittal Log: Prior to proceeding with affected work, Contractor shall prepare and submit a Submittal Log, which lists submittal items per the product specifications for review and approval by University's Representative and Architect. Contractor shall allow seven (7) calendar days for Trustees review. Submittal Log shall identify all specified submittals to be made and shall serve as checklist for submittals.

- 1. Maintain accurate submittal log for duration of Contract. Indicate current status of all submittals at all times. Submit log at progress meeting and as otherwise requested by University Representative or Architect.
 - 2. Format shall be suitable for Project and shall be subject to acceptance by University's Representative and the Architect. Comply with directions by University's Representative and the Architect for scope and format of Submittals List.
 - 3. Submittals list shall include the following submittal types and headings:

- SD = Shop Drawings are required
 - PD = Product Data required
 - SA = Samples required

- CO = Color samples required
 SS = Site Sample installations are required
 LM = List of Materials
 RD = Record Drawings required
 CE = Certificates are required
 PR = Manufacturer's instructions or specifications required
 OM = Operation and Maintenance manuals are required
 EQ = Maintenance materials/equipment are required
 WA = Warranties and/or guarantees are required
 LR = Laboratory Reports are required
 FT = Factory Test reports are required
 ST = Site Test reports required
 RP = Submittal to the Architect for record purposes only and not for review or approval
 O = Other submittal requirements as specified in Section

1. Sample Table:

<u>Section</u>	<u>SD</u>	<u>PD</u>	<u>SA</u>	<u>CO</u>	<u>SS</u>	<u>LM</u>	<u>RD</u>	<u>CE</u>	<u>PR</u>	<u>OM</u>	<u>EQ</u>	<u>WA</u>	<u>LR</u>	<u>FT</u>	<u>ST</u>	<u>RP</u>	<u>O</u>
05120	x					x											
09250		x			x	x		x					x		x		
10810		x	x														

- D. Transmission of Submittals: Submittals shall be processed electronically (with exceptions such as product and material samples or otherwise designated or approved by the University Representative). Transmit all submittals from Contractor to Architect via Electronic Project Management (EPM) system, unless otherwise directed, using a transmittal form for each one. Submittals received from sources other than the Contractor will be returned without action. Include all information specified below for identification of submittal and for monitoring of review process.

2. Architect will provide example Letter of Transmittal, if requested.

3. Submittals shall be concurrently made available via EPM to University's Representative for review.

- E. Timing of Submittals: Make submittals sufficiently in advance of construction activities to allow shipping, handling and review by the Architect and Architect's consultants. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

1. The Architect will make desired corrections and consolidate relevant Trustees comments within fifteen (15) calendar days and return the submittal to the Contractor via EPM system. Submittals, which require coordination with other submittals, may require more than fifteen (15) calendar days review time. Submittals that require selection of colors will be reviewed.

Color selection may not be provided until all submittals requiring color selection have been received and reviewed, and color selections have been approved by the Trustees.

2. Make corrections required by the Architect and submit via EPM system for final review and distribution.
3. If an intermediate submittal is necessary, process the same as the initial submittal.
4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

F. Submittals Identification:

1. Provide a space on all submittals electronically approximately four-inches by five-inches on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken. Include the following information on the label for processing and recording action taken:
 - a. Project name and Trustees project number
 - b. Submission date
 - c. Name and address of Architect
 - d. Name and address of Contractor
 - e. Name and address of subcontractor
 - f. Name and address of supplier
 - g. Name of manufacturer
 - h. Number and title of appropriate Specification Section
 - i. Drawing number and detail references, as appropriate.
3. Identify each element on submittal by reference to Drawing sheet number, detail, schedule, room number, assembly or equipment number, Specifications article and paragraph, and other pertinent information to clearly correlate submittal with Contract Drawings. On the submittal transmittal form or separate sheet record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information submitted complies with requirements of the Contract Document. The Architect's review of such submittals or shop drawings or product data shall not relieve the Contractor of responsibility for deviations from the drawings or specifications.
4. Identify each submittal by Specification Section number followed by a number indicating sequential submittal for that Section. Resubmittals shall use same number as original submittal, followed by a letter indicating sequential resubmittal. For example:

09 26 13-01-01 First submittal for Section 09 26 13 - Gypsum Veneer Plastering.

09 26 13-02-01 Second submittal for Section 09 26 13 - Gypsum Veneer Plastering.

09 26 13-02-02 Resubmittal of second submittal for Section 09 26 13 - Gypsum Veneer

Plastering.

09 26 13-02-03 Second resubmittal of second submittal for Section 09 26 13 - Gypsum Veneer Plastering.

5. Place a permanent label or title block on each submittal electronically for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
- G. Grouping of Submittals: Unless otherwise specifically permitted by the Architect, make all submittals in groups containing all associated items. The Architect may reject partial submittals as incomplete or hold them until related submittals are made.
- H. Unsolicited Submittals: Unsolicited submittals may be returned without being reviewed.
- I. Record Submittals: When record submittals are specified, submit in accordance with the Electronic Project Management System requirements. Record submittals will not be reviewed but will be retained for historical and maintenance purposes.
- J. Revisions: Revisions to original submittal list and schedule will only be accepted by University Representative and Architect when revisions are required by circumstances not reasonably anticipated by Contractor during preparation of original schedule. Submit revisions not later than 20 calendar days following the date that the need for revision became necessary.

1.6 CONSTRUCTION PROGRESS SCHEDULE SUBMITTAL

- A. Submit as specified in the Contract General Conditions under Schedule and Section 01 32 00 for Construction Progress Documentation.

1.7 CONTRACTOR'S REVIEW OF SUBMITTALS

- A. Contractor's Review of Submittals: Prior to submission to Architect for review, Contractor shall review each submittal for completeness and conformance to specified requirements. Contractor shall stamp each submittal with a review action stamp and sign each copy of submittal. Submittals without stamp and signature will not be reviewed and will be returned. Electronic signatures are acceptable but will need to be authenticated during the submittal process. Contractor's submittal action stamp shall certify the following actions by Contractor:
 1. Field measurements have been determined and verified.
 2. Conformance with requirements of Contract Drawings and Specifications is confirmed.
 3. Catalog numbers and similar data are correct.
 4. Work being performed by various subcontractors and trades is coordinated.
 5. Field construction criteria have been verified, including confirmation that information submitted has been coordinated with the work being performed by others for University and actual site conditions.
 6. All deviations from requirements of Drawings and Specifications have been identified and noted.
 7. Contractor shall certify that submittals have been reviewed and approved:

Stamp Submittals utilizing the following language:

"The undersigned certifies this submittal has been reviewed and approved with respect to the means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incidental thereto; and also warrants that this submittal complies with the Contract Documents and comprises no variation thereto.

Signature: _____ Date: _____

Name Printed: _____ Title _____

Contractor Name: _____

8. Submittals not certified by being stamped and signed by Contractor electronically will be returned without action, as will submittals which, in University Representative's or Architect's opinion, have not been adequately reviewed and coordinated by Contractor.
- B. Changes in Work: Changes in the Work shall not be authorized by submittal review actions. No review action, implicit or explicit, shall be interpreted to authorize changes in the Work. Changes shall only be authorized by separate written direction from the University Representative, in accordance with the Contract General Conditions.
- C. Allow sufficient review time so that installation will not be delayed as result of time required to process submittals, including time for resubmittals.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related elements of Work so processing will not be delayed by need to review submittals concurrently for coordination.
 - a. University Representative and Architect reserve right to withhold action on submittal requiring coordination with other submittals until related submittals are received.
 3. Allow additional time if processing must be delayed to permit coordination with subsequent submittals.
 4. If intermediate submittal is necessary, process same as initial submittal.
 5. Allow same time for reprocessing each submittal as allowed for processing original submittal.
 6. No extension of Contract Time will be authorized because of failure to transmit submittals to University Representative sufficiently in advance of Work to permit processing.
- D. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to University Representative using Submittal Transmittal form attached at the end of this section.
1. Submittals received from sources other than Contractor will be returned without action.
 2. Number each submittal and resubmittal as indicated in approved Submittal Schedule.

3. Submittals forwarded without a completed Submittal Transmittal form will be returned without review.
4. Submittals shall be submitted electronically unless they are related to materials and products.

1.8 REVIEW OF SUBMITTALS BY UNIVERSITY'S REPRESENTATIVE AND ARCHITECT

- A. Review of Submittals by University's Representative and Architect: Submittals shall be a communication aid between Contractor and Architect by which interpretation of Contract Documents requirements may be confirmed in advance of construction.
 1. Reviews by University's Representative, Architect and Architect's consultants shall be only for general conformance with the design concept of the Project and general compliance with the information given in the Drawings and Specifications.
 2. The Architect's review shall not be construed as an "approval," or to relieve the Contractor(s) and material suppliers of responsibility for errors or omissions in the submitted documents.
 3. Acceptance of a specific item does not include acceptance of the assembly of which the item is a component.
 4. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly via EPM system.
- B. Review Action: Architect will stamp each submittal with a uniform, self-explanatory action stamp.
 1. Stamp will be appropriately marked as follows to indicate the action taken:
 - a. Action 1 (no exception taken): Means fabrication, manufacture, or construction may proceed providing submittal complies with Contract Documents.
 - b. Action 2 (make corrections noted; no resubmission required): Means fabrication, manufacture, or construction may proceed providing submittal complies with Architect's notations and Contract Documents. (Note: If Contractor cannot comply with notations, make revisions and resubmit.)
 - c. Action 3 (make corrections noted; submit corrected copy): Means fabrication, manufacture, or construction may proceed; however, submittal did not fully demonstrate full extent of all conditions, details and coordination with other surrounding work and therefore requires additional information and rework as noted. Resubmit shop drawings for final Action 1 or 2. Should Contractor proceed with fabrication, manufacturing or construction, it shall do so at its own risk.
 - d. Action 4 (rejected, revise and resubmit): Means submittal does not comply with design intent of Contract Documents. Do not use submittals stamped Action 3. Make revisions and resubmit.
 - e. Action 5 (rejected, submit specified item): Means submittal varies from specified item or system specified in Contract Documents and is not acceptable for use on the project. Do not use submittals stamped Action 4. Make revisions and resubmit.
 - f. Action 6 (resubmit with related assembly items): Means submittal of related assembly item(s) are required in conjunction with the submittal for proper review.
 - g. Action 7 (rejected; incorrect transmittal): Means the Submittal Transmittal form specified for use on the Project was not included, incomplete, or incorrectly completed.

- h. Action 8 (No Action): Means documents have not been reviewed by Architect and submittal is returned to Contractor for several possible reasons: submittal not requested, submittal not complete, submittal not coordinated, or submittal bears no resemblance to design intent.
 - i. Action 9 (submitted to consultant for review): This code is for the use of the Architect to indicate routing to various A/E consultants. Any submittals marked Action 6 by Architect will be returned to Contractor without review.
 - j. Record Submittals: Specifications require certain information and calculations be submitted for record purposes only. Such submittals will not be acted upon, stamped or returned to Contractor.
 - 2. Do not permit submittals marked "Rejected, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
 - 3. Note: Any work performed prior to receiving a fully approved submittal shall be done at the Contractor's risk and shall be subject to being replaced if Contract requirements are not met.
- C. Contract Requirements:
- 1. Review actions by Architect and Architect's consultants shall not relieve the Contractor from compliance with requirements of the Contract Drawings and Specifications.
 - a. Acceptance of submittals with deviations shall not relieve Contractor from responsibility for additional costs of changes required to accommodate such deviations.
 - b. Deviations included in submittals without prior acceptance will be considered an exception from review of submittals whether noted or not on returned copy.
 - 2. No review action, implicit or explicit, shall be interpreted to authorize changes in the Work. Changes shall only be authorized by separate written Change Order or Field Instruction, in accordance with the Contract General Conditions.
 - 3. When professional certification of performance criteria of materials, systems or equipment is required by Contract Documents, University Representative and Architect shall be entitled to rely upon accuracy and completeness of such calculations and certifications.
 - 4. Notations by University Representative or Architect which increase contract cost or time of completion shall be brought to University Representative's and Architect's attention before proceeding with Work.
- D. Resubmittals:
- 1. Subject to same terms and conditions as original submittal.
 - 2. University Representative and Architect will accept not more than one resubmittal.
 - a. Should additional resubmittals be required, Contractor shall reimburse Trustees for University Representative and Architect's accounts for time spent in processing additional resubmittals at rate of 2.5 times rate of Direct Personnel Expense (DPE). Direct Personnel Expense is defined as direct salaries of University Representative's and Architect's personnel engaged on Project and portion of costs of mandatory, and customary contributions and benefits related thereto, including employment taxes and other statutory employee benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.

1.9 PRODUCT DATA SUBMITTALS

- A. Product Data: Catalog cuts, photographs, illustrations, standard details, standard schedules, performance charts, material characteristics, color and pattern charts, test data, roughing-in diagrams and templates, standard wiring diagrams and performance curves and listings by Code authorities and nationally-recognized testing and inspection services. Where product data must be specially prepared because standard manufacturer data is not suitable for use, submit according to requirements for shop drawings specified below.
- B. Modifications to Standard Product Data: Modify manufacturer's standard catalog data to indicate precise conditions of the Project.
 1. Provide space for review action stamps and, if required by authorities having jurisdiction, license seal of Engineer and/or design consultant, if applicable.
 2. Mark each copy to show applicable choices and options. Where manufacturer's product data includes information on several products, some of which are not required, mark copies to highlight applicable information.
 3. Include the following information:
 - a. Manufacturer's literature with recommendations,
 - b. Compliance with recognized trade association standards,
 - c. Compliance with recognized testing agency standards,
 - d. Application of testing agency labels and seals,
 - e. Notation of dimensions verified by field measurement,
 - f. Notation of coordination requirements,
 - g. Environmental Product Declaration (EPD)'s information.

Environmental Product Declaration: Independently verified document created and verified in accordance with International Organization for Standardization (ISO) 14025 for Type III environmental declarations that identifies the global warming potential emissions of the facility- specific material or product through a product stage life cycle assessment.

The legislation was introduced as Assembly Bill (AB) 262. It targets the embedded carbon emissions of certain construction materials used in public works projects. AB 262 requires that these materials have a global warming potential that falls below a limit set by the Department of General Services.

The following materials or products are subject to the Buy Clean California Act, and shall have EPD's submitted for all products listed below:

Material or product	Material specifications: CSI Unifomat
Carbon steel rebar	Section 03 20 00, "Bar Reinforcement"
Structural steel	Section 05 12 00, "Structural Steel"
Flat glass	Section 08 80 00, "Glazing"
Mineral wool board insulation	Section 07 21 13.19 "Mineral Board Insulation"

4. Do not submit product data until compliance with requirements of the Contract Documents has been confirmed.
 5. Proceed with installation only using reviewed copy of product data with appropriate action stamp as indicated in Section 1.8 B1 above. Do not permit use of unmarked copies of product data in connection with construction.
- C. Copies: Submit electronic copies of catalog pages with applicable data highlighted and cross-referenced to Drawings and Specifications requirements. Paper copies will not be acceptable unless specifically authorized by the University Representative. Distribution of approved submittals shall be electronic unless otherwise noted.

1.10 SHOP DRAWINGS SUBMITTALS

- A. Shop Drawings: Drawings, diagrams, schedules and other graphic depictions to illustrate fabrication and installation of a portion of the Work. Shop Drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
1. Identification of products and materials included
 2. Compliance with referenced standards
 3. Notation of coordination requirements
 4. Dimensions
 5. Notation of dimensions established by field measurement.
- B. Coordination: Show all field dimensions and relationships to adjacent or critical features of Work.
- C. Preparation of Shop Drawings: Prepare and submit electronically newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
1. Provide space for review action stamps and, if required by governing authorities having jurisdiction, license seal of Architect and Architect's design consultant, if applicable.
 2. Prepare shop drawings submitted in electronic format that shall be printable on minimum sheet size of 17-inches by 22-inches, or smaller if a multiple of 8-1/2 inches by 11-inches. Maximum size shall be 30-inches by 42-inches.
 3. Except as otherwise approved by the University Representative, submit all shop drawings electronically using the Contractor's Electronic Project Management system.
 4. Do not use Shop Drawings without an appropriate final review stamp indicating action taken in connection with construction.
- D. Distribution of Reviewed Shop Drawings: Electronic distribution of reviewed shop drawings will be by Contractor and must be stamped by the Architect.

1.11 SAMPLE SUBMITTALS

- A. Samples: Full-size, fully-fabricated samples cured and finished as specified and physically identical with the material or product proposed. Samples shall include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to include the following:
 - a. Project name and location
 - b. Manufacturer and supplier.
 - c. Name, finish, and composition of material.
 - d. Location where material is to be used.
 - e. Specification Section number.
 - f. Submittal number.
 - g. Contractor's review stamp.
 - h. Space for Architect's review stamp.
 - i. Compliance with recognized standards
 - j. Availability and delivery time.
 2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 3. Submit actual samples. Photographic or printed reproductions will not be accepted.
 4. Field samples specified in individual Sections are special types of samples. Field samples shall be full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be evaluated.
- B. Preliminary or Selection Submittals: Where samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit full set of choices for the specified material or product.
- a. Preliminary submittals will be reviewed and returned with the Architect's mark indicating selection and other action.
- C. Quantity: Except for samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit three sets. One sample will be returned marked with the action taken.
1. Maintain sets of samples, as returned, at the Project site, for quality comparisons throughout the course of construction.
 2. Unless otherwise noted, full-size and complete samples will be returned and may be incorporated into field mock-ups. Samples may be incorporated into the Work (completed

- construction) only with written approval of the Architect and the University Representative in advance of sample preparation.
3. Other samples shall be produced and mounted on cardstock in 8-1/2" by 11" format, three-hole punched and suitable for inclusion in product sample binders. Contractor shall provide binders as directed.
 4. Contractor shall prepare and distribute additional samples to subcontractors, manufacturers, fabricators, suppliers, installers, and others as necessary for performance of the Work.
 5. Accepted samples will form standard of comparison for finished Work. Defects and deviations in excess of those in accepted samples, are unacceptable and are subject to rejection of completed Work.
- D. Color Samples: Architect will review and select colors for Project only after all colors are received, so that colors may be properly coordinated.
- E. Review of Field Samples: Review by Architect of field samples will be made for the following products, as applicable to the Project scope, if not otherwise required and if requested by Contractor.
1. Casework.
 2. Portland cement concrete paving: Trowel finish, imprinted texture, colors, abrasive blasting, exposed aggregate and acid washing.
 3. Exterior plaster finish color and texture.
 4. Gypsum board textures and finishes.
 5. Gypsum plaster textures and finishes.
 6. Field-applied paint colors and finishes: Draw-downs and brush-outs.

1.12 MANUFACTURER'S INSTRUCTIONS

- A. Manufacturer's Instructions: Submit manufacturer's instructions for preparation, mixing, assembly, handling, application and installation of products, as applicable and as specified in product sections of the Specifications.
1. Include applicable ICBO ES Evaluation Reports. Evaluation Reports shall be current and shall be annotated for applicable products.
 2. Include applicable Safety Data Sheets (SDS), for Project record only.
 3. Include written recommendations, as applicable, from manufacturer for Project conditions.
 4. Identify conflicts between manufacturers' instructions and Contract Documents.
- B. Copies: Electronic distribution will be required. If requested and agreed to by the University Representative, copies may be distributed as necessary.
- C. Reviews by Architect and University's Representative: Manufacturer's instructions shall be for information and will not be reviewed by Architect or University's Representative.

1.13 REPORTS OF RESULTS OF INSPECTIONS AND TESTS

- A. Reports of Results of Inspections and Tests: Submit technical data, test reports, calculations, surveys, and certifications based on field tests and inspections by independent inspection and testing agency and by authorities having jurisdiction.
 - 1. Reports of results of inspections and tests shall not be considered Contract Documents.
 - 2. Refer to Section 01 45 00 - Quality Control for additional requirements.

1.14 OPERATION AND MAINTENANCE DATA SUBMITTALS

- A. Operation and Maintenance Data Submittals: Refer to requirements specified in Section 01 78 23 - Operation and Maintenance Data. Include operation and maintenance data submittals in Construction Progress Schedule. Refer to Contract General Conditions.

1.15 CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificates to Architect through Electronic Project Management system for review as specified.
- B. Submit in form of letter or company standard forms, signed by officer of manufacturer.
- C. Each certification shall include the following:
 - 1. Project name and location.
 - 2. Contractor's name and address.
 - 3. Quantity and date or dates of shipment or delivery to which certificate applies.
 - 4. Manufacturer's name.
- D. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- E. Certificates may be recent or previous test results on material or product but must be acceptable to University Representative and Architect.

PART 2 - PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

Not applicable to this Section.

END OF SECTION

SECTION 01 35 00
SPECIAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- 1. Environmental protection procedures
- 2. Smoke/odor control procedures
- 3. Noise control procedures
- 4. Dust and air pollution control procedures
- 5. Hazardous materials procedures
- 6. Welding and burning mitigation procedures
- 7. Erosion and sediment control procedures (Storm Water Pollution Protection Plan
- 8. Disposal operations procedures
- 9. Cultural resources procedures
- 10. Alteration project procedures.

1.3 RELATED SECTIONS

- A. Section 01 73 29 - Cutting and Patching: General requirements for procedures and limitations for cutting and patching the work.

1.4 ENVIRONMENTAL PROTECTION PROCEDURES

- A. Environmental Protection Procedures: General requirements specified in this Section are in addition to those of the Contract General Conditions.
 - 1. During the progress of the work, keep the premises occupied in a neat and clean condition and protect the environment both on site and off site, throughout and upon completion of the construction project.
 - 2. In coordination with the Campus, develop an Environmental Protection Plan in detail and submit to University's Representative for approval within 30 calendar days from the date of commencement specified in the Notice to Proceed. Distribute approved plan electronically to all employees and to all subcontractors and their employees. Environmental Protection Plan shall include, but not be limited to, the following items:

- a. Required permits
 - b. Proposed sanitary landfill site
 - c. Other proposed disposal sites
 - d. Noise Control
 - e. Dust Control
 - f. Erosion and Sediment Control
 - g. Any agreements with public or private landowners regarding equipment, materials storage, borrow sites, fill sites, or disposal sites. Such agreements made by Contractor shall be invalid if their execution causes violation of local or regional grading or land use regulations.
- B. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result.
- 1. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.
 - 2. Comply with noise control requirements specified below.
- C. Construction Operations: All construction operations shall comply with all applicable Federal, State and local Codes, ordinances, statutes and regulations pertaining to water, air, solid waste and noise pollution. It shall be Contractor's responsibility to identify and determine necessary measures to be taken to comply with such Codes, ordinances, statutes and regulations.
- D. Definitions of Contaminants:
- 1. Sediment: Soil and other debris that have been eroded and transported by runoff water
 - 2. Solid waste: Rubbish, debris, garbage and other discarded solid materials resulting from construction activities, including a variety of combustible and non combustible wastes, such as ashes, waste materials that result from construction or maintenance and repair work, leaves and tree trimmings
 - 3. Chemical waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, disinfectants, organic chemicals and inorganic wastes. Some of the above may be classified as "hazardous"
 - 4. Sanitary wastes:
 - a. Sewage: Domestic sanitary sewage
 - b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing and consumption of food.
- E. Hazardous Materials: See also Section below titled "HAZARDOUS MATERIALS PROCEDURES."

1. Except as otherwise specified, in the event the Contractor encounters on the site material reasonably believed to be asbestos, lead, polychlorinated biphenyl (PCB), or other hazardous materials which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Trustees in writing.
 2. Work in affected areas shall not thereafter be resumed except by written agreement of the Trustees and Contractor if in fact the material is asbestos, lead, PCB, or other hazardous materials and has not been rendered harmless.
 3. Work in affected areas shall be resumed in the absence of asbestos, lead, PCB, or other hazardous materials, or when such materials have been rendered harmless.
- F. Protection of Natural Resources: It is intended that the natural resources within the Project boundaries and outside the limits of permanent work performed under this Contract be preserved in their existing condition or be restored to an equivalent or improved condition upon completion of the work. Confine construction activities to areas defined by the public roads, easements, and work area limits shown on the drawings. Return construction areas to their pre construction elevations except where surface elevations are otherwise noted to be changed. Maintain natural drainage patterns. Conduct construction activities such that ponding of stagnant water conducive to mosquito breeding habitat will not occur at any time.
1. Land resources protection: Do not remove, cut, deface, injure or destroy trees or shrubs outside the work area limits. Do not remove, deface, injure or destroy trees within the Project area without permission from University's Representative. Such improvements shall be removed and replaced, if required, by the Contractor at no change in Contract Time and Contract Sum.
 2. Landscaping protection: Protect trees that are located near the limits of Project area which may possibly be defaced, bruised or injured or otherwise damaged by the Contractor's operations. No ropes, cables or guys shall be fastened to or be attached to any existing nearby trees or shrubs for anchorages. Refer to additional requirements specified in Section 01 56 00 - Temporary Barriers and Controls.
 - a. Trimming: Refer to Section 01 56 39 - Tree and Plant Protection.
 - b. Excavations around trees: Refer to Section 01 56 39 - Tree and Plant Protection.
 - c. Repair and restoration: Repair or replace trees or other landscape feature scarred or damaged by equipment or construction operations as specified below. Repair and restoration plan shall be reviewed and approved by University's Representative prior to its initiation.
 3. Temporary construction:
 - a. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the University's Representative.
 - b. Level all temporary roads, parking areas and any other areas that have become compacted or shaped.

- c. Unpaved areas where vehicles have been operated shall receive suitable surface treatment or shall be periodically wetted down to prevent construction operations from producing dust damage and nuisance to persons and property, at no additional cost to the Trustees.
- d. Keep haul roads clear at all times of any object that creates an unsafe condition. Promptly remove any contaminants or construction materials dropped from construction vehicles. Do not drop mud and debris from construction equipment on public streets. Sweep clean turning areas and pavement entrances as necessary.
- 4. Water resources: Comply with all applicable Federal, State and local Codes, ordinances, statutes and regulations pertaining to discharge (directly or indirectly) of pollutants to underground and natural waters.
 - a. Perform all Work under the Contract in a manner that any adverse environmental impacts are reduced to a level that is acceptable to University's Representative and authorities having jurisdiction.
 - b. Refer to Division 2 - Site Construction, earthwork Sections, and Civil Drawings for specific requirements on control of storm water and disposal of water from dewatering activities.
- 5. Oily Substances: At all times, special measures shall be taken to prevent oily or other hazardous substances from entering the ground, drainage areas or local bodies of water in such quantities as to affect normal use, aesthetics or produce a measurable impact upon the areas. All soil or water that is contaminated with oily substances due to Contractor's operations shall be disposed of in accordance with applicable regulations, at no change in Contract Time and Contract Sum.

1.5 SMOKE/ODOR CONTROL PROCEDURES

- A. Smoke/Odor Control: Protect primary fresh air intakes to existing buildings from exhaust from internal combustion engines, paint and solvent fumes and other noxious fumes and vapors.
 - 1. Implement control methods such as snorkels from engines exhausts to 50 feet away from air intakes. Provide carbon filters on air intakes as necessary, including periodic replacement of filters to ensure effectiveness.
 - 2. All other activities generating fumes shall be limited to minimum distance of 50 feet from air intake grilles.
 - 3. If fume-generating procedures must occur within 50 feet of an air intake, Contractor shall do the following:
 - a. Notify University's Representative at least 14 calendar days in advance of such activities.
 - b. Perform Work when it least impacts the University (evenings, weekends or particularly windy days).
 - c. Provide carbon filter media, plastic barriers, or other control methods to ensure fresh air only enters into the building ventilation system.

1.6 NOISE CONTROL PROCEDURES

- A. Noise Control Procedures, General: Requirements of this Section are in addition to those of the Contract General Conditions. Maximum noise levels within 1,000 feet of classrooms, laboratories, residences, businesses, adjacent buildings and other populated areas:

1. Noise levels for trenchers, pavers, graders and trucks: Not exceeding 90 dBA at 50 feet as measured under noisiest operating conditions.
 2. Noise levels for all other equipment: Not exceeding 85 dBA at 50 feet.
- B. Noise Control of Equipment:
1. Equip jackhammers with exhaust mufflers and steel muffling sleeves.
 2. Use air compressors of a quiet type such as a "whisperized" compressor. Compressor hoods shall be closed while equipment is in operation.
 3. Use electrically-powered rather than gasoline or diesel powered fork lifts.
 4. Provide portable noise barriers around jack hammering, with barriers constructed of 3/4 inch plywood lined with 1-inch thick duct-liner type fiberglass on Work side.
- C. Noise Control of Construction Operations:
1. Keep noisy equipment as far as possible from noise sensitive site boundaries.
 2. Machines shall not be left idling.
 3. Use electric power in lieu of internal combustion engine power whenever possible.
 4. Maintain equipment properly to reduce noise from excessive vibration, faulty mufflers, or other sources. All engines shall have properly functioning mufflers.
- D. Scheduling of Noisy Operations: Schedule construction activities to minimize time of noisy operations and disruption to occupants of adjoining facilities. Notify University's Representative in advance of performing Work creating unusual noise and schedule such Work at times mutually agreeable.
- E. Accessory Noise: Do not play radios, tape recorders, televisions, and other similar items at construction site.

1.7 DUST AND AIR POLLUTION CONTROL PROCEDURES

- A. Dust and Air Pollution Control Procedures, General: Requirements of this Section are in addition to those of Article 4.03 of the Contract General Conditions. Employ measures to prevent or minimize creation of dust and air pollution. Contractor shall appoint a dust control monitor to oversee and implement all measures specified in this Article.
1. Unpaved areas shall be wetted down, to eliminate dust formation, a minimum of twice a day to reduce particulate matter. When wind velocity exceeds 15 mph, site shall be watered down more frequently.
 2. Store all volatile liquids, including fuels or solvents in closed containers.
 3. No on-site burning of debris, lumber and other scrap shall be permitted.
 4. Properly maintain equipment to reduce gaseous pollutant emissions.
 5. Exposed areas, new driveways and sidewalks shall be seeded, treated with soil binders or paved, as appropriate, as soon as possible.
 6. Cover stockpiles of soil, sand and other loose materials.
 7. Cover trucks hauling soil, debris, sand or other loose materials.

8. Sweep project area streets at least once daily. Refer to Section 01 74 00 - Cleaning Requirements.

1.8 HAZARDOUS MATERIALS PROCEDURES

A. Identified Hazardous Materials:

1. Limited hazardous materials investigations have been conducted for the project site, the results of which are reported in technical memorandums included with the bid documents. These documents are furnished to Contractor as information available to Contractor. The technical memorandums are included in the bid package as Exhibits G3 and H3.
2. As required, Contractor shall perform hazardous materials abatement in compliance with requirements described in the document identified above. Costs and time associated with abatement of hazardous materials identified in this report shall be included in the Contract Sum and Contract Time.
 - a. Comply with California Code of Regulations, Title 8, Sections 1529, 1532.1 and 5208.
3. Architect assumes no responsibility relating to existence of any hazardous materials, and Architect assumes no responsibility or liability for performance of Work described in the report identified above.

B. Unidentified Hazardous Materials:

1. Information regarding known asbestos containing material (ACM) is available from University's office of Industrial Health & Instructional Safety.
2. Except as otherwise specified, in the event that Contractor encounters on the project site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or other hazardous materials which have not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to University's Representative.
3. Work in the affected area shall not be resumed except by written agreement between University and Contractor if in fact the material is asbestos, PCB, or other hazardous materials and has not been rendered harmless.
4. Work in the affected area shall be resumed in the absence of asbestos, PCB or other hazardous materials, or when such materials have been rendered harmless.

C. Notification and Disclosure: Refer to Contract General Conditions for Asbestos Notification and Disclosure requirements. Refer to the bid documents for information available to Contractor.

1. In the event that hazardous materials are discovered on site during performance of the Work, Contractor shall notify the University's Representative and request directions for abatement of hazardous materials.
2. University will ensure that the identified hazardous waste and/or hazardous materials are handled and disposed in the manner specified by the State of California Hazardous Substances Control Law (Health and Safety Code Division 20, Chapter 6.5).

1.9 WELDING AND BURNING MITIGATION PROCEDURES

- A. Welding and Burning Mitigation Procedures: Eliminate welding and burning of steel as much as possible. Where unavoidable, perform welding and burning with all possible precaution to avoid fire hazard. Provide a fire watch for minimum of 30 minutes after burning stops. Provide protection for all adjacent surfaces.

1.10 EROSION AND SEDIMENT CONTROL PROCEDURES

- A. Erosion and Sediment Control Procedures: Refer to runoff control requirements specified in Section 01 57 00 - Temporary Controls. Obtain and comply with Storm Water Pollution Protection Plan (SWPPP) and project-specific requirements indicated on Civil Drawings.

1.11 DISPOSAL OPERATIONS PROCEDURES

- A. Solid Waste Management:
 - 1. Supply solid waste transfer containers. Daily remove all debris such as spent air filters, oil cartridges, cans, bottles, combustibles and litter. Take care to prevent trash and papers from blowing onto adjacent property. Encourage personnel to use refuse containers. Convey contents to a sanitary landfill.
 - 2. Washing of concrete containers where wastewater may reach adjacent property, storm drains or natural water courses will not be permitted. Remove any excess concrete to the sanitary landfill.
- B. Chemical Waste and Hazardous Materials Management: furnish containers for storage of spent chemicals used during construction operations. Dispose of chemicals and hazardous materials in accordance with applicable regulations.
- C. Garbage: Store garbage in covered containers, pick up daily and dispose of in a sanitary landfill.
- D. Grading Spoil and Landscape Debris: Dispose of vegetation, weeds, rubble, and other materials removed by the clearing, stripping and grubbing operations off site at a suitable disposal site in accordance with applicable Federal, State and local Codes, ordinances, statutes and regulations
- E. Excavated Materials:
 - 1. Native soil complying with the requirements of applicable Division 2 - Site Construction earthwork Section, may be used for backfill, fill and embankments as allowed in applicable by that section.
 - 2. Remove all material which is excavated in excess of that required for backfill. Dispose of unsuitable excavated material from the site and dispose of it legally.
 - a. Excess suitable backfill material shall be hauled off site. No additional compensation will be paid to the Contractor for such off haul. Include all such costs in the Contract Sum.
 - b. Unsuitable backfill material shall be disposed of off-site in accordance with applicable regulations, in a disposal site indicated in the Environmental Protection Plan.
 - c. Remove rubbish and materials unsuitable for backfill immediately following excavation.
 - d. Remove material in excess of that required for backfill immediately following backfill operations.

1.12 CULTURAL RESOURCES PROCEDURES

- A. Cultural Resources Procedures: Requirements specified in this Section are in addition to those required by Article 4.03 of the Contract General Conditions.
 - 1. Project does not pass through any known archaeological sites. However, it is conceivable that unrecorded archaeological sites could be discovered during construction.
 - 2. In the event that artifacts, human remains, or other cultural resources are discovered during subsurface excavations at locations of the Work, the Contractor shall protect the discovered items, cease work for a distance of 35 feet radius in the area, notify the Architect and University Representative and comply with applicable law.
 - 3. Trustees may retain an Archaeologist to monitor and recover data and artifacts during period that work has ceased.
 - 4. All items found which are considered to have archaeological significance are the property of the University.

1.13 ALTERATION PROJECT PROCEDURES

- A. Perform Alteration Procedures in accordance with Section 01 35 16-Alteration Procedures.

PART 2 - PRODUCTS

2.1 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING

- A. Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing.
- B. Generally the Contract Documents will not define products or standards of workmanship present in existing construction; determine products by inspection and necessary testing, and determine quality of workmanship by using existing as a sample for comparison.
- C. The presence of a product, finish, or type of construction requires that patching, extending or matching shall be performed as necessary to make work complete and consistent with identical standards of quality.

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

- A. Perform cutting and patching as specified in Section 01 73 29 - Cutting and Patching.

END OF SECTION

SECTION 01 35 43

ENVIRONMENTAL PROCEDURES HAZARDOUS MATERIAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Hazardous materials abatement.

1.3 IDENTIFIED HAZARDOUS MATERIALS

- A. Identified Hazardous Materials:
 - 1. Limited hazardous materials investigations have been conducted for the project site, the results of which are documented in the technical memorandums included with the bid documents. These memorandums are furnished as information available to Contractor. The memorandums are included in the bid documents as Exhibits G3 and H3.
 - 2. Contractor shall perform hazardous materials abatement, removal, and related work in compliance with requirements described in the document identified above. Costs and time associated with abatement of hazardous materials identified in this report shall be included in the Contract Sum and Contract Time.
 - a. Comply with California Code of Regulations, Title 8, Sections 1529, 1532.1 and 5208.
 - 3. Architect assumes no responsibility relating to existence of any hazardous materials, and Architect assumes no responsibility or liability for performance of Work described in the report identified above.

1.4 UNIDENTIFIED HAZARDOUS MATERIALS

- A. Unidentified Hazardous Materials:
 - 1. Information regarding known hazardous materials is available from University's Representative.
 - 2. Except as otherwise specified, in the event that Contractor encounters on the project site material reasonably believed to be asbestos, lead, polychlorinated biphenyl (PCB), or other hazardous materials which have not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to University's Representative.

3. Work in the affected area shall not be resumed except by written agreement between University and Contractor if in fact the material is asbestos, lead, PCB, or other hazardous materials and has not been rendered harmless.
 4. Work in the affected area shall be resumed in the absence of asbestos, lead, PCB or other hazardous materials, or when such materials have been rendered harmless.
- B. Notification and Disclosure: Refer to Contract General Conditions for Asbestos Notification and Disclosure requirements. Refer to the bid documents for information available to Contractor.
1. In the event that hazardous materials are discovered on site during performance of the Work, Contractor shall notify the University's Representative and request directions for abatement of hazardous materials.
 2. Comply with hazardous materials requirements in the University's Safety Manual, provided to Contractor under separate cover by University's Representative (if available).
 3. University will ensure that the identified hazardous waste and/or hazardous materials are handled and disposed in the manner specified by the State of California Hazardous Substances Control Law (Health and Safety Code Division 20, Chapter 6.5).

PART 2 - PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

Not applicable to this Section.

END OF SECTION

SECTION 01 35 50

SAFETY PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Procedures for health and safety protection, site safety requirements and requirements for reporting accidents.

1.3 RELATED SECTIONS

- A. Section 01 35 43 - Hazardous Material Procedures: Protection from asbestos containing materials (ACM), polychlorinated biphenyl (PCB), or other hazardous materials.
- B. Section 01 52 00 – Construction Area and Temporary Facilities.
- C. Contract General Conditions – Article 4.08d.

1.4 SUBMITTALS

- A. Accident Reports: A copy of each accident report, which the Contractor or subcontractors submit to their insurance carriers, shall be forwarded to the Architect and to the University Representative as soon as possible, but in no event later than 5 calendar days after the day the accident occurred.
- B. Site Safety Plan: Submit a Site Safety plan per the requirements listed within this section.
 - 1. Due within 21 Days of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. During the course of construction, submit any proposed revisions for acceptance prior to implementing any changes.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Special facilities, devices, equipment, clothing, and similar items used by the Contractor in the execution of the Work shall comply with applicable regulations.

PART 3 - EXECUTION

3.1 STOP WORK ORDERS

- A. Stop Work Orders:
 - 1. When the Contractor or its subcontractors are notified by the University's Representative of an incident of noncompliance with the provisions of the Contract, and the action(s) to be taken, the Contractor shall immediately, if so directed, or within 48 hours after receipt of a notice of violation, correct the unsafe or unhealthy condition.
 - 2. If the Contractor fails to comply promptly, all or any part of the work performed may be stopped by with a "Stop Work Order." When, in the opinion of the University's Representative, satisfactory corrective action has been taken to correct the unsafe and unhealthy condition, a written release of the stop work order will be issued as soon as possible.
 - 3. The Contractor shall not be allowed any extension of time or compensation for damages by reason of or in connection with such work stoppage.

3.2 PROTECTION

- A. Protection: Contractor shall take all necessary precautions to prevent injury to the public, building occupants, or damage to property of others. Such measures shall not be prescribed by the University or Architect, but shall be the responsibility solely of the Contractor.
 - 1. For the purposes of the Contract, the public or building occupants shall include all persons not employed by the Contractor or a subcontractor working under the Contractor's direction.
 - 2. Work shall not be performed in any area occupied by the public or University's employees unless specifically permitted by the Contract or subsequent written agreements are made with adequate steps taken for the protection of the public and the University's employees.
 - 3. Whenever practicable, the work area shall be fenced, barricaded, or otherwise blocked off from the public or building occupants to prevent unauthorized entry into the work area.
- B. Alternate Precautions: When the nature of the Work prevents isolation of the work area, and the public or building occupants may be in or pass through, under or over the work area, alternate precautions such as the posting of signs, the use of signal persons, the erection of barricades or similar protection around any hazardous operations shall be used as appropriate.
- C. Public Thoroughfare: When Work is to be performed over a public thoroughfare such as a sidewalk, lobby, or corridor, the thoroughfare shall be closed, if possible, or other precautions taken such as the installation of screens or barricades. When the exposure to heavy falling objects exists, as during the erection of building walls or during demolition, special protection of the type detailed in 29 CFR 1910/1926 shall be provided.
- D. Hazardous Conditions: Storing, positioning or use of equipment, tools, materials, scraps, and trash in a manner likely to present a hazard to the public or building occupants by its accidental shifting, ignition, or other hazardous qualities is prohibited.
- E. Site Safety Plan (*outline below provided for reference and use by the Contractor*):

Site Safety Plan Requirements

Project Name

Site Safety Director	Phone Number
General Contractor	TBD
	Email TBD

Site Safety Plan (SSP)

The SSP shall be consistent with the fire safety precautions as specified in the Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions, Supplementary General Conditions, other Division 1 Specification Sections, as outlined in this document, and the CFC and its referenced standards. The General Contractor is responsible for carrying out the provisions of the SSP and communicating it to all subcontractors. The SSP shall include the following:

1. Documentation of the training of the site safety director and fire watch personnel.
2. Procedures for reporting emergencies.
3. Fire department vehicle access routes.
4. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
5. Smoking and cooking policies, designated areas to be used where approved, and signage locations in accordance with Section 3305.8.
6. Location and safety considerations for temporary heating equipment.
7. Hot work permit plan.
8. Plans for control of combustible waste material.
9. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
10. Provisions for site security.
11. Changes that affect this plan.
12. Other site-specific information required by the fire code official.

I. Access and Parking

- A. **Fire Department Access Roadways:** All construction sites shall be accessible by fire department apparatus by means of roadways having an all-weather driving surface of not less than 20 feet of unobstructed width. The roads shall have the ability to withstand the live loads of fire apparatus and have a minimum 13½ feet (13 feet 6 inches) of vertical clearance. Dead end fire access roads in excess of 150 feet in length shall be provided with approved turnarounds.
1. When approved by the Fire Code Official, temporary access roadways may be utilized until such time as permanent roadways are installed. As a minimum, the roadway shall consist of a compacted sub-base and 6 inches of road base material (Class 2 aggregate base rock) both compacted to a minimum 95%. The perimeter edges of the roadway shall be

contained and delineated by curb and gutter or other approved method. The use of geotextile reinforcing fabric underlayment or soils lime-treatment may be required if so, determined by the project civil engineer. Provisions for surface drainage shall also be provided where necessary. The integrity of the roadway shall be maintained at all times.

- B. **Premises Identification:** The address numbers of the property or project location shall be plainly visible and legible from the street or road fronting the property at the fire apparatus access point or as otherwise approved.
- C. **Vehicle Parking:** All vehicles shall be parked a minimum of 20 feet from buildings under construction.
 - 1. Exceptions: a.) Vehicles that are temporarily parked for loading/unloading or other construction related operations. Such vehicles shall not be left unattended. b.) Private vehicles may be parked in parking garages of Type I construction if the automatic fire sprinkler system is in service and vertical openings are protected.
- D. **Site Security:** The site shall be secured by fencing designed to prevent climbing and monitored periodically so that the site is secure. A fire watch shall be provided during nonworking hours for construction that exceeds 40 feet in height above the lowest adjacent grade or when otherwise required as an element of the SSP.

II. Fire Protection Systems

- A. **Fire Hydrants:**
- B. **Standpipes:**
- C. **Fire Walls:**
- D. **Fire Sprinkler Systems:**
- E. **Fire Alarm Systems:** Fire alarm systems shall be maintained operational at all times during building alterations. When an alteration requires modification to a portion of the fire alarm system, the portion of the system requiring work shall be isolated and the remainder of the system shall be kept in service whenever practical. When it is necessary to shut down an entire fire alarm system, a fire watch or other mitigation approved by the Site Safety Director shall be implemented by the general contractor until the system is returned to full service.
- F. **Fire Extinguishers:** Portable fire extinguishers shall be provided and shall be mounted on a wall or post at each usable stairway and such that the travel distance to any extinguisher does not exceed 75 feet. Mounting height to the top of the extinguisher shall not exceed 5 feet. Extinguishers shall not have less than a 2A10BC rating or as otherwise directed by the fire department. The general contractor shall ensure that an adequate number of individuals are trained in the proper use of portable fire extinguishers.

III. General Precautions

- A. **Smoking:** Smoking is prohibited anywhere inside or on the roof of new buildings under construction or in the project work area of buildings undergoing alteration. A suitable number of 'No Smoking' signs shall be posted to ensure that smoking is controlled.

- B. **Telephone Service:** Provisions shall be provided at the construction site for emergency notification of the fire department via telephone. The street address of the construction site shall be posted adjacent to the telephone, along with the number for the public safety answering point. Alternatively, where an equivalent means of communication has been approved, the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks and in the construction site office.

IV. Exit Requirements

- A. **Minimum Number of Exits:** All buildings under construction shall have a least one unobstructed exit. All exits shall be identified in the SSP.
- B. **Multi-Story Buildings:**
- C. **Assembly Points:** Designated exterior assembly points shall be established for all construction personnel to relocate to upon evacuation. The assembly points shall also be posted at the job site.

V. Flammable and Combustible Liquids

- A. **Storage Areas:** Storage areas shall be kept free of weeds and extraneous combustible material. Open flames and smoking shall be prohibited in storage areas.
- B. **Containers:** Metal containers for Class I or II liquids shall be in accordance with DOT requirements or shall be of an approved design. Discharge devices shall not cause an internal pressure on the container. Individual containers shall not be interconnected and shall be kept closed when not in use.
- C. **Secondary Containment:** Secondary containment or a means of spill control, drainage control, and diking shall be required for containers and tanks as approved by the fire department and University; if applicable, local hazardous materials program agency.
- D. **Marking:** Tanks and containers shall be marked with the name of the product and "FLAMMABLE — KEEP FIRE AND FLAME AWAY." Tanks (i.e., containers in excess of 60 gallons) shall also be labeled "KEEP 50 FEET FROM BUILDINGS."
- E. **Fueling of Equipment:** All fueling of equipment must take place outside of the structure under construction and away from any potential ignition sources.
- F. **Tank Installation Plans/Permit:**

VI. Other Combustible Materials

- A. **Combustible Material Storage:** Combustible construction materials shall be stored a minimum of 20 feet from buildings under construction or undergoing remodel.
 - 1. Exceptions: a.) Materials that are staged for installation on a floor level. b.) When approved by the Site Safety Director, materials may be stored in parking garages of Type I construction if the automatic fire sprinkler system is in service and vertical openings are protected.
- B. **Garbage Chutes and Dumpsters:** All combustible garbage chutes must have an automatic sprinkler head recessed into the top of the chute and supplied by a temporary water supply. The supply must be a commercial rubber hose a minimum of ¾" diameter. Dumpsters must be

removed from the site as soon as filled to prevent debris from clogging the chute. Dumpsters, not associated with a garbage chute, must be a minimum of 20' away from the structure under construction where practicable.

- C. **Combustible Debris:** Wood, cardboard, packing material, form lumber, and similar combustible debris shall not be accumulated within buildings. Such debris, rubbish, and waste material shall be removed from buildings on a daily basis.
- D. **Oily Rags:** Oily rags and similar material shall be stored in metal or other approved containers equipped with tight-fitting covers.

VII. Compressed Gases

- A. **Protection of Gas Containers:** Gas containers/cylinders shall be protected as follows:
 - 1. Combustible materials shall be kept a minimum of 10 feet from gas containers.
 - 2. Cylinders shall be protected against physical damage.
 - 3. Cylinders shall be stored upright and secured to prevent falling.
 - 4. Cylinders shall not be placed near elevators, unprotected platform edges or other areas where they would drop more than 2 feet.
 - 5. Cylinders shall not be placed in areas where they may be damaged by falling objects.
 - 6. When cylinders are not in use, valve protective caps shall be in place.
 - 7. Ropes, chains or slings shall not be used to suspend gas cylinders, unless the cylinder was manufactured with appropriate lifting attachments.
- B. **Separation:** When stored, gas cylinders shall be separated from each other based on their hazard classes.
- C. **Marking:** Gas cylinders shall be marked with the name of the contents.
- D. **Liquefied Petroleum Gas (LP-Gas):**
- E. **Use in Buildings:** Propane containers may be used in buildings under construction or undergoing major renovation as a fuel source for temporary heating for curing concrete, drying plaster and similar applications in accordance with the following:
 - 1. Heating elements (other than integral heater-container units) shall be located at least 6 feet from any LP- Gas container.
 - 2. Integral heater-container units specifically designed for the attachment of the heater to the container, or to a supporting standard attached to the container, may be used provided they are designed and installed so as to prevent direct or radiant heat application to the LP-Gas container.
 - 3. Blower and radiant type units shall not be directed toward any LP-Gas container within 20 feet.
 - 4. Heat producing equipment shall be installed with clearance to the combustibles in accordance with the manufacturer's installation instructions.
 - 5. Cylinders shall comply with DOT cylinder specifications and shall be secured in an upright position.
 - 6. Regulators shall be approved for use with LP-Gas. Fittings shall be designed for at least 250 p.s.i.g. service pressure.

7. Hose shall be designed for a working pressure of at least 350 p.s.i.g. (unless limited to 5 p.s.i.g.) and shall be a maximum of 6 feet in length.
8. Portable heaters shall be equipped with an approved automatic device to shut off the flow of gas to the main burner and to the pilot in the event of flame extinguishment or combustion failure. Portable heaters with an input of more than 50,000 Btu/hr shall be equipped with either a pilot that must be proved before the main burner can be turned on or an approved electronic ignition system.

F. **Occupied Buildings:**

VIII. Hot Work

- A. Hot work includes any work involving operations capable of initiating fires or explosions, including cutting, welding, brazing, soldering, grinding, thermal spraying, thawing pipe, torch applied roofing, or any other similar activity.
- B. Hot work shall only be conducted in areas designed or authorized for that purpose by the personnel responsible for a hot work program. Hot work shall not be conducted in the following areas unless approval has been obtained from the fire code official:
 1. Areas where the sprinkler system is impaired.
 2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
 3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust or loose combustible materials.
 4. On board ships at dock or ships under construction or repair.
 5. At other locations as specified by the fire code official.
- C. **Area Reviews:** Before hot work is permitted and not less than once per day while the permit is in effect, the area shall be inspected by the individual responsible for authorizing hot work operations to ensure that it is a fire safe area. Information shown on the permit shall be verified prior to signing the permit.
- D. **Pre-Hot-Work Check:** A pre-hot-work check shall be conducted prior to work to ensure that all equipment is safe and hazards are recognized and protected. A report of the check shall be kept at the work site during the work and available upon request. The pre-hot-work check shall determine all of the following:
 1. Hot work equipment to be used shall be in satisfactory operating condition and in good repair.
 2. Hot work site is clear of combustibles or combustibles are protected.
 3. Exposed construction is of noncombustible materials or, if combustible, then protected.
 4. Openings are protected.
 5. Floors are kept clean.
 6. Exposed combustibles are not located on the opposite side of partitions, walls, ceilings or floors.
 7. Fire watches, where required, are assigned.
 8. Approved actions have been taken to prevent accidental activation of fire protection system equipment in accordance with Sections 3504.1.8 and 3504.1.9.
 9. Fire extinguishers and fire hoses (where provided) are operable and available.

- E. **Fire Watch:** The sole duty of fire watch personnel shall be to watch for the occurrence of fire during and after hot work operations. Individuals designated to fire watch duty shall have fire extinguishing equipment readily available and shall be trained in the use of such equipment. Personnel assigned to fire watch shall be responsible for extinguishing spot fires and communicating an alarm. Hot work conducted in areas with vertical and horizontal fire exposures that cannot be observed by a single individual shall have additional personnel assigned to fire watches to ensure that all exposed areas are monitored.
- F. **Post-Work Inspection:** The fire watch shall be maintained a minimum of 30 minutes after the conclusion of the work to look out for leftover sparks, slag or smoldering combustibles.
- G. **Weather:** On red flag declared fire days (due to temperature, humidity and/or wind conditions), hot work operations shall be curtailed, and the fire watch shall be extended through the night.

IX. Special Equipment

- A. **Motorized Equipment:** Motorized equipment, including internal-combustion-powered construction equipment, shall be used in accordance with the following:
 - 1. Fuel for equipment shall be stored in an approved area outside of the building.
 - 2. Equipment shall not be refueled while in operation.
 - 3. Equipment shall be located so that exhausts do not discharge against combustible materials.
 - 4. When possible, exhausts should be piped to the outside of the building.
- B. **Temporary Heating Equipment:** Temporary heaters, such as those that are LPG fueled, shall be listed and shall be installed, used, and maintained in accordance with the manufacturer's instructions (See LPG storage and use requirements, above). Heating devices shall be secured properly and kept clear from combustible materials. Refueling operations shall be conducted in an approved manner.
- C. **Asphalt and Tar Kettles:** Asphalt kettles shall not be located within 20 feet of any combustible material, combustible building surface or building opening. With the exception of thermostatically controlled kettles, an attendant shall be within 100 feet of a kettle when the heat source is operating. Ladders or similar obstacles shall not form a part of the route between the attendance and the kettle. Kettles shall be equipped with tight-fitting covers. A minimum 20-B:C rated portable fire extinguisher shall be located within 30 feet of each asphalt kettle when the heat source is operating. Minimum 20-B:C rated portable fire extinguishers also shall be located on roofs during asphalt coating operations.

X. Daily Fire Safety Inspection

The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section. The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site for presentation to the fire code official upon request.

- A. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in CFC Chapter 35, and hot work is performed only in areas approved by the site safety director.
- B. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
- C. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
- D. Temporary wiring does not have exposed conductors.
- E. Flammable liquids and other hazardous materials are stored in locations that have been approved by the site safety director when not involved in work that is being performed.
- F. Fire apparatus access roads required by CFC Section 3311 are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet.
- G. Fire hydrants are clearly visible from access roads and are not obstructed.
- H. The location of fire department connections to standpipe and in-service sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
- I. Standpipe systems are in service and continuous to the highest work floor, as specified in CFC Section 3313.1.
- J. Portable fire extinguishers are available in locations required by CFC Sections 3316 and 3318.3.

END OF SECTION

SECTION 01 35 53

SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Contractor Security requirements.

1.3 SECURITY (Also refer to Contract General Conditions)

- A. Protect the Work from theft, vandalism and unauthorized entry. Contractor shall have sole responsibility for job site security.
- B. Maintain security throughout construction until the University's occupancy or acceptance.
- C. Provide keying different from permanent keying of locks and include organized, locked and supervised storage for receiving and dispensing items of finish hardware throughout the construction.
- D. Provide the Project Inspector with keys necessary to gain access to locked areas of the Work. The Project Inspector will be responsible for such keys and will return them to the Contractor upon acceptance of the project or area as complete.

1.4 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into project site.
- B. Allow building entrance only to authorized persons with proper identification.

1.5 PERMANENT KEYS

- A. Immediately upon receipt of permanent keys for whatever purpose (finish hardware, mechanical equipment, casework, dispensers, lockers, switches, equipment items, etc.), tag or otherwise clearly identify keys according to one approved system and turn them over to the University prior to any opportunity of access to keys by parties other than the University.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes: Certain Codes and Standards and relevant requirements applicable to the Work required under this Contract.

1.3 AUTHORITY AND PRECEDENCE OF CODES, ORDINANCES AND STANDARDS

- A. Authority: All codes, ordinances and standards referenced in the Drawings and Specifications shall have the full force and effect as though printed in their entirety in the Specifications.
- B. Precedence:
 - 1. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence.
 - 2. Where the Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, the Drawings and Specifications shall take precedence so long as such increase is legal.
 - 3. Where no requirements are identified in the Drawings or Specifications, comply with all requirements of applicable codes, ordinances and standards of authorities having jurisdiction.

1.4 STATUTORY AND JURISDICTIONAL REGULATIONS

- A. Perform the Work in accordance with Applicable Code Requirements and applicable requirements of all other regulatory agencies including, but not limited to, the following:

1. State of California Code of Regulations (CCR), Title 24 State Building Standards, 2022.
 2. California State Fire Marshall
 3. Local City Fire Department - Public Assembly Unit (based on project location).
 4. Division of the State Architect.
 5. Trustees Designated Plan Check Authority (P.C. Associates).
 6. Trustees Designated Seismic Peer Review Authority.
- B. Performance of the Work shall also comply with applicable requirements of California Code of Regulations (CCR) as follows:
1. Title 19 - Public Safety.
 2. Title 22 - Social Security.
- C. Unless otherwise specified, specific references to codes, regulations, standards, manufacturers' instructions, or requirements of regulatory agencies, when used to specify requirements for materials or design elements, shall mean the edition of each in effect as identified in the Contract Documents.
- D. Contractor shall maintain copies of regulatory reference manuals and code books on the job site for reference during planning, submittal processing and field installation of specific work.
- E. Contractor and each subcontractor or supplier engaged in construction of the project shall be thoroughly familiar with the codes and regulations applicable to their specific construction activities. Contractor's responsibility for familiarity with applicable codes and regulations shall extend to the entire scope of work specified in the Contract Documents.

1.5 CONFLICTS

- A. Unless otherwise directed by the Architect, if a conflict exists between referenced regulatory requirements, comply with the one establishing more stringent requirements.
- B. Unless otherwise directed by the Architect, if a conflict exists between referenced regulatory requirements and the Contract Documents, comply with the more stringent requirements.
- C. Submittals
1. Submit to the University Representative copies of all permits, licenses, certifications, inspection reports, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records and other documentation established and/or required in conjunction with compliance with specified standards and regulations. Maintain copies of the aforementioned documents at the project site at all times.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 42 00

REFERENCE STANDARDS AND ABBREVIATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Use of references in Drawings and Specifications, including requirements for copies of reference standards at Project site.
- B. Definitions of terms used in Specifications and Drawings, including abbreviations, acronyms, names and terms which may be used in Specifications.

1.3 RELATED SECTIONS

- A. Section 01 41 00 - Regulatory Requirements: Identification of applicable building Code and other codes, ordinances and regulations applicable to performance of the Work.

1.4 USE OF REFERENCES

- A. References: The Drawings and Specifications contain references to various standards, standard specifications, codes, practices and requirements for products, execution, tests and inspections. These reference standards are published and issued by the agencies, associations, organizations and societies listed in this Section or identified in individual product specification Sections.
 - 1. Wherever term "Agency" occurs in Standard Specifications, it shall be understood to mean the term used for University for purposes of the Contract.
 - 2. Wherever term "Engineer" occurs in Standard Specifications, it shall be understood to mean Architect or other responsible design professional for purposes of the Contract.
 - 3. Where reference is made to Standard Details, such reference shall be to the Standard Details accompanying the Standard Specifications.
- B. Relationship to Drawings and Specifications: Such references are incorporated into and made a part of the Drawings and Specifications to the extent applicable.
- C. Referenced Grades Classes and Types: Where an alternative or optional grade, class or type of product or execution is included in a reference but is not identified on the Drawings or in the Specifications, provide the highest, best and greatest of the alternatives or options for the intended use and prevailing conditions.
- D. Copies of Reference Standards:

1. Reference standards are not furnished with the Drawings and Specifications because it is presumed that the Contractor, subcontractors, manufacturers, suppliers, trades and crafts are familiar with these generally-recognized standards of the construction industry.
2. Copies of reference standards may be obtained from publishing sources.

E. Jobsite Copies:

1. Contractor shall obtain and maintain at the Project site copies of reference standards identified on the Drawings and in the Specifications in order to properly execute the Work.
2. At a minimum, the following shall be readily available at the site (electronically or in print), as applicable to the Work:
 - a. State Building Codes: As referenced in Section 01 41 00 - Regulatory Requirements.
 - b. Safety Codes: Occupational Safety and Health Act (OSHA) regulations and State of California, California Administrative Code, California Code of Regulations (CCR), Title 8 - Industrial Relations, Chapter 4, Subchapter 7, General Industry Safety Orders (Cal-OSHA), to extent applicable to the Work.
 - c. General Standards:
 - 1) CCR Title 24, Part 2, Volume 3: 2025 California Building Code (CBC) Material, Testing and Installation Standards.
 - 2) CCR Title 24, Part 12: 2025 California Referenced Standards Code.
 - 3) Underwriters Laboratories, Inc. (UL) Building Products Listing.
 - 4) Factory Mutual Research Organization (FM) Approval Guide.
 - 5) American Society for Testing and Materials (ASTM) Standards in Building Codes.
 - 6) American National Standards Institute (ANSI) standards.
 - d. Fire and Life Safety Standards: All referenced standards pertaining to fire rated construction and exiting.
 - e. Common Materials Standards: American Concrete Institute (ACI), American Institute of Steel Construction (AISC), American Welding Society (AWS), Gypsum Association (GA), National Fire Protection Association (NFPA), Tile Council of America (TCA) and Woodwork Institute of California (WIC) standards to the extent referenced within the Contract Specifications.
 - f. Research Reports: ICC Evaluation Service, Inc. (ICC-ES), formerly ICBO Evaluation Service, Inc. (ICBO ES) Research Reports and National Evaluation Service, Inc. Reports (NER), for products not in conformance to prescribed requirements stated in California Building Code (CBC).
 - g. Product Listings: Approval documentation, indicating approval of authorities having jurisdiction for use of product within the applicable jurisdiction.

F. Edition Date of References:

1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of the Agreement, Contract Drawings and/or Contract Specifications.
2. All amendments, changes, errata and supplements as of the effective date shall be included.

- G. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision or amendment. It is presumed that the Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.5 DEFINITIONS OF TERMS

- A. Basic Contract Definitions: Words and terms governing the Work are defined in the Contract General and Supplementary Conditions, as referenced in the Agreement.
- B. Words and Terms Used on Drawings and in Specifications: Additional words and terms may be used in the Drawings and Specifications and are defined as follows:
1. "Applicable": As appropriate for the particular condition, circumstance or situation.
 2. "Approve(d)": Approval action shall be limited to the duties and responsibilities of the party giving approval, as stated in the Conditions of the Contract. Approvals shall be valid only if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences and procedures of construction. Approval shall not relieve the Contractor from responsibility to fulfill Contract requirements.
 3. "And/or": If used, shall mean that either or both of the items so joined are required.
 4. "Directed": Limited to duties and responsibilities of the University's Representative or Architect as stated in the Contract General Conditions, meaning "as instructed by the University's Representative or Architect, in writing, regarding matters other than the means, methods, techniques, sequences and procedures of construction. Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the University's Representative or Architect", "requested by the University's Representative or Architect", and similar phrases. No implied meaning shall be interpreted to extend the responsibility of the University's Representative, Architect or other responsible design professional into the Contractor's supervision of construction.
 5. "Equal" or "Equivalent": As determined by Architect or other responsible design professional as being equivalent, considering such attributes as durability, finish, function, suitability, quality, utility, performance and aesthetic features.
 6. "Furnish": Means supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
 7. "Indicated": The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown", "noted", "scheduled", and "specified" are used to help the reader locate the reference. There is no limitation on location.
 8. "Install": Describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.
 9. "Installer"

- a. "Installer": refers to the Contractor or an entity engaged by the Contractor, such as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - b. "Experienced Installer": The term "experienced," when used with "installer" means having a minimum of 5 previous Projects similar in size to this Project, knowing the precautions necessary to perform the Work, and being familiar with requirements of authorities having jurisdiction over the Work.
10. "Jobsite": Same as site.
11. "Necessary": With due considerations of the conditions of the Project and as determined in the professional judgment of the Architect or other responsible design professional as being necessary for performance of the Work in conformance with the requirements of the Contract Documents, but excluding matters regarding the means, methods, techniques, sequences and procedures of construction.
12. "Noted": Same as "Indicated."
13. "Per": Same as "in accordance with," "according to" or "in compliance with."
14. "Products": Material, system or equipment.
15. "Project Site": Same as "Site."
16. "Proper": As determined by the Architect or other responsible design professional as being proper for the Work, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, which are solely the Contractor's responsibility to determine.
17. "Provide": Means "furnish and install, complete and ready for the intended use."
18. "Regulation": Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as and rules, conventions and agreements within the construction industry that control performance of the Work.
19. "Required": Necessary for performance of the Work in conformance with the requirements of the Contract Documents, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, such as:
- a. Regulatory requirements of authorities having jurisdiction.
 - b. Requirements of referenced standards.
 - c. Requirements generally recognized as accepted construction practices of the locale.
 - d. Notes, schedules and graphic representations on the Drawings.
 - e. Requirements specified or referenced in the Specifications.
 - f. Duties and responsibilities stated in the Bidding and Contract Requirements.
20. "Scheduled": Same as "Indicated."
21. "Selected": As selected by the University's Representative, Architect or other responsible design professional from the full selection of the manufacturer's products, unless specifically limited in the Contract Documents to a particular quality, color, and texture or price range.
22. "Shown": Same as "Indicated."

23. "Site": Same as "Site of the Work" or "Project Site;" the area or areas or spaces occupied by the Project and including adjacent areas and other related areas occupied or used by the Contractor for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land upon which the Project is to be built.
24. "Supply": See "Furnish."
25. "Testing Laboratory" or "Testing Laboratories": An independent entity engaged to perform specific inspections or tests, at the Project Site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or tests. Refer to Section 01458 - Testing Laboratory Services.
26. "Testing and Inspection Agency": Same as "Testing Laboratory."

1.6 ABBREVIATIONS, ACRONYMS, NAMES AND TERMS, GENERAL

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Abbreviations, General: The following are commonly-used abbreviations which may be found on the Drawings or in the Specifications:

AC or ac	Alternating current or air conditioning (depending upon context)	KW or kw	Kilowatt
AMP or amp	Ampere	KWH or kwh	Kilowatt hour
C	Celsius	LBF or lbf	Pounds force
CFM or cfm	Cubic feet per minute	LF or lf	Lineal foot
CM or cm	Centimeter	LBF or lbf	Pounds force
CY or cy	Cubic yard	LF or lf	Lineal foot
DC or dc	Direct current	M or m	Meter
DEG or deg	Degrees	MM or mm	Millimeter
F	Fahrenheit	MPH or mph	Miles per hour
FPM or fpm	Feet per minute	PCF or pcf	Pounds per cubic foot
FPS or fps	Feet per second	PSF or psf	Pounds per square foot
FT or ft	Foot or feet	PSI or psi	Pounds per square inch
Gal or gal	Gallons	PSY or psy	Per square yard
GPM or gpm	Gallons per minute	SF or sf	Square foot
IN or in	Inch or inches	SY or sy	Square yard
KVA or kva	Kilovolt amperes	V or v	Volts

- C. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the

entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities	(800) 872-2253
	Available from Access Board	(202) 272-0080
	www.access-board.gov	
CFR	Code of Federal Regulations	(888) 293-6498
	Available from Government Printing Office	(202) 512-1530
	www.access.gpo.gov/nara/cfr	
CRD	Handbook for Concrete and Cement	(601) 634-2355
	Available from Army Corps of Engineers	
	Waterways Experiment Station	
	www.wes.army.mil	
DOD	Department of Defense Military Specifications and Standards	(215) 697-6257
	Available from Department of Defense Single Stock Point	
	www.dodssp.daps.mil	

D. Undefined Abbreviations, Acronyms, Names and Terms: Words and terms not otherwise specifically defined in this Section, in the Instructions to Bidders, in the Contract General Conditions, on the Drawings or elsewhere in the Specifications, shall be as customarily defined by trade or industry practice, by reference standard and by specialty dictionaries such as the following:

1. Dictionary of Architecture and Construction, Fourth Edition (Cyril M. Harris, McGraw-Hill Book Company, 2006).
2. The American Institute of Architects (AIA) Document M101, "Glossary of Construction Industry Terms."
3. Encyclopedia of Associations, published by Gale Research Co., commonly available in public libraries.

PART 2 - PRODUCTS

Not applicable to this section.

PART 3 - EXECUTION

Not applicable to this section.

END OF SECTION

SECTION 01 43 39

MOCK-UPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Full scale mock-ups for visual qualities.

1.3 RELATED SECTIONS

- A. Section 32 01 26.71 – Grooving of Concrete Paving.

1.4 DEFINITIONS

- A. Mock-Ups: Full-size, physical example assemblies to illustrate finishes and materials.
 - 1. Mock-ups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
 - 2. Mock-ups establish the standard by which the Work will be judged.

1.5 SUBMITTALS

- A. Product Data and Shop Drawings: For each product or system that will be incorporated in the mock-ups, submit required submittals electronically as specified in submittal section and applicable product section of the Specifications.

1.6 QUALITY ASSURANCE

- A. Mock-Ups: Before installing portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mock-ups in location and of size indicated or, if not indicated, as directed by University's Representative.
 - 2. Notify University's Representative and Architect minimum of seven days in advance of dates and times when mock-ups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.

4. Obtain review and acceptance of mock-ups by Architect and University's Representative before starting Work, including fabrication and installation construction.
5. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mock-ups when directed, unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MOCK-UPS FOR VISUAL QUALITIES

- A. Mock-Ups for Visual Qualities: Before installing portions of the Work requiring a mock-up, build the mock-ups with each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 1. Construct field mock-ups as indicated on the Drawings, indicating assemblies and interfaces of materials.
 2. Construct mock-ups at location where directed by University's Representative.
 3. Demonstrate the proposed range of visual effects, qualities and workmanship.
 4. Provide structural substrate for mock-ups as suitable. Mock-ups shall be free standing and self-supporting.
 5. Maintain mock-ups during construction in an undisturbed condition as a standard for judging completed Work.
 6. Demolish and legally dispose of mock-ups when directed, unless otherwise indicated.

PART 3 - EXECUTION

3.1 CONSTRUCTION OF MOCK-UPS FOR VISUAL QUALITIES

- A. Mock-Ups for Visual Qualities, General: Construct mock-ups as noted on the Drawings and specified in individual product Sections of the Specifications.
 1. Remove, reconstruct and refinish products as necessary to achieve fit, finish and tolerances acceptable to University's Representative and Architect.

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Definitions
- B. Responsibilities
- C. Inspections
- D. Submittals
- E. Regulatory requirements for testing and inspection.
- F. Contractor's quality control.
- G. Quality of the Work.
- H. Inspections and tests by authorities having jurisdiction.
- I. Inspections and tests by serving utilities.
- J. Inspections and tests by manufacturer's representatives.

1.3 RELATED SECTIONS

- A. Section 01 31 13 - Coordination: Coordination of Work under Contract.
- B. Section 01 41 00 - Regulatory Requirements: Compliance with applicable codes, ordinances and standards.
- C. Section 01 45 29 - Testing Laboratory Services: Selection of independent testing and inspection laboratory; tests and inspections conducted by testing laboratory.
- D. Section 01 60 00 - Product Requirements: Product options, substitutions, transportation and handling requirements, storage and protection requirements, and system completeness requirements.

1.4 DEFINITIONS

- A. Quality control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by University Representative or Architect.
- B. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

1. Specific quality control requirements for individual activities are specified in Sections relative to those activities.
2. Specified inspections, tests, and related actions do not limit Contractor's quality control procedures that facilitate compliance with Contract Document Requirements.
3. Requirements for Contractor to provide quality control services required by University Representative, Architect, or authorities having jurisdiction are not limited by provisions of this Section.

1.5 RESPONSIBILITIES

- A. General: Comply with requirements of Contract General Conditions.
- B. Unless otherwise indicated as the responsibility of another identified entity, Trustees will employ and pay for services of independent testing laboratory to perform inspections, tests, and other quality control services specified elsewhere in Contract Documents and required by authorities having jurisdiction.
 1. Where individual Sections specifically indicate that certain inspections, tests, and other quality control services are Contractor's responsibility, Contractor shall employ and pay qualified independent testing agency to perform quality control services. Costs for these services are included in Contract Sum.
 - a. Where Trustees have engaged testing agency for testing and inspecting part of Work, and Contractor is also required to engage entity for same or related element, Contractor shall not employ entity engaged by Trustees, unless agreed to in writing by Trustees.
- C. Retesting: Contractor is responsible for retesting where results of inspections, tests, or other quality control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether original test was Contractor's responsibility.
 1. Cost of retesting Work, revised or replaced by Contractor, is Contractor's responsibility where required tests performed on original Work indicated noncompliance with Contract Document requirements.
- D. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
 1. Provide access to Work.
 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 3. Assist Trustees as requested in taking quantities of representative samples of materials that require testing or assist testing agency in taking samples.
 4. Provide facilities for storage and curing of test samples.
 5. Provide security and protection of samples and test equipment at Project Site.
- E. Duties of Testing Agency: Independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with

University Representative, Architect, and Contractor in performance of agency's duties. Testing agency shall provide qualified personnel to perform required inspections and tests.

1. Agency shall notify University Representative, Architect, and Contractor promptly of irregularities or deficiencies observed in Work during performance of its services.
2. Agency is not authorized to release, revoke, modify, alter, interpret, or expand requirements of Contract Documents or approve or accept any portion of Work.
3. Agency shall not perform any duties of Contractor.

1.6 INSPECTIONS

- A. General: All construction work shall be subject to inspection by the Trustees (hereinafter referred to as Owner) and the Architect, and all such construction or work shall remain accessible and exposed for inspection purposes until approved by the Owner.
 1. The Owner will provide project personnel, including inspectors, to be available at the project site.
 2. Approval as a result of an inspection shall not be construed to be an approval of any violation of the provisions of the building code or of other ordinances of the California State Building Code or other regulations of Agencies having jurisdiction over this project, including plans and specifications. Inspections presuming to give authority to violate or cancel the provisions of code or contract documents shall not be valid.
 3. It shall be the duty of the contractor to cause the work to remain accessible and exposed for inspection purposes. Neither the Inspector, Trustees, nor Architect shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.
- B. Inspection Requests: It shall be the duty of Contractor to notify the Inspector that specific work is ready for inspection. The Owner requires that every request for inspection be filed at least two working days (48 hours) before such inspection is desired. Such requests shall be submitted in writing, using the inspection request form included at the end of this section.
- C. Approval Required: Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the Inspector. The Inspector, upon notification, shall make the requested inspections and shall either indicate in writing that a specific portion of the construction is satisfactory as completed, or shall notify the Contractor that same fails to comply with plans and specifications. Any portions which do not comply shall be corrected by the Contractor prior to the end of the workday, or a Deficiency Notice will be issued by the Inspector placing the Contractor on notice that the work does not conform to the requirements of the Contract Documents. Such portion of Work shall not be covered or concealed until authorized by the Inspector.
 1. There shall be a final inspection and approval of all buildings and structures when completed and ready for occupancy and use.
- D. Inspection Coordination: Contractor shall provide, on a weekly basis, an anticipated Inspection Requirements Schedule, coordinated with the three-week look ahead schedule. The Inspection Requirements Schedule shall show the anticipated inspection needs for the following three weeks

to facilitate appropriate campus coordination, as well as mobilization of required inspection staffing.

- E. Required Inspections: Reinforcing steel, structural framework or interior wall and/or ceiling support framing of any part of any building or structure shall not be covered or concealed without first obtaining the approval of the Inspector.
 - 1. Listed below are the minimum inspection requirements:
 - a. Foundation Inspection: To be made after excavations for footings are completed and all reinforcing steel is in place. For concrete foundations, all required forms shall be in place prior to inspection. All materials for foundation shall be on the project site, with the exception of ready-mixed concrete prepared at an off-site batch plant in accordance with the Project Specifications.
 - b. Concrete Slab or Under-floor Inspection: To be made after all in-slab or under-floor building service equipment, conduit, piping, accessories, and other ancillary equipment items are in place, but before any concrete is placed or floor sheathing installed (including subfloor).
 - c. Frame Inspection: To be made after all framing, fire blocking and bracing are in place and all pipes and vents are complete and the rough electrical, plumbing and heating wires, pipes and ducts are approved.
 - d. Mechanical, Electrical, and Plumbing Rough-In Inspection: To be made after all mechanical and electrical rough-in work is completed.
 - e. Lath or Gypsum Board Inspection: To be made after all lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.
 - f. Final Inspection: To be made when the building is completed and ready for occupancy.
 - g. Other Inspections: In addition to the inspections specified above, the inspector may make or require other inspections of any construction work to ascertain compliance with the provisions of the plans and specifications.
 - h. Reinspections: A reinspection fee may be assessed for each inspection or reinspection when such portion of work for which inspection is called is not complete, or when corrections called for are not made.
 - 2. The Contractor is responsible for reviewing all of the Contract Documents for any additional inspection requirements.

1.7 SUBMITTALS

- A. Reports:
 - 1. Where Trustees are responsible for service, independent testing agency shall submit certified reports electronically (or in writing if necessary), of each inspection, test, or similar service to University Representative and Architect.
 - 2. If Contractor is responsible for service, independent testing agency shall submit certified report electronically (or in writing if necessary) of each inspection, test, or similar service through Contractor for distribution as noted above.

3. Submit additional copies of each written report directly to governing authority when authority so directs.
- B. Report Data: Provide reports electronically of each inspection, test, or similar service including, but not limited to the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making inspection or test.
 6. Designation of Work and test method.
 7. Identification of Specification Section.
 8. Complete inspection or test data.
 9. Test results and interpretation of test results.
 10. Ambient conditions at time of sample taking and testing.
 11. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting.

1.8 REGULATORY REQUIREMENTS FOR TESTING AND INSPECTION

- A. Building Code Requirements: Comply with requirements for testing and inspections in the California Building Code (CBC), as interpreted by authorities having jurisdiction. Additional requirements for testing and inspection, as adopted by authorities having jurisdiction, shall be included in the Contract Sum and Contract Time.
- B. Requirements of Fire Regulations: Comply with testing and inspection requirements of the Fire Marshal having jurisdiction. All tests and inspections shall be included in Contract Sum and Contract Time.

1.9 CONTRACTOR'S QUALITY CONTROL

- A. Contractor's Quality Control: Contractor shall ensure that products, services, workmanship and site conditions comply with requirements of the Drawings and Specifications by coordinating, supervising, testing and inspecting the Work and by utilizing only suitably qualified personnel.
- B. Quality Requirements: Work shall be accomplished in accordance with quality requirements of the Drawings and Specifications, including, by reference, all Codes, laws, rules, regulations and standards. When no quality basis is prescribed, the quality shall be in accordance with the best accepted practices of the construction industry for the locale of the Project, for projects of this type.
- C. Quality Control Personnel: Contractor shall employ and assign knowledgeable and skilled personnel as necessary to perform quality control functions to ensure that the Work is provided as required.

- D. Coordination of Field Quality Control: Contractor shall coordinate and schedule field quality control activities of University's independent testing and inspection agency and inspectors from authorities having jurisdiction.

1.10 QUALITY OF THE WORK

- A. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects and fit for the intended use.
- B. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements.
- C. Protection of Existing and Completed Work: Take all measures necessary to preserve and protect existing and completed Work free from damage, deterioration, soiling and staining, until Acceptance by the University.
- D. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.
- E. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviations are acceptable and appropriate for the Project.
- F. Verification of Quality: Work shall be subject to verification of quality by University or Architect in accordance with provisions of the Contract General Conditions.
 - 1. Contractor shall cooperate by making Work available for inspections and observations by University's Representative, Architect and their consultants.
 - 2. Such verification may include mill, plant, shop, or field inspection, as required.
 - 3. Provide access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated.
 - 4. Provide all information and assistance as necessary, including that from subcontractors, fabricators, materials suppliers and manufacturers, for verification of quality by University's Representative or Architect.
 - 5. Contract modifications, if any, resulting from such verification activities shall be governed by applicable provisions in the Contract General Conditions.
- G. Observations by Architect and Architect's Consultants: Periodic and occasional observations of Work in progress will be made by Architect and Architect's consultants as deemed necessary to review progress of Work and general conformance with the design intent.
- H. Limitations on Inspection, Test and Observations: Employment of an independent testing and inspection agency and observations by Architect and Architect's consultants shall not relieve Contractor of the obligation to perform Work in full conformance to all requirements of Contract Documents and applicable Building Code and other regulatory requirements.

- I. Rejection of Work: The University reserves the right to reject any and all Work not in conformance to the requirements of the Contract Documents.
- J. Correction of Non-Conforming Work: Non conforming Work shall be modified, replaced, repaired or redone by the Contractor at no change in Contract Sum or Contract Time.
- K. Acceptance of Non-Conforming Work: Acceptance of non conforming Work, without specific written acknowledgement and approval of the University's Representative, shall not relieve the Contractor of the obligation to correct such Work.
- L. Contract Adjustment for Non-conforming Work: Should University's Representative determine that it is not feasible or not in University's interest to require non-conforming Work to be repaired or replaced, an equitable reduction in Contract Sum shall be made by agreement between University's Representative and Contractor. If an equitable amount cannot be agreed upon, a Field Instruction will be issued and the amount in dispute resolved in accordance with applicable provisions of the Contract General Conditions.
- M. Non-Responsibility for Non-Conforming Work: Architect and Architect's consultants disclaim any and all responsibility for Work produced that is not in conformance with the Contract Drawings and Contract Specifications.

1.11 INSPECTIONS AND TESTS BY AUTHORITIES HAVING JURISDICTION

- A. Inspections and Tests by Authorities Having Jurisdiction: Contractor shall cause all tests and inspections required by authorities having jurisdiction to be made for Work under this Contract.
 - 1. Except as specifically noted, scheduling, coordinating and conducting such inspections and tests shall be solely the Contractor's responsibility.
 - 2. All time required for inspections and tests by authorities having jurisdiction shall be included in the Contract Time.
 - 3. Costs for inspections and tests by authorities having jurisdiction will be paid by University.

1.12 INSPECTIONS AND TESTS BY SERVING UTILITIES

- A. Inspections and Tests by Serving Utilities: Contractor shall cause all tests and inspections required by serving utilities to be made for Work under the Contract.
 - 1. Except as specifically noted, scheduling, coordinating and conducting such inspections and tests shall be solely the Contractor's responsibility. All time required for inspections and tests by serving utilities shall be included in the Contract Time.
 - 2. Except as specifically noted, all costs for inspections and tests by serving utilities shall be included in the Contract Sum.

1.13 INSPECTIONS AND TESTS BY MANUFACTURER'S REPRESENTATIVES

- A. Inspections and Tests by Manufacturer's Representatives: Contractor shall cause all specified tests and inspections to be conducted by materials or systems manufacturers. Additionally, all tests and inspections required by materials or systems manufacturers as conditions of warranty or certification of Work shall be made, the cost of which shall be included in the Contract Sum.

1. Scheduling, coordinating and conducting such inspections and tests shall be solely the Contractor's responsibility. All time required for inspections and tests by manufacturer's representatives shall be included in the Contract Time.
2. All costs for inspections and tests by manufacturer's representatives shall be included in the Contract Sum.

1.14 INSPECTIONS BY INDEPENDENT TESTING AND INSPECTION AGENCY

- A. Inspections by independent Testing Laboratory: Refer to Section 01 45 29 - Testing Laboratory Services.

PART 2 - PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

Not applicable to this Section.

END OF SECTION

SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Administrative and procedural requirements for quality control services.
 - 1. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, and governing authorities. They do not include Contract enforcement activities performed by the Trustees or Architect.
 - 2. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.

1.3 RELATED SECTIONS

- A. Section 01 45 00 - Quality Control: General requirements for inspections and tests.
- B. Individual Product Specifications Sections: Specific requirements for inspections and tests.

1.4 RESPONSIBILITIES

- A. Testing Laboratory: Trustees will engage and pay for the services of an independent agency to perform inspections and tests specified as the Trustees' responsibility.
 - 1. Where the Trustees have engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Trustees, unless otherwise agreed in writing with the Trustees.
- B. Retesting: The Contractor is responsible for the cost of retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
 - 1. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
- C. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested.

- D. Coordination: The Contractor, the Trustees, Inspector, and each agency engaged to perform inspections, testing and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
1. The Contractor is responsible for communicating to the Inspector the scheduling times for inspections, tests, taking samples and similar activities.
- E. Payment for Testing Laboratory Services:
1. Unless otherwise specified, Trustees will pay for tests and inspections performed by Testing Laboratory, as specified in individual product Sections of the Specifications. Overtime costs due to scheduling for the convenience of the Contractor or to make up for Work behind schedule shall be deducted by Change Order from Contract Sum.
 2. When tests and inspections are required on an overtime basis, initial payment will be made by the Trustees. All costs for overtime testing and inspections shall be paid for by the Contractor and deducted by Change Order from the Contract Sum.
 3. Unless otherwise specified, Contractor shall be back-charged for mileage and travel time for inspection services requiring more than fifty (50) miles from Project site to test products purchased by Contractor.
 - a. Testing laboratory shall forward all billings and records of such costs to University's Representative for approval.
 - b. Such costs, if determined by University's Representative to be attributable to the Contractor under this provision, shall be deducted by Change Order from Contract Sum.
 4. Contractor shall pay all costs for repeated observations, reinspection or retesting by Testing Laboratory due to non-conforming Work. Costs shall be deducted by Change Order from Contract Sum.
 5. Additional Tests, Inspections and Related Services: Contractor shall be charged costs for additional tests, inspections and related services, due to the following. Such costs shall be deducted by Change Order from Contract Sum.
 - a. Work is not ready to inspect when inspectors arrive.
 - b. Failure to properly schedule or notify testing and inspection agency or authorities having jurisdiction.
 - c. Changes in sources, lots or suppliers of products after original tests or inspections.
 - d. Changes in means methods, techniques, sequences and procedures of construction that necessitate additional testing, inspection and related services.
 - e. Changes in mix designs for concrete and mortar after review and acceptance of submitted mix design.
 - f. Multiple off-site fabrication sites.
 - g. Fabrication and installation errors.
 - h. Inefficient, sporadic, or poorly organized manufacturing that causes additional testing costs to be incurred.

- F. Segregation in Billing of Overtime Services: Billings for overtime services shall have straight time and overtime costs segregated and shall have substantiation by detailed explanations justifying necessity of services on overtime basis.
- G. Obligation to Perform Work According to Contract Documents: Employment of Testing Laboratory shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents and applicable Codes.
- H. Limits on Testing Laboratory's Authority:
 - 1. Testing Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Testing Laboratory may not approve or accept any portion of the Work.
 - 3. Testing Laboratory may not assume any duties of Contractor.
 - 4. Testing Laboratory shall have no authority to stop Work.
- I. Contractor's Responsibilities to Testing Laboratory: Contractor shall make the Work in all stages of progress available for personal and continuous observation by the Testing Laboratory.
 - 1. Testing Laboratory shall have free access to any and all parts of the Work at all times.
 - 2. Contractor shall provide the Testing Laboratory with reasonable facilities for Testing Laboratory to obtain such information as Testing Laboratory determines is necessary for Testing Laboratory to be kept fully informed of the progress and manner of performance of the Work and character of products, according to Testing Laboratory's duties and responsibilities.
 - 3. Observation and inspection of the Work by Testing Laboratory shall not relieve Contractor from any obligation to fulfill the requirements of the Contract.
- J. Retesting: When materials tested fail to meet requirements herein specified, they shall be promptly corrected or removed and replaced and retested in a manner required by University's Representative. Costs involved in retesting shall be deducted by Change Order from Contract Sum.

1.5 TESTS AND INSPECTIONS

- A. Tests and Inspections, General: All construction work shall be subject to inspection by the Trustees and the Architect, and all such construction or work shall remain accessible and exposed for inspection purposes until approved by the Trustees.
 - 1. The Trustees will provide project personnel, including inspectors, to be available at the project site.
 - 2. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of the building code or of other ordinances of the jurisdiction, including plans and specifications. Inspections presuming to give authority to violate or cancel the provisions of code, or of plans and specifications shall not be valid.

3. It shall be the duty of the contractor to cause the work to remain accessible and exposed for inspection purposes. Neither the Inspector nor the Trustees or Architect shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.
- B. Inspection Requests: It shall be the duty of the Contractor doing the work to notify the Inspector that such work is ready for inspection. The Trustees require that such work is ready for inspection. The Trustees require that every request for inspection be filed at least two working days before such inspection is desired. Such requests shall be in writing.
- C. Approval Required: Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the Inspector. The Inspector, upon notification, shall make the requested inspections and shall either indicate in writing that portion of the construction is satisfactory as completed, or shall notify the Contractor that same fails to comply with plans and specifications. Any portions of Work that do not comply shall be corrected by the Contractor, and such portion shall not be covered or concealed until authorized by the Inspector.
 1. There shall be a final inspection and approval of all buildings and structures when completed and ready for occupancy and use.
- D. Inspection Coordination: Contractor shall provide, on a weekly basis, an anticipated Inspection Requirements Schedule, coordinated with the three-week look ahead schedule, showing the anticipated inspection needs for the following three weeks to facilitate appropriate campus coordination and interface as well as mobilization of required inspection staffing.
- E. Required Inspections: Reinforcing steel, structural framework, footings, underground utilities, or interior wall and/or ceiling support framing of any part of any building or structure shall not be covered or concealed without first obtaining the approval of the Inspector.
 1. Listed below are the minimum inspection requirements:
 - a. Frame Inspection: To be made after all framing, fire blocking and bracing are in place and all pipes and vents are complete and the rough electrical, plumbing and heating wires, pipes and ducts are approved.
 - b. Mechanical, Electrical, and Plumbing Rough-In Inspection: To be made after all mechanical and electrical rough-in work is completed.
 - c. Lath or Gypsum Board Inspection: To be made after all lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.
 - d. Final Inspection: To be made when the building is completed and ready for occupancy.
 - e. Other Inspections: In addition to the called inspections specified above, the inspector may make or require other inspections of any construction work to ascertain compliance with the provisions of the plans and specifications.
 - f. Re-inspections: A re-inspection fee may be assessed for each inspection or re-inspection when such portion of work for which inspection is called for but is not complete or when corrections called for are not made.
 - g. Footings: to be inspected 1) after forms are completed, 2) after reinforcement is completed, and 3) during concrete placement, and 4) after forms are removed and prior to placement of soil/fill.

- h. Underground utilities: To be inspected 1) prior to install after trench/excavation is prepared for installation, 2) after installation is complete, 3) during any leak testing, 4) and prior to backfill.
 - i. Rebar: to be inspected after installation and prior to concrete pour.
- 2. The Contractor shall be responsible for reviewing all of the Contract Documents for any additional inspection requirements.

1.6 SUBMITTALS

- A. Reports: Trustees' independent testing agency shall submit a certified electronic report of each inspection, test or similar service, to the Architect, the Trustees, the Contractor, and the Inspector.
- B. Report Data: Electronically distributed reports of each inspection test or similar service shall include, but not be limited to:
 - Date of issue
 - Project title and number
 - Name, address and telephone number of testing agency
 - Dates and locations of samples and tests or inspections
 - Names of individuals making the inspection or test
 - Designation of the Work and test method
 - Identification of product and Specification Section
 - Complete inspection or test data
 - Test results and an interpretation of test results
 - Ambient conditions at the time of sample-taking and testing
 - Comments or professional opinion as to whether inspected or tested
 - Work complies with Contract Document requirements
 - Name and signature of laboratory inspector
 - Recommendations on retesting.

1.7 SCHEDULES FOR TESTING

- A. Testing and Inspection Schedule: After discussion with University's Representative and Testing Laboratory in advance of performance of testing and inspection services, Contractor shall determine dates and times necessary for Testing Laboratory to schedule performance of required tests and inspections and determine due dates for issuance of reports.
 - 1. Integrate Testing and Inspection Schedule with Construction Schedule requirements specified in the Contract general Conditions.
 - 2. Determine and indicate in Testing and Inspection Schedule necessary time for preparation and submission of reports of tests and inspections.
- B. Revising Testing and Inspection Schedule: When changes of the construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

- C. Adherence to Testing and Inspection Schedule: When the Testing Laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributed to the delay may be back charged to the Contractor and shall not be borne by the University.

1.8 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor's Responsibilities for Inspections and Tests:
 - 1. Notify Project Inspector and Testing Laboratory two working days in advance of expected time for operations requiring inspection and testing services.
 - 2. Deliver to Testing Laboratory or designated location, adequate samples of materials proposed to be used which require advance testing, together with proposed mix designs.
 - 3. Cooperate with University's Representative, Testing Laboratory, Project Inspector, Architect, Architect's consultants and other responsible design professionals. Provide access to Work areas and off-site fabrication and assembly locations, including during weekends and after normal work hours.
 - 4. Provide incidental labor and facilities to provide safe access to Work to be inspected and tested, to obtain and handle samples at the Work site or at source of products to be tested, and to store and cure test samples.
 - 5. Provide at least 15 days in advance of first inspection or test of each type, a schedule of tests or inspections indicating types of tests or inspections and their scheduled dates.
 - 6. Provide two working days notice to University's Representative, Architect and, as applicable, responsible design consultant, of each test and inspection.

1.9 INSPECTIONS TESTS BY OTHERS

- A. Inspections by Others: Refer to Section 01 45 00 - Quality Control for requirements regarding observations and inspections by University's Representative, Architect and Project Inspector.
- B. Tests by Others: Refer to Section 01 45 00 - Quality Control and individual product Specifications Sections for requirements regarding tests and inspections by product manufacturers and others, including serving utilities.

PART 2 - PRODUCTS

Not applicable to this section.

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. Repair and Protection: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document 01 73 29 requirements for "Cutting and Patching."

1. Protect construction exposed by or for quality control service activities, and protect repaired construction.
2. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION

SECTION 01 51 00
TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Temporary utilities and services, including:
 - 1. Heating and cooling during construction
 - 2. Ventilation during construction
 - 3. Temporary water service
 - 4. Temporary sanitary facilities
 - 5. Temporary power and lighting
 - 6. Construction telephone service.
- B. Removal of temporary utilities.

1.3 RELATED SECTIONS

- A. Section 01 11 00 Summary of the Work: Contractor's use of site and premises.

1.4 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, applicable meter readings and similar procedures performed on temporary utilities.

1.5 TEMPORARY UTILITIES AND SERVICES

- A. Temporary Utilities and Services, General: All utilities and other services necessary for proper performance of the Work shall be provided by Contractor, unless specifically noted otherwise. Refer to Contract General Conditions. Temporary utilities and services shall conform to all applicable requirements of authorities having jurisdiction and serving utility companies and agencies, including the following:
 - 1. Requirements of authorities having jurisdiction, including:
 - a. Cal OSHA
 - b. California Building Code (CBC) requirements
 - c. Health and safety regulations
 - d. Utility agency and company regulations
 - e. Police, Fire Department and Rescue Squad rules

- f. Environmental protection regulations
- 2. Standards:
 - a. NFPA Document 241 - Building Construction and Demolition Activities.
 - b. ANSI A10 Series - Safety Requirements for Construction and Demolition.
 - c. NECA Electrical Design Library - Temporary Electrical Facilities.
 - d. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with California Electrical Code (CEC).
- B. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
- C. Temporary Connections and Fees: Contractor shall arrange for services and pay all fees and service charges for temporary power, water, sewer, gas and other utility services necessary for the Work.
 - 1. Contractor shall apply for and obtain permits for temporary utilities, including permits for temporary generators, from authorities having jurisdiction.
 - 2. All costs for temporary connections, including fees charged by serving utilities, shall be included in Contract Sum.
- D. Permanent Connections and Fees: Contractor shall arrange for utility agencies and companies to make permanent connections. University will arrange for permanent utility account and pay permanent connection fees. After Contract Completion review and determination that Work is acceptable, University will pay utility service charges for services delivered through permanent connections, for normal quantities.
- E. Use of Temporary Utilities: Enforce strict discipline in use of temporary utilities to conserve on consumption. Limit use of temporary utilities to essential and intended uses to minimize waste and abuse.

1.6 PROJECT CONDITIONS

- A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the site.
- B. Contractor shall be responsible for building and work area security to all areas of work where Contractor or its subcontractors enter and perform work.

1.7 HEATING AND COOLING

- A. Temporary Heating and Cooling: Provide and pay for temporary heating and cooling devices, fuel and related service charges to provide ambient temperatures as required to maintain conditions necessary for proper performance of construction activities.
- B. Use of Permanent Heating and Cooling Systems: Permanent heating and cooling equipment may be used after completion, testing and inspection of systems and approval of code authorities having jurisdiction.

1. Prior to operation of permanent heating equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place.
 2. Contractor shall provide and pay for operation, maintenance and regular replacement of filters and worn or consumed parts.
 3. Immediately prior to Contract Completion review, change disposable filters and clean permanent filters of equipment used during construction.
- C. Temperature Criteria: Maintain interior ambient temperature of minimum 50 degrees F and maximum 80 degrees F, unless otherwise specified or approved by University's Representative.

1.8 VENTILATION DURING CONSTRUCTION

- A. Ventilation During Construction: Contractor shall provide and pay for temporary ventilation devices, energy and related service charges.
- B. Use of Permanent Ventilation Systems: The University may use permanent ventilation equipment after completion, testing and inspection of systems and approval by University's Representative and authorities having jurisdiction.
1. Prior to operation of permanent ventilation equipment for ventilation purposes during construction, Contractor shall verify that equipment is lubricated and filters are in place.
 2. Contractor shall provide and pay for maintenance and regular replacement of filters and worn or consumed parts of permanent ventilation system using for ventilation during construction.
 3. Immediately prior to Contract Completion review, Contractor shall change disposable filters and clean permanent filters of equipment used during construction.
- C. Ventilation Criteria: Ventilate enclosed areas to assist cure of materials, to dissipate humidity and to prevent accumulation of dust, fumes, vapors and gases, as necessary for proper performance of the Work.

1.9 TEMPORARY WATER SERVICE

- A. Temporary Water Service: Contractor shall locate and connect to existing water source for temporary construction water service. Contractor shall comply with the following:
1. Locate and connect to existing water source for temporary construction water service, as acceptable to University's Representative.
 2. Extend branch piping with outlets located, so that water is available by use of hoses.
 3. Temporary water service piping, valves, fittings and meters shall comply with requirements of the serving water utility and California Plumbing Code (CPC).
 4. All costs to establish temporary construction water system shall be included in the Contract Sum, or if so specified, costs shall be paid from Contractor's General Conditions, Allowances, or Contingency.

- B. Use of Permanent Water System: Permanent water system may be used for construction water after completion, sterilization, testing and inspection of system and approval by University's Representative and authorities having jurisdiction.

1.10 TEMPORARY SANITARY FACILITIES

- A. Temporary Sanitary Facilities: Provide and maintain adequate temporary sanitary facilities and enclosures for use by construction personnel.
 - 1. Number of temporary toilets shall be suitable for number of workers.
 - 2. Provide wash-up sink with soap, towels and waste disposal.
- B. Use of Permanent Sanitary Facilities: Do not use permanent sanitary facilities unless approved by University's Representative. Immediately prior to Contract Completion review, thoroughly clean and sanitize permanent sanitary facilities used during construction.

1.11 TEMPORARY POWER AND LIGHTING

- A. Temporary Power and Lighting, General: Comply with NECA Electrical Design Library - Temporary Electrical Facilities.
- B. Temporary Power: Provide electric service as required for construction operations, with branch wiring and distribution boxes located to provide electrical service for performance of the Work.
 - 1. Provide temporary electric feeder connected to electric utility service at location determined by Contractor and as approved by serving electric utility and/or University.
 - 2. Temporary power conduit, raceways, fittings, conductors, panels, connections, disconnects, overcurrent protection, outlets and meters shall comply with requirements of the serving electric utility, California Electrical Code (CEC) and requirements of authorities having jurisdiction.
 - 3. Contractor shall pay all costs to establish temporary electric service, or if so specified, costs of temporary power shall be paid from Contractor's General Conditions, Allowances, or Contingency.
 - 4. As necessary in order to maintain construction progress, Contractor shall provide and pay all costs associated with generators used for temporary power.
- C. Temporary Lighting: Provide temporary lighting as necessary for proper performance of construction activities and for inspection of the Work.
 - 1. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
 - 2. Maintain lighting and provide routine repairs.
- D. Protection: Provide weatherproof enclosures for power and lighting components as necessary. Provide overcurrent and ground-fault circuit protection, branch wiring and distribution boxes located to allow convenient and safe service throughout the project site. Provide flexible power cords as required.

- E. Use of Permanent Power and Lighting Systems: Permanent power and lighting systems may be used after completion, testing and inspection of systems and approval by University's Representative and authorities having jurisdiction.
 - 1. Contractor shall maintain lighting and make routine repairs and replacements as necessary.
 - 2. After beneficial use of the facilities has been received, University will pay for reasonable amounts of electricity consumed after permanent power system is operational and approved by authorities having jurisdiction. University shall not pay for the cost of wasted electricity, for example, lighting beyond hours of construction.
- F. Service Disruptions: When necessary for energizing and de-energizing temporary electric power systems, minimize disruption of service to those served by public mains. Schedule transfers at times convenient to University and to occupants.
- G. Relamping: For permanent lighting used during construction, relamp all fixtures immediately prior to Contract Completion (punch list) review.

1.12 CONSTRUCTION TELEPHONE SERVICE

- A. Construction Telephone Service: Contractor shall provide telephone service to Contractor's field staff by means of cellular telephone or other methods to enable communications between University's Representative, Project Inspector, and Contractor.
 - 1. Include voice message services.
 - 2. All costs of construction telephones shall be included in Contract Sum.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials: Contractor shall provide new materials. If acceptable to the University Representative, undamaged previously used materials in serviceable condition may be used. Provide materials that are suitable for the use intended. Their use and methods of installation shall not create unsafe conditions or violate requirements of applicable codes and standards.
- B. Equipment: Contractor shall provide new equipment; or, if acceptable to the Trustees, Contractor may provide undamaged, previously used equipment in serviceable condition. Provide equipment that is suitable for use intended.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES INSTALLATION

- A. Temporary Utilities Installation, General: Contractor shall engage the appropriate local utility company or personnel to install temporary service or connect to existing service.
 - 1. Use Charges: Cost or use charges for temporary facilities are the Contractor's responsibility.

2. Allowance for Utilities Charges: When Contract includes an allowance for metering of utility services, whether through temporary or permanent facilities, unused amount shall be returned to the Trustees by deductive change order.
- B. Water Service: Contractor may take water from the University's systems in such quantities and at such times as they are available. If this is done, Contractor shall provide all temporary materials necessary to extending the utility to where they will be used. Contractor shall install a meter and reimburse the University for any water used. Where sub-metering is not possible or practical, a flat fee may be established and paid to the University.
- C. Temporary Electric Power Service: If approved, the contractor may take electricity from the University's system if available. If this is done, Contractor shall provide all equipment, including connections, and other materials necessary for extending the utility lines to where they will be used. Contractor shall coordinate the installation with the University's Representative. Contractor shall install a meter and reimburse the University for any power used. Where sub-metering is not possible or practical, a flat fee may be established and paid to the University.
1. When not available from the University, the Contractor must arrange and pay for electric service through the local utility or furnish his own portable power.
 2. All permanent power used by the Contractor prior to Occupancy by the Trustees shall be metered and paid for by the Contractor.
 3. Install electrical power service underground, except where overhead service must be used.
 4. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics throughout construction period. As required, the system shall include, but not be limited to, the following: meters, transformers, overload protection disconnects, automatic ground fault interrupters, main distribution switchgear, distribution panels, etc.
 5. Install and operate temporary lighting as required for proper security and protection. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- D. Temporary Telephones: Contractor shall have telephone service available at its business office for the duration of contract where the Contractor and its superintendent may be contacted.
- E. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, Contractor shall install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Contractor shall comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations." Contractor shall:
1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.

4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
- F. Maintenance of Temporary Utilities and Services: Contractor shall maintain temporary utilities and services in good operating condition until removal. Contractor shall protect utilities and services from environmental and physical damage.
- G. Work outside defined construction site: Comply with Section 01 55 00, Vehicular and Pedestrian Controls for requirements for all work that impacts areas outside of the Construction site perimeter as defined in the contract documents. This includes ingress and egress to the site by construction personnel and vehicles.
- H. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site

3.2 TERMINATION AND REMOVAL OF TEMPORARY UTILITIES AND SERVICES

- A. Termination and Removal of Temporary Utilities and Services: Unless the Trustees require that it be maintained longer, Contractor shall remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than final Completion. Contractor shall complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. At final Completion, Contractor shall clean and renovate permanent facilities that have been used during the construction period.
- B. Removal of Temporary Underground Utilities and Restoration: Remove temporary underground utility installations to a minimum depth of two-feet below utility services. Contractor shall:
 1. Backfill, compact and re-grade site as necessary to restore areas or to prepare for indicated paving and landscaping.
 2. Restore paving damaged by temporary utilities. Refer to requirements specified in Section 01 73 29 - Cutting and Patching Requirements.
- C. Cleaning and Repairs: Contractor shall clean exposed surfaces and repair damage caused by installation and use of temporary utilities and services. Where determined by University's Representative that repair of damage is unsatisfactory Work, Contractor shall replace construction with matching finishes. Refer to requirements specified in Section 01 73 29 - Cutting and Patching Requirements.

END OF SECTION

SECTION 01 52 00
CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section specifies requirements for temporary services and facilities, including utilities, temporary construction fencing, construction and support facilities, security and protection. Refer to section 01 51 00 for additional information regarding temporary utilities.
- B. Temporary utilities that are required include but are not limited to:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Telephone service.
 - 4. Data services.
- C. Temporary construction and support facilities that are required include but are not limited to:
 - 1. Temporary heat
 - 2. Field offices and storage sheds
 - 3. Temporary enclosures
 - 4. Hoists and temporary elevator use
 - 5. Waste disposal services
 - 6. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities that are required include but are not limited to:
 - 1. Temporary fire protection
 - 2. Barricades, warning signs, lights
 - 3. Environmental protection.
 - 4. Site security for theft.

1.3 ACTION SUBMITTALS

- A. Layout of Field Offices and Sheds: Within five working days of the Notice-to-Proceed, Contractor shall submit to University's Representative a proposed layout for field offices, sheds and storage areas. University's Representative will review and respond within five working days with comments and directions. Contractor shall comply with directions of University's Representative.

- B. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.4 INFORMATIONAL SUBMITTALS

- A. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of Section 01 57 23, Storm Water Pollution Prevention.
- B. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.
- D. Temporary Utilities: Submit reports of tests, inspections, applicable meter readings and similar procedures performed on temporary utilities.

1.5 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of the authorities having jurisdiction, including but not limited to:
 - 1. Cal OSHA
 - 2. Building Code requirements
 - 3. Health and safety regulations
 - 4. Utility company regulations
 - 5. Police, Fire Department and Rescue Squad rules
 - 6. Environmental protection regulations.

- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library, "Temporary Electrical Facilities".
 - 1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.
 - 2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the site.
- B. Contractor shall be responsible for building and individual room security to all areas of work where Contractor or its subcontractors enter and perform work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials; if acceptable to the University Representative, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended. Their use and methods of installation shall not create unsafe conditions or violate requirements of applicable codes and standards.
- B. Temporary Construction Perimeter Fence - Provide 11-gauge, galvanized 2 inch, chain link fabric fencing 6-feet high with galvanized steel pipe posts, 1-1/2" I.D. for line posts, top posts and bottom posts, and 2-1/2" I.D. for corner posts. All fencing shall be covered with green fabric shade cloth, secured to top and bottom rails through integral metal eyelets. Contractor is responsible to maintain the fence and green shade through the entire duration of the contract. It is the contractor's responsibility to coordinate and relocate the fence as required for construction.
- C. All work areas within the campus and public spaces shall be fenced with minimum 6-feet chain link portable fence sections, with 1-1/2" top, bottom and side rails. All fencing shall be covered with green fabric shade cloth material, secured to top, bottom and side rails with integral metal eyelets. Shade cloth shall not be left unsecured. Fencing materials shall be maintained in good, damage free condition at all times.
 - 1. Fencing shall extend around and enclose entire work area, as well as stored materials and equipment.
 - 2. Fencing shall be secured in a closed condition when not required to be open to allow completion of the work. Fencing shall be secured each day at the close of work.

3. The use of alternate materials such as barricades, delineators and caution tape to enclose or delineate work areas will not be accepted.
4. 3 sand bags shall be placed on every stand. Contractor shall replace sand bags whenever a sand bag ruptures.
5. Contractor can tie-back fencing to fixed stakes as required in lieu of sand bags. Tie backs shall not be trip hazards.
6. Plastic water filled K-rail can be used in lieu of fencing when approved in advance by the University.

2.2 EQUIPMENT

- A. General: Provide new equipment; or, if acceptable to the University, Contractor may provide undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. First Aid Supplies: Comply with governing regulations.
- C. Fire Extinguishers: Provide 2 hand carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
- D. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.
- E. Temporary lighting: Provide adequate illumination to all areas of the project as required for ingress, egress, and prosecution of the Work. Provide cages where fixtures are exposed to potential breakage.

2.3 TEMPORARY FIELD OFFICE FOR OWNER'S USE (NOT APPLICABLE)

- A. If requested by the University, Contractor to provide a trailer, construct a separate field office building, or use existing buildings if so designated on the Contract Documents, for the exclusive use of the Owner's Representatives fully equipped and ready for use within fourteen (14) days of the Notice-to-Proceed. The field office, if a trailer, and its appurtenances or accessories shall remain the property of the Contractor.
- B. Building shall be of weather tight construction and contain a minimum of [Campus shall specify size requirements] 600 square feet, (12ft. x 50ft.), of floor space. Provide 8-foot minimum ceiling height. Provide two separate offices (minimum 120 square feet), a workroom/meeting room (minimum 240 square feet), and toilet/washroom. Provide restroom inside the building with necessary sewer and water connections for exclusive use of the University. If no sewer connection is available the contractor shall provide a sewage holding tank; and include weekly disposal services. Provide floor-to-ceiling walls to separate the rooms; do not use temporary partitions. Provide interconnecting floors. Provide stairs as required for each door entrance.
- C. Provide at least six windows with security bars in the building, with at least one window for each room. Provide blinds for windows. Provide two entrance doors to the building, one at each end. Provide cylinder lock, and dead bolt and key on each door. Provide six sets of keys to the Project Manager and/or Construction Inspector.

- D. Line walls and ceiling with insulation.
- E. Provide heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 degrees F
- F. Provide warm white fluorescent light fixtures to evenly illuminate the rooms to a minimum of 50 foot-candles and an average of 70 foot-candles measured at desk height. Provide a minimum 60-watt or equivalent light fixture in the lavatory facility. Provide light switch in each room.
- G. Provide two duplex 120-volt outlets in each room (one only in restroom).
- H. Provide hot water and cold water, electricity, telephone service with two voice lines and a dedicated fax line. Provide at least one cordless telephone in each office, and an answering machine. Provide bottled drinking water service with hot and cold dispenser.
- I. Contractor shall pay all costs, including but not limited to, trailer rental, electrical service including installation, pole rental, conductor placement/rental, electrical meters, etc., through the duration of the project
- J. Contractor shall pay telephone installation cost (including pole rental, etc.) and monthly service charge for all phone/data lines. The Contractor shall pay for all telephone calls, including local and long distance charges, taxes and all other fees charged by the phone company. The Contractor shall provide two land-lines, one dedicated fax line, and Nextel cellular and Nextel radio service with (707) area code phone numbers or equivalent.
- K. Provide and install data wiring (CAT6) in the University Trailer as required for both office computers and printers. Contractor shall be required to install a temporary 6sm/6mm fiber optic cable from a location as directed by the University to the Construction Site Trailer for data services, including temporary utility pole rental, patch panels installation, fiber termination, and routing equipment as required to connect the University Trailer to the University Network. Alternatively, provide broadband DSL or cable modem service for the University Trailer (University's choice). For either case, the Contractor is responsible to provide and install routers, cables, software, etc., to provide broadband Internet connections for the computers in the University's Trailer. The Contractor is responsible for all setup charges and monthly service charges payable to third-party broadband service provider (DSL or cable modem), necessary to provide unlimited broadband Internet access to the University's trailer (there is no charge for access to the University network by the University' trailer).

2.4 ACCESSORY EQUIPMENT (All equipment indicated below shall be provided by the Contractor).

- A. For each office:
 - 1. One 3' x 6' desk with drawers and locks
 - 2. One cushioned office swivel chair for desk
 - 3. Eight cushioned chairs for visitors
 - 4. One metal filing cabinet, 18"W x 30"D x 52"H, four drawers with locks
 - 5. One bookcase, 12"D x 48"L, with one 12-inch-high shelf and one 18-inch-high shelf
 - 6. One waste basket
 - 7. One recycling basket
 - 8. One 36" plan rack, with six 36" metal stick files.

9. Two wall mounted marker boards, 4'X4' minimum, with all four markers (each color, red, green, blue, black).
- B. For the workroom:
 1. Two 4' x 8' flat tables with four cushioned chairs each.
 2. Two wastebaskets
 3. One plan rack, with five metal stick files
 4. One wall-mounted marker board, 4' x 8', with four markers (each color, red, green, blue, and black).
 5. One wall-mounted corkboard for thumbtacks, 4' x 4' minimum.
 6. Plain paper, programmable high-speed fax with dedicated phone line.
- C. Business Machine for copying, scanning, and faxing: Contractor shall provide [Campus to designate copier equipment] capable of copying, scanning, faxing in color, for both 8.5" X 11" and 11" X 17", automatic document feeder, collating and stapling capabilities. Contractor to provide maintenance, paper, toner, and all required supplies to operate copy machine throughout the duration of the project. There can be no substitutions of this product as this product is the only certified copier for the University.
- D. Two cordless phones with answering machines or voice mail service.
- E. Provide small refrigerator no less than 2.5 cubic feet.
- F. Provide small emergency first aid kit.
- G. Provide all the above and all office supplies and stationery for University trailer, including, but not limited to, paper, pens, pencils, ink cartridges, laser printer cartridges file folders, binders, etc., for University use throughout the duration of the project at the Contractor expense.
- H. All equipment indicated above shall be new. The Contractor shall maintain or replace failed or malfunctioning equipment within 48-hours (24 hours for computer and printer – related hardware) as directed by the University, or the University reserve the right to lease/purchase replacement equipment at the Contractor's expense.

2.5 SERVICE CONTRACTS

- A. Provide weekly janitorial service to include trash removal, floor cleaning and dusting. In addition, the Contractor shall maintain the approach to the field office free from mud and water. Electrical service shall consist of a minimum of 4 circuit, 110 volt, 60-amp service.

2.6 PROJECT IDENTIFICATION

Reference section 01 58 00 for temporary project signage details

- A. List title of project, the name of the University, the Contractor, and Architectural/Engineering team, as well as a Contractor phone number that the community may call with noise complaints 24-hours a day seven days a week. University shall approve signs before installation.
- B. Erect signs on site at locations designated by the University. Install project identification signs within 5 days of Notice-To-Proceed.

- C. No other signs are allowed without University permission except those required by law.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 SANITARY FACILITIES

- A. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve project's needs.
 - 1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used materials.
 - 2. Contractor shall not use existing campus sanitary facilities at any time.

3.3 SUPPORT FACILITIES

- A. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not store materials more than seven days during normal weather or 3 days when temperature is expected to rise above 80 degrees F. Handle hazardous, dangerous or unsanitary waste by containerizing properly. Dispose of material lawfully.
 - 1. Furnish equipment necessary for refuse removal. Do not use University disposal bins or trash carts at any time.
- B. Retain local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ service to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

3.4 SECURITY

- A. Prior to commencement of the work, initiate a security program and install enclosure fence with lockable entrance gates. Location shall be sufficient to encompass the entire area of construction operation.
 - 1. Install and maintain substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.

2. University will not be liable for damage or loss to the Work due to trespass or theft. In addition, the University or University shall not be liable for loss or damage to Contractor's materials, tools, or equipment. The contractor is solely responsible for the security the contractor's work area.
- B. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

3.5 REMOVAL OF CONSTRUCTION FACILITIES

- A. Removal of Construction Facilities: Unless otherwise mutually agreed by University's Representative and Contractor, remove temporary materials, equipment, services, and construction prior to Contract Completion review.
 1. Coordinate removal with requirements specified in Section 01 51 00 - Temporary Utilities, Section 01 55 00 - Vehicular and Pedestrian Controls and Section 01 57 00 - Temporary Controls.
 2. Completely remove in-ground construction facilities to minimum depth of two feet. Backfill, compact and regrade site as necessary to restore areas or to prepare for indicated paving and landscaping.
- B. Cleaning and Repairs: Clean and repair all damage caused by installation or use of temporary construction facilities on public and private rights-of-way and University property.

END OF SECTION

SECTION 01 55 00
VEHICLE AND PEDESTRIAN CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Section specifies requirements for construction activities impacting the Campus Community outside the designated construction site, as well as requirements for Contractor ingress to and egress from the project site. Section includes, but is not limited to the following:
 - 1. Construction activities within or adjacent to pedestrian walkways and thoroughfares.
 - 2. Construction within landscape and hardscape areas outside the designated Project site area.
 - 3. Procedures for work within city streets and campus roads.
 - 4. Haul routes and temporary traffic Control.
 - 5. Contractor parking.

1.3 WORK WITHIN AREAS OF PEDESTRIAN ACCESS

- A. General: These requirements apply to all work required on the Campus outside the designated Project Site. Requirements also apply to activities occurring on the Project Site, which impact adjacent areas of the Campus.
- B. Fencing of Work Areas
 - 1. All work areas within the campus and public spaces shall be fenced with minimum 6-feet chain link portable fence sections, with 1-1/2" top, bottom and side rails. All fencing shall be covered with green fabric shade cloth material, secured to top, bottom and side rails with integral metal eyelets. Shade cloth shall not be left unsecured. Fencing materials shall be maintained in good, damage free condition at all times.
 - a. Fencing shall extend around and enclose entire work area, as well as stored materials and equipment.
 - b. Fencing shall be secured in a closed condition when not required to be open to allow completion of the work. Fencing shall be secured each day at the close of work.
 - c. The use of alternate materials such as barricades, delineators and caution tape to enclose or delineate work areas will not be accepted.
 - d. 3 sand bags shall be placed on every stand. Contractor shall replace sand bags whenever a sand bag ruptures.
 - e. Contractor can tie-back fencing to fixed stakes as required in lieu of sand bags. Tie backs shall not be trip hazards.

- f. Plastic water filled K-rail can be used in lieu of fencing when approved in advance by the University.

C. Sidewalk Closures and Restrictions

1. Use Cal-Trans Standard reflectorized signage where required to indicate closure of sidewalks, temporary revisions to crosswalks and other impacts to normal pedestrian walk routes.
2. Where sidewalks are partially restricted due to construction activities, a minimum width of 48" shall be maintained.
3. Bases for temporary fencing shall not extend into the required walk area.
4. Where portions of a sidewalk are temporarily closed, temporary fencing shall be placed at the nearest intersection to prevent the site impaired from traveling in a direction that will require them to eventually stop and return to said intersection. Pedestrian detour signs and "sidewalk closed" signs shall also be provided at the point of closure.

D. Access for construction equipment and material deliveries

1. All haul routes and delivery routes shall conform to the routes designated in Contractor's approved Work Plans. Refer to Section 01 14 00 for requirements.
2. Times for delivery of materials and hauling shall comply with the requirements of the Contract Documents and approved Contractor Work Plans.
3. No staging or parking of vehicles or construction equipment will be allowed outside the Project Site, except within the work areas designated in the approved Contractor Work Plans.
4. Flagman Requirements
 - a. All major vehicles and equipment using approved haul routes that travel over intercampus pedestrian thoroughfares shall be escorted by at least one flagman until the vehicle or equipment is within the confines of the project site. Contractor is advised that the Campus Community includes a large volume of students and staff with disabilities, including but not limited to wheel chair users, persons with hearing impairments, and persons with sight impairments; for this reason, escorting of equipment and vehicle traffic will be strictly enforced.
 - i. Flagman shall be trained and shall direct pedestrians and traffic in accordance with the requirements set forth in Article 1.4 below.
 - b. Entry exit gates to the project site shall be left in a closed position at all times, unless a flagman is stationed at the gate to control unauthorized entry into the project site.
5. Maintenance of Thoroughfares
 - a. Pedestrian thoroughfares and crossings shall be maintained in a safe, clean condition, free of dirt, gravel and other debris resulting from construction operations at all times.
 - b. Where work occurs on or adjacent to pedestrian thoroughfares, Contractor shall employ adequate measures (such as sandbagging, earthen barriers, etc.) to ensure that walks are protected from overflow of construction materials or runoff into the pedestrian area.

- c. Where work occurs on or adjacent to pedestrian thoroughfares, Contractor shall employ adequate measures to ensure that walks are protected from overhead hazards, such as falling debris. Provide covered walkway structures and other measures as required to comply with O.S.H.A. standards.
 - d. Contractor shall confirm local Fire Dept. requirements for access to the construction site and other Campus facilities impacted by the Work throughout the course of construction. Where Fire Dept. access must be maintained at specific areas, Contractor shall tailor the Work Plan and provide necessary temporary measures to accommodate requirement.
6. Trenching Operations
- a. Where trenching occurs through, across or adjacent to pedestrian thoroughfares, the work shall comply with the approved Work Plan for the area in question.
 - b. Temporary pedestrian crossings required due to trenching operations:
 - i. Steel plating shall be placed across trenches and trench bracing shall be installed in accordance with W.A.T.C.H. standards as referenced in section 1.04 below.
 - ii. Minimum 6-feet high chain link fencing sections (per paragraph 1.2-B above) shall be installed inside the edge of the plating on each side to clearly delineate the path of travel and prevent pedestrians from stepping into trench area.
 - iii. All steel plating shall have beveled edges and shall comply with A.D.A. requirements for path of travel. Edges of plates at each approach shall be painted with a 1" safety yellow contrasting band. Plating shall be anchored in accordance with W.A.T.C.H. standards and carry appropriate traffic ratings where it is required to carry emergency response vehicle traffic.
 - iv. The use of barricades, delineators and or caution tape in lieu of the required temporary fencing sections is unacceptable.

1.4 WORK WITHIN ROADWAYS AND PARKING AREAS

A. General Requirements

- 1. All construction activities which occur within campus roadways and parking areas shall comply with the 2012 version of the City of Los Angeles Work Area Traffic Control Handbook (W.A.T.C.H.) for traffic control, signage and barricading, as supplemented by these specifications. Where conflicts exist between specific requirements, the more stringent requirement shall apply. W.A.T.C.H. standards are available from Building News Inc., 3055 Overland Ave., Los Angeles, Ca., 90034 - Phone: 310/202-7775.
- 2. Flagman requirements and operations shall comply with W.A.T.C.H. standards and the State of California, Dept. of Transportation "Instructions to Flaggers" - 2012 Edition.
- 3. Signage: All temporary traffic control signage shall comply with California Vehicle Code Section 21400 and California Dept. of Transportation (Cal-Trans) standards. All signage shall be reflectorized.
- 4. Where trenches, excavations or other work is required within streets, the Work shall be scheduled so as to maintain a minimum of one open traffic lane at all times. A minimum of

two lanes as required allowing safe 2-way traffic shall be restored prior to completion of Contractor's operations each day.

5. All work within University roadways and parking areas requires approval of Contractor's Work Plan prior to commencement. Refer to Section 01 14 00 for Work Restrictions.

B. Fencing, Barricades and Traffic Plating

1. All work areas shall be fenced in compliance with paragraph 1.3-B above. Modifications to this requirement due to specific access requirements for completion of the work shall be requested by Contractor in the Work Plan Submittal for a designated area.
2. Type I Barricades as referenced in the W.A.T.C.H. standards are not acceptable for use on the Project. Contractor shall use type II or type III barricades where required.
3. Where temporary traffic controls must remain in place overnight or at other times when Contractor is not continuously present in the work area, cones, plastic delineators and other lightweight traffic control devices subject to displacement shall not be used for traffic control.
4. Where temporary fencing and/or barricades remain in place overnight, Type II barricades with flashing amber lights shall be used to delineate the protruding corners of the of the work area enclosure at the approach from each direction.
5. Where trenches or excavations of a depth of 3'-0" or deeper and a width of 2'-0" or greater are directly adjacent to a drive lane, the trench shall be plated in accordance with W.A.T.C.H. standards, or concrete barricades (k-rail) shall be installed to protect vehicle traffic from entering the excavation during times when the work area is not manned by Contractor.
6. Where trenches or excavations of a depth of 4'-0" or greater are directly adjacent to a drive lane or pedestrian walk, the protective fencing shall be a minimum horizontal distance of 4'-0" from the edge of the excavation.
7. All traffic plates shall be beveled in the direction of vehicle traffic and secured in place. Where work occurs at pedestrian crossings, comply with Article 1.3 above.
8. Comply with W.A.T.C.H. standards for sizing of traffic plates and shoring of trenches up to 4' in width. For trenches exceeding 4' in width, Contractor shall engage a Civil Engineer registered in the State of California to design plating and shoring system.

C. Flagman Requirements

1. Whenever existing traffic lanes are altered, contractor shall provide properly equipped and trained flagmen to direct traffic. Comply with W.A.T.C.H. standards and Cal-Trans "Instructions to Flaggers".
2. Whenever a section of two-way traffic is temporarily reduced to one lane, a minimum of two flagmen shall be provided to ensure proper traffic control in each direction. 2-way radio devices shall be used for communication between the flagmen where both direct line of site and audible communication cannot be maintained.
3. Flagmen shall be dedicated solely to traffic and pedestrian control and shall not perform additional duties while assigned as flagmen.

D. Signage

1. Traffic control signage shall be provided as required for safe and proper direction of vehicles and in accordance with the requirements listed in paragraph 1.4-A-3 above.
2. All signage shall be reflectorized.
3. Temporary traffic control signs shall be California Dept. of Transportation standard type as listed in the following schedule.

SIGN TYPE	DESIGNATION	SIZE
STOP	R1R	30 x 30
SPEED LIMIT	R2R	24 x 30
KEEP RIGHT/LEFT	R7R	18 x 24
DO NOT ENTER	R11R	24 x 24
NO RIGHT TURN	R16R	24 x 24
NO LEFT TURN	R17R	24 x 24
NO PARKING	R26DR	12 x 12
NO PARKING/FIRE LANE	R26RFL	12 x 18
NO PARKING ANYTIME	R28R	12 x 18
YIELD	R39R	30" triangle
DISABLED PARKING	R99R	12 x 18
EXIT ONLY	R108R	18 x 24
ENTER ONLY	R109R	18 x 24
NO PEDESTRIANS	R96R	18 x 18
USE CROSSWALK	R96BR	18 x 12
TWO-WAY TRAFFIC AHEAD	R40R	24 x 30
MERGE	WLR (L) or (R)	24 x 24

E. Haul Routes

1. Haul Routes for Construction activities and delivery of materials shall strictly adhere to routes designated in the contract documents. All vehicles and equipment are required to use designated routes only. Deviations from designated haul routes shall only be permitted where previously authorized in Contractor's approved Work Plans.
2. Continuous or major hauling on campus roads shall be restricted to the hours of 7:00 am through 6:00 p.m. unless otherwise authorized by the University Representative.
3. Contractor shall comply with hauling and truck traffic requirements on all City roads and shall obtain all required permits and authorizations. Weight loads carried by vehicles shall be within capacity recommended by manufacturer and shall comply with applicable laws and regulations relating to allowable capacities for specific roads.
4. Roads shall be maintained in a clean condition at all times. Sweeping of roads shall occur at minimum on a daily basis, or more often as required by continual hauling operations or construction traffic.
5. All loads shall be covered with secured tarpaulins when gravel, asphalt, debris, or other loose materials are removed from or hauled into the Campus.
6. Truck staging shall not occur on any campus road, or City road within the Campus, unless prior authorization is received through approval of the Contractor's Work Plan.

7. Provide protection against damage to existing sidewalks, curbs and gutters and other improvements at locations where construction vehicles enter. Contractor shall be responsible for repair of all damage resulting from its operations. Damage to concrete shall be repaired by replacement of full sections to the nearest existing construction joint in each direction.
- F. Emergency Response Access
1. Contractor shall maintain adequate provisions for passage of emergency response vehicles (ambulances, fire trucks etc.) over campus roads and inner-campus thoroughfares at all times.
 2. At all times that work is occurring which requires trenching, excavations, or other blockages of any fire lane or emergency access location, Contractor shall have traffic plating and other materials and equipment on hand as required to permit immediate passage of response vehicles in the case of an emergency. At no time shall said blockages be left unmanned.

1.5 PARKING CONTROL

- A. Contractor and all subcontractors, suppliers, etc. are required to purchase University parking passes. Contractor Parking Passes are required for all vehicles parking on campus regardless of location.
- B. Contractor, subcontractors and suppliers shall park within the Construction site and other authorized areas as identified in the Contract Documents.
- C. Any parking in University lots or stalls outside the authorized areas identified in the Contract Documents requires payment of the current University parking fees as evidenced by display of a valid Cal Poly Humboldt parking permit. Permits may be obtained by purchasing them through the University Cashier's Office, kiosks, or by use of the University parking app.
- D. Contractor, subcontractors and suppliers shall at no time park any vehicle on the inner-campus, outside the confines of the construction site as designated in the Contract Documents. Vehicles in non-compliance will be cited and towed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE OF PARKING AND ACCESS ROADS

- E. Maintenance: Contractor shall maintain traffic and parking areas in a sound condition. Contractor shall repair breaks, potholes, low areas, standing water and other deficiencies, to maintain paving and drainage in original or specified condition.
- F. Cleaning of Sidewalks, Roadways, and Parking Areas: Contractor shall keep public and private rights-of-way and parking areas clear of construction-caused soiling, dust and debris, especially debris hazardous to vehicle tires.

1. Contractor shall inspect and perform cleaning hourly to ensure entire public commons areas, sidewalks, crosswalks, roadways, haul routes, and parking lots are free of all debris.
Contractor shall provide dedicated laborers and equipment as required to ensure areas are kept neat and clean during each day of the contract.
2. Contractor shall coordinate with requirements specified in Section 01 57 00 - Temporary Controls and Section 01 74 00 - Cleaning Requirements.

END OF SECTION

SECTION 01 55 29
CONSTRUCTION STAGING AREAS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Contractor Staging Area requirements.

1.3 RELATED SECTIONS

- A. Section 01 11 00 - Summary of the Work: Contractor's use of site and premises.
- B. Section 01 52 00 - Construction Facilities: Field offices and sheds.
- C. Section 01 35 53 - Security
- D. Section 01 55 00 - Vehicular & Pedestrian Controls
- E. Section 01 57 00 - Temporary Controls
- F. Section 01 74 00 - Cleaning Requirements: Periodic cleaning and cleaning for Final Completion review.

1.4 SUBMITTALS

- A. Shop Drawings: Prior to site mobilization, Contractor shall prepare and submit for review by University's Representative a site plan indicating detailed layout of Contractor Staging Area, including:
 - 1. Temporary utilities
 - 2. Temporary fencing and gates
 - 3. Temporary offices and sheds
 - 4. Construction aids
 - 5. Vehicular access ways and on-site parking
 - 6. Temporary barriers and enclosures
 - 7. Storm water pollution prevention measures

PART 2 - PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

3.1 CONTRACTOR STAGING AREA REQUIREMENTS

- A. Contractor Staging Areas: Refer to reference drawings included in the set of Contract Drawings for location of Contractor Staging Areas.
 - 1. Contractor shall use only site areas designated specifically by University as Contractor Staging Area for the Project.
 - 2. Contractor Staging Area for the Project shall be clearly indicated on site plan. Contractor shall remove equipment placed or located outside of areas designated for Contractor Staging Area to within Contractor Staging Area at no change in Contract Time and Contract Sum.
 - 3. Contractor shall keep access to Contractor Staging Areas and other construction access ways and thoroughfares clear at all times. Contractor shall provide traffic and parking control signage acceptable to University's Representative.
- B. Cleanliness: Contractor shall keep Staging Area clear of trash and debris and in neat order. Contractor shall be responsible for cleanliness and order of assigned Staging Areas, as acceptable to University's Representative.

3.2 REMOVAL OF CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- A. Removal of Construction Facilities and Temporary Controls: Unless otherwise mutually agreed by University's Representative and Contractor, Contractor shall remove temporary materials, equipment, services, and construction prior to Contract Completion review. Contractor shall coordinate removal with requirements specified in Section 01 51 00 - Temporary Utilities, Section 01 52 00 - Construction Facilities, Section 01 55 00 - Vehicular & Pedestrian Controls and Section 01 57 00 - Temporary Controls.
- B. Cleaning and Repairs: Contractor shall clean and repair damage caused by installation or use of temporary facilities on public and private rights-of-way.
- C. Removal of Temporary Utilities and Restoration: Contractor shall remove temporary underground utility installations to a depth of two feet. Backfill, compact and regrade site as necessary to restore areas or to prepare for indicated paving and landscaping.

END OF SECTION

SECTION 01 56 39

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Requirements to preserve, protect, and prune as necessary existing trees and shrubs, and other vegetation indicated to remain.
- B. All trees and plant materials to remain on site shall be protected from all trades working on the job, and it shall be the Contractor's responsibility to insure that all subcontractors are aware of and held responsible for any damage to existing trees and plant material. In addition, Contractor shall be held responsible to insure that following protective measures are carried out throughout the entire construction period.
- C. Maintenance: Throughout the life of the construction project, the Contractor shall be responsible for overseeing the watering, fertilizing, pruning, and other measures necessary to protect all existing trees, lawns, shrubs, groundcover and other plants using methods approved by University Representative.

1.3 RELATED REQUIREMENTS

- A. Section 01 57 00 – Temporary Controls
- B. Section 01 57 23 – Storm Water Prevention Pollution.
- C. Division 32 – Exterior Improvements: Landscaping specifications related to trees, shrubs and ground covers, as applicable.

1.4 QUALITY ASSURANCE

- A. Contractor shall coordinate all plant removal, relocation, or protection with the University's Representative and the Facilities Management Grounds Manager.
- B. Arborist: If specified in the Contract Documents, Contractor shall engage and pay a Certified Arborist who will be responsible for supervising implementation of tree and plant protection measures specified in this Section.
 - 1. Arborist shall be subject to acceptance by University's Representative.
 - 2. Arborist registered by the American Society of Consulting Arborists.
 - 3. Submit evidence contract with acceptable Certified Arborist prior to commencing site mobilization activities.

PART 2 - PRODUCTS

2.1 BARRIERS

- A. Barriers: As specified in Section 01 57 10 – Existing Finish Protection.

2.2 FERTILIZER

- A. Fertilizer: Unless otherwise directed by University's Representative, type and quantity of fertilizer shall be determined by the Facilities Management Grounds Manager, or a soil agronomist engaged and paid by Contractor, who is acceptable to University's Representative. Any fertilizer product shall be submitted to the University for approval prior to onsite delivery.
 - 1. As basis for bidding, fertilizer shall be Romeo "Greenbelt" 22-14-14 tree fertilizer or approved equal at 4 lb. fertilizer dissolved in 100 gallons water.
- B. Accessory Materials: As determined by Contractor as necessary for sustained health of trees and plants, subject to acceptance by University's Representative. Accessory materials shall include mulch, tree and plant stakes and temporary covers.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protection: Prior to construction activities, especially demolition and excavation, on the site, Contractor shall meet with the University, including the Facilities Management Grounds Manager, to coordinate and specify tree protection measures to be implemented during the project. If required by the Contract Documents, Contractor shall submit to University's Representative evidence of a contract with a Certified Arborist who shall be responsible for supervising implementation of the following tree protection measures.
 - 1. Protect all existing trees, shrubs and ground covers from stockpiling, material storage including soil, vehicle parking and driving within the tree drip line. Restrict foot traffic to prevent excessive compacting of soil over root systems.
 - 2. Protect root systems of existing trees, shrubs, and ground covers from damage due to chemically injurious materials in solution caused by runoff and spillage during mixing, placement of construction materials, and drainage from stored materials.
 - 3. Protect root system from flooding, erosion, excessive wetting and drying resulting from de watering and other operations.
 - 4. Above-ground surface runoff shall not be directed into the tree canopy area from adjacent areas. Ensure that sidewalks or other construction do not trap water near the tree. Coordinate with requirements specified in Section 01 57 00 - Temporary Controls.
 - 5. Protect existing plant materials from unnecessary cutting, breaking and skinning of roots and branches, skinning and bruising of bark.
 - 6. Use no soil sterilants under pavement near existing trees.
 - 7. Do not allow fires under and adjacent to existing trees or plants.

- B. Maintenance: Throughout duration of the Contract, Contractor shall be responsible for irrigation, fertilizing, pruning, and other measures necessary to protect and nurture all existing trees, plants, ground covers and lawns indicated to remain in Project using methods approved in writing by the University.

3.2 PRUNING

- A. Engage the University or, if applicable, a Consulting Arborist registered by the American Society of Consulting Arborists, or approved equal. The University or arborist shall direct removal of branches from trees and large shrubs, and correctional pruning and cabling of specified trees that are to remain, if required to clear new construction and where indicated. The University or arborist shall also direct necessary tree root pruning and relocation work.
- B. Where indicated by University Representative, extend pruning operation to restore natural shape of entire tree using only Western Chapter ISA Pruning Standards.
- C. Cut branches and roots with sharp pruning instruments. Do not break, chop, or mutilate.
- D. Pruning of existing trees shall concern itself with removing all dead wood 1/2" or greater in size, removing vines and/or sucker growth. Tree cavities existing on all oak trees are to be cleaned of wood rot. The procedure for each tree may vary and will need to be approved by the Consulting Arborist prior to commencing work.
- E. Tree limbs in the way of proposed buildings shall only be trimmed by an ISA Certified Arborist or ISA Certified Climber. Limb removal scope shall be approved by the University.

3.3 IRRIGATION

- A. Irrigate trees and other vegetation that are to remain as necessary to maintain their health before, during and after the course of the work as directed by the University or Consulting Arborist. Maintain an irrigation schedule and document. Submit schedule to Owner's Representative for review and acceptance.
- B. If the soil within the drip line of the tree is compacted, then prior to watering or fertilizing trees, the area within the drip line of the tree shall be rototilled to loosely break up the top two (2) inches of existing soil.
- C. All trees shall be deep root watered by the use of an injection needle to a depth of eighteen (18) inches. Needle shall be inserted into the ground five (5) feet apart in concentric rings around the tree; each ring is four (4) feet wider than the previous one. This process shall continue out to the drip line of the tree.
- D. Trees greater than twelve (12) inches in caliper shall be watered during the first month of construction using 800 gallons of water per tree [actual amount TBD]. For trees less than twelve (12) inches in caliper, 600 gallons of water shall be used per tree [actual amount TBD]. This procedure shall be repeated every six (6) months, in addition to the normal watering schedule.

3.4 FERTILIZING

- A. All trees shall be fertilized before, during, and after construction by pumping under pressure directly 18-inches into root zone as directed by the University or Certified Arborist.

3.5 EXCAVATION AROUND TREES

- A. Excavate within drip lines of trees only where indicated on bid documents.
- B. Where trenching for utilities is required within drip lines, tunnel under and around roots of 2 1/2" diameter or larger by hand digging. Do not cut main lateral roots that are 2" or larger. Cut smaller roots that are smaller than 2" which interfere with installation of new work. Use sharp approved pruning tools. Pipes should be routed into an alternate location to avoid conflict, wherever possible.
- C. Where excavating for new construction is required within drip lines of trees, hand excavate to minimize damage to root systems. Use narrow tine spading forks and comb soil to expose roots. Relocate roots in backfill areas wherever possible. If large, main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking.
- D. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately six (6) inches back from new construction. Cover cut ends with plastic bag(s).
- E. Do not allow exposed roots to dry out before permanent backfill is placed. Provide temporary earth cover, pack with wet peat moss or four (4) layers of wet untreated burlap and temporarily support, and protect from damage until permanently relocated and covered with backfill. Water to eliminate voids and air pockets.
- F. Thin branching structure in accordance with Western Chapter, ISA Pruning Standards to balance loss to root system caused by damage or cutting of root system. Thinning shall not exceed 30% of existing branching structure.

3.6 GRADING AND FILLING AROUND TREES

- A. Maintain existing grade within drip line of trees unless otherwise indicated. Any grade change shall be limited to six (6) inches of cut or fill from the original grade and shall be accomplished by hand. Under all trees there shall be no grade change under at least the inner 50% of the tree canopy, unless otherwise approved by the University.
- B. Lowering Grades: where existing grade is above new finish grade shown around trees, carefully hand excavate within drip line to new grade. Cut roots exposed by excavation to approximately three (3) inches below elevation of new finish grade.
- C. Raising Grades: permitted only as acceptable to University Representative.
- D. If building pads or foundations are to be constructed within the fenced areas or if the existing landscape is to be altered by the addition of fill or reduced by excavation, the University Representative shall be notified prior to this work. Measures as approved by the University Representative, such as small retaining walls or subgrade aeration lines, may be required to mitigate construction procedures affecting the tree.

3.7 REPAIR AND REMOVAL OF TREES

- A. Repair and Removal of Trees: Certified Arborist and University's Representative will determine whether trees shall be restored or removed. Treat and restore trees damaged by construction operations in a manner acceptable to University's Representative. Perform restoration and

pruning promptly after damage occurs to prevent progressive deterioration of damaged trees. If trees cannot be restored, equitable adjustment to Contract Sum shall be made to compensate University for loss, in accordance with the Contract General Conditions.

1. Remove dead and damaged trees that are determined by Certified Arborist to be incapable of restoration to normal growth pattern.
2. Contractor shall be liable for all damage and necessary restoration actions to existing trees, including trunk, branches, or roots. Restoration shall be performed under direction of the University or Certified Arborist.

3.8 REPAIR AND REPLACEMENT OF SHRUBS AND GROUND COVER

- A. Repair shrubs and other vegetation damaged by construction operations in a manner acceptable to University Representative. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged plant.
- B. Remove and replace all dead and damaged plants that are determined by the University Representative to be incapable of restoration to normal growth pattern.
 1. Provide new shrubs of same size and species as those replaced or as acceptable to the University Representative.
 2. Plant and maintain as specified under Division 32.
- C. Repairs and Replacements of Shrubs and Ground Cover: Repair shrubs and other vegetation damaged by construction operation in manner acceptable to University's Representative.
 1. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged plant. Remove and replace all dead and damaged plants up to six-inch diameter, which are determined by University's Representative as being incapable of restoration to normal growth pattern.
 2. Provide new shrubs of same size and species as those replaced or as acceptable to the University's Representative.

3.9 COMPENSATION TO UNIVERSITY FOR LOST AND DAMAGED TREES

- A. The Contractor shall be liable for the loss in value to damaged trees and for all repair or replacement costs resulting from construction operations as determined by the University Representative. Because of the irreplaceable nature of many of the existing trees, the amount of assessment shall be determined by the University Representative, depending upon tree species, condition before damage, and location value.
- B. Designated sums shall be governed by applicable provisions of the Contract General Conditions

END OF SECTION

SECTION 01 57 00
TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. The requirements for the following subjects are included in this Section:
 - 1. Environmental Protection Plan
 - 2. Smoke/Odor Control
 - 3. Noise Control
 - 4. Dust and Air Pollution Control
 - 5. Welding and Burning
 - 6. Erosion and Sediment Control
 - 7. Disposal Operations
 - 8. Cultural Resources

1.3 PROTECTION OF EXISTING CONDITIONS

- A. Protection of Adjacent Facilities: Contractor shall restrict Work to limits indicated on the Drawings and as specified in Section 01 11 00 - Summary of the Work. Protect existing, adjacent facilities from damage, including soiling and debris accumulation.
- B. Video and Photo Record of Existing Conditions: Contractor shall produce video record and photo records of all existing conditions within and adjacent to Project area.
 - 1. Video record shall be made with sound to record comments to identify locations and describe conditions. Photo records shall be made available on a USB drive
 - 2. University's Representative will accompany Contractor during recording of existing conditions but will not direct recording process.
 - 3. Video and photo record shall capture the state of existing features, including but not limited to:
 - a. Paving
 - b. Landscaping
 - c. Building surfaces
 - d. Utilities
 - e. Lighting standards, fencing, signage and other site appurtenances
 - 4. Contractor shall retain one copy and deliver one copy of video and photo record to University's Representative within seven calendar days after they have been produced.

5. Video and photo record shall be used to verify restoration of existing conditions after completion of construction activities.
 6. Existing features not recorded shall be restored as directed by University's Representative, including reconstruction and refinishing as determined necessary by University's Representative.
- C. Existing Utilities - Should the Contractor break any utility the contractor should immediately act to repair the utility. Contractor shall continuously work to repair broken utilities to minimize impact to the University.
- D. Contractor shall maintain spare parts and materials to repair all utilities, water lines, sewer lines, etc.

1.4 ENVIRONMENTAL PROTECTION PLAN

- A. The requirements of the Article are in addition to those of the Contract General Conditions.
- B. During the progress of the work, keep the premises occupied in a neat and clean condition and protect the environment both on site and off site, throughout and upon completion of the construction project.
- C. In coordination with the Campus, develop an Environmental Protection Plan in detail and submit to the University Representative within 21 calendar days from the date of commencement specified in the Notice to Proceed. Distribute the approved plan to all employees and to all subcontractors and their employees. The Environmental Protection Plan shall include, but not be limited to, the following items:
1. Copies of required permits.
 2. Proposed sanitary landfill site.
 3. Other proposed disposal sites.
 4. Noise Control.
 5. Dust Control.
 6. Erosion and Sediment Control.
 7. Copies of any agreements with public or private landowners regarding equipment, materials storage, borrow sites, fill sites, or disposal sites. Any such agreement made by the Contractor shall be invalid if its execution causes violation of local or regional grading or land use regulations.
 8. Hazardous waste disposal procedures.
- D. Requirements: All operations shall comply with all federal, state and local regulations pertaining to water, air, solid waste and noise pollution.
- E. Definitions of Contaminants:
1. Sediment: Soil and other debris that have been eroded and transported by runoff water.
 2. Solid waste: rubbish, debris, garbage and other discarded solid materials resulting from construction activities, including a variety of combustible and non-combustible wastes, such as ashes, waste materials that result from construction or maintenance and repair work, leaves and tree trimmings.

3. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, disinfectants, organic chemicals and inorganic wastes. Some of the above may be classified as "hazardous."
 4. Sanitary Wastes:
 - a. Sewage: domestic sanitary sewage.
 - b. Garbage: refuse and scraps resulting from preparation, cooking, dispensing and consumption of food.
 5. Hazardous Materials: Except as otherwise specified, in the event the Contractor encounters on the site material reasonably believed to be hazardous, including asbestos, polychlorinated biphenyl (PCB), or other materials which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the University in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the University and Contractor if in fact the material is asbestos, PCB, or other hazardous materials and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos, PCB, or other hazardous materials, or when such materials have been rendered harmless.
- F. Protection of Natural Resources:
1. General: It is intended that the natural resources within the project boundaries and outside the limits of permanent work performed under this Contract be preserved in their existing condition or be restored to an equivalent or improved condition upon completion of the work. Confine construction activities to areas defined by the public roads, easements, and work area limits shown on the drawings. Except where otherwise noted, return construction areas to their pre-construction elevations. Maintain natural drainage patterns. Conduct construction activities such that ponding of stagnant water conducive to mosquito breeding habitat will not occur at anytime.
 2. Land Resources: Do not remove, cut, deface, injure or destroy trees or shrubs outside the work area limits. Do not remove, deface, injure or destroy trees within the work area without approval by the University and the Architect. Such improvements shall be removed and replaced, if required, by the Contractor at his own expense.
 - a. Protection: Protect trees that are located near the limits of the Contractor's work areas which may possibly be defaced, bruised or injured or otherwise damaged by the Contractor's operations. No ropes, cables or guys shall be fastened to or be attached to any existing nearby trees or shrubs for anchorages. No vehicles or equipment shall be parked within the extents of the canopy of any tree.
 - b. Trimming: Refer to Tree and Plant Protection Section 01 56 39.
 - c. Excavation Around Trees: Refer to Tree and Plant Protection 01 56 39.
 - d. Repair or Restoration: Repair or replace any trees or other landscape feature scarred or damaged by equipment or construction operations as specified below. The repair and/or restoration plan shall be reviewed and approved by the University and Architect prior to its initiation.

- e. Temporary Construction: Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction unless approved by University. Level all temporary roads, parking areas and any other areas that have become compacted or shaped. Any unpaved areas where vehicles are operated shall receive a suitable surface treatment or shall be periodically wetted down to prevent construction operations from producing dust damage and nuisance to persons and property, at no additional cost to the University. Keep haul roads clear at all times of any object which creates an unsafe condition. Promptly remove any contaminants or construction materials dropped from construction vehicles. Do not drop mud and debris from construction equipment on public streets. Sweep clean turning areas and pavement entrances as necessary.
- 3. Water Resources: Investigate and comply with all applicable federal, state and local regulations concerning the discharge (directly or indirectly) of pollutants to the underground and natural waters. Perform all work under this Contract in such a manner that any adverse environmental impacts are reduced to a level that is acceptable to the Architect and regulatory agencies. Refer to section 01 57 23 (SWPP) and project Earthwork specification for control of water and dewatering disposal requirements.
 - a. Oily Substances: At all times, special measures shall be taken to prevent oily or other hazardous substances from entering the ground, drainage areas or local bodies of water in such quantities as to affect normal use, aesthetics or produce a measurable impact upon the areas. Any soil or water which is contaminated with oily substances due to the Contractor's operations shall be disposed of in accordance with applicable regulations.

1.5 SMOKE/ODOR CONTROL

- A. Primary fresh air intakes to existing buildings must be protected from exhaust from internal combustion engines, paint and solvent fumes and other noxious fumes and vapors.
- B. The Contractor must implement control methods such as snorkels from engines exhausts to 50 feet away from air intakes.
- C. All other activities generating fumes must be limited to a distance of at least 50 feet from the air intake grille.
- D. If fume generating procedures must occur within 50 feet of an air intake the Contractor is responsible for the following:
 - 1. Notify the University Representative at least 14 days in advance.
 - 2. Complete the work when it least impacts the University (evenings, weekends, or particularly windy days).
 - 3. Provide carbon filter media, plastic barriers, or other control methods to assure fresh air only enters into the building ventilation system.

1.6 NOISE CONTROL

- A. The requirements of this section are in addition to those of the Project Contract General Conditions.

- B. Maximum noise levels within 1,000 feet of any classroom, laboratory, residence, business, adjacent buildings, or other populated area: noise levels for trenchers, pavers, graders and trucks shall not exceed 90 dBA at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dBA at 50 feet.
- C. Equipment: Equip jackhammers with exhaust mufflers and steel muffling sleeves. Air compressors should be of a quiet type such as a "whisperized" compressor. Compressor hoods shall be closed while equipment is in operation. Use electrically powered rather than gasoline or diesel powered forklifts. Provide portable noise barriers around jack hammering, barriers constructed of ¾-inch plywood lined with 1-inch thick fiberglass on work side.
- D. Operations: keep noisy equipment as far as possible from noise-sensitive site boundaries. Machines should not be left idling. Use electric power in lieu of internal combustion engine power wherever possible. Maintain equipment properly to reduce noise from excessive vibration, faulty mufflers, or other sources. All engines shall have properly functioning mufflers.
- E. Scheduling: schedule noisy or potentially disruptive operations so as to minimize their duration at any given location, and to minimize disruption to the adjoining users. Notify the University Representative in advance of performing work creating unusual noise and schedule such work at times mutually agreeable. The University reserves the right to require performance of any noisy and/or potentially disruptive work during off-hours in order to accommodate the Universities operations.
- F. Do not play radios, tape recorders, televisions, and other similar items at construction site.

1.7 DUST AND AIR POLLUTION CONTROL

- A. The requirements of this Article are in addition to those of the Contract General Conditions.
- B. Employ measures to avoid the creation of dust and air pollution.
 - 1. Unpaved areas shall be wetted down, to eliminate dust formation, a minimum of twice a day to reduce particulate matter. When wind velocity exceeds 15 mph, site shall be watered down more frequently.
 - 2. Store all volatile liquids, including fuels or solvents in closed containers.
 - 3. No open burning of debris, lumber or other scrap will be permitted.
 - 4. Properly maintain equipment to reduce gaseous pollutant emissions.
- C. Exposed areas, new driveways and sidewalks shall be seeded, treated with soil binders, or paved as soon as possible.
- D. Cover stockpiles of soil, sand and other loose materials.
- E. Cover trucks hauling soil, debris, sand or other loose materials.
- F. Sweep project area streets at least once daily, or more often as required to maintain streets in a clean condition.
- G. Appoint a dust control monitor to oversee and implement all measures listed in this Article.

1.8 WELDING AND BURNING

- A. Eliminate welding and burning of steel as much as possible. Where unavoidable, perform welding and burning with all possible precaution to avoid fire hazard. Provide a fire watch for minimum of 30 minutes after burning stops. Provide protection for all adjacent surfaces.

1.9 EROSION AND SEDIMENT CONTROL

- A. Discharge construction runoff into small drainages at frequent intervals to avoid build-up of large potentially erosive flows.
- B. Prevent runoff from flowing over unprotected slopes.
- C. Keep disturbed areas to the minimum necessary for construction.
- D. Keep runoff away from disturbed areas during construction.
- E. Direct flows over vegetated areas prior to discharge into public storm drainage systems.
- F. Trap sediment before it leaves the site, using such techniques as check dams, sediment ponds, or siltation fences.
- G. Remove and dispose of all project construction-generated siltation that occurs in offsite retention ponds.
- H. Stabilize disturbed areas as quickly as possible.
- I. Remove mud from tires of earth moving trucks and equipment before traversing project area streets.
- J. Contractor shall commission a Civil Engineer licensed in the State of California to produce a Water Quality Management and Storm Water Pollution Prevention Plan per Section 01 57 23. The plan shall comply with all applicable Code and Agency requirements, and shall govern the protectionary measures to be implemented and maintained by Contractor throughout the construction period. The plan shall be subject to approval by the University, and Contractor shall make reasonable revisions as directed by the University at no additional cost.

1.10 DISPOSAL OPERATIONS

- A. Solid Waste Management: supply solid waste transfer containers. Daily remove all debris such as spent air filters, oil cartridges, cans, bottles, combustibles and litter. Take care to prevent trash and papers from blowing onto adjacent property. Encourage personnel to use refuse containers. Convey contents to a sanitary landfill.
- B. Washing of concrete containers where wastewater may reach adjacent property, storm drains or natural watercourses will not be permitted. Remove any excess concrete to the sanitary landfill.
- C. Chemical Waste and Hazardous Materials Management: furnish containers for storage of spent chemicals used during construction operations. Dispose of chemicals and hazardous materials in accordance with applicable regulations.
- D. Garbage: store garbage in covered containers; pick up daily and dispose of in a sanitary landfill.
- E. Dispose of vegetation, weeds, rubble, and other materials removed by the clearing, stripping and grubbing operations off site at a suitable disposal site in accordance with applicable regulations.
- F. Excavated Materials:

1. If approved by Architect, native soil complying with the requirements of Earthwork Section, may be used for backfill, fill and embankments as allowed by that section.
 2. Spoil Material: remove all material that is excavated in excess of that required for backfill, and such excavated material that is unsuitable for backfill, from the site.
 - a. Excess suitable backfill material shall be hauled off site. No additional compensation will be paid to the Contractor for such off haul. Include all such costs in the lump sum prices bid for the project.
 - b. Unsuitable backfill material will be disposed of off site in accordance with applicable regulations, in a disposal site indicated in the Environmental Protection Plan. Remove rubbish and materials unsuitable for backfill immediately following excavation. Remove material in excess of that required for backfill immediately following backfill operations.
- G. Rubbish shall consist of all materials not classified as suitable materials or rubble and shall include shrubbery, trees, timber, trash and garbage.

1.11 CULTURAL RESOURCES

- A. The requirements of this article are in addition to those of the Contract General Conditions.
- B. The project does not pass through any known archaeological sites. However, it is conceivable that unrecorded archaeological sites could be discovered during construction.
- C. In the event that artifacts, human remains, or other cultural resources are discovered during subsurface excavations at locations of the Work, the Contractor shall protect the discovered items, cease work for a distance of 35 feet radius in the area, notify the IOR and the University's Representative and comply with applicable law.
- D. The University may retain an Archaeologist to monitor and recover data and artifacts during period when work has ceased.
- E. All items found which are considered to have archaeological significance are the property of the University.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 57 10

EXISTING FINISH PROTECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Section specifies the requirements for construction activities impacting the interior and exterior improvements within and adjacent to the construction site. The protection requirements herein are minimum requirements and is/are the contractors responsibility to ensure all aspects of work are protected regardless of the listing within this specification or not. Protection of work is an on-going process whereby the contractor shall adjust, add, change, and replace protection as needed throughout the project to ensure all aspects of work are protected to the greatest possible extent. Section includes but is not limited to the following:
 - 1. Protection of existing finishes within and adjacent to the work area(s).
 - 2. Protection of existing equipment within and adjacent to the work area(s).
 - 3. Protection of completed work.
 - 4. Protection of Building systems, i.e. mechanical, electrical, plumbing utilities and data systems.
 - 5. Protection of ingress and egress pathways.
 - 6. Protection of elevator and lifts.
 - 7. Erection and maintenance of temporary barriers and enclosures.

1.3 CODES AND REGULATIONS

- A. California Building Code (CBC): Comply with California Building Code (CBC) Chapter 33, Section 3303, Protection of Pedestrians During Construction or Demolition
- B. Fire Regulations: Comply with requirements of fire authorities having jurisdiction, including California Fire Code (CFC) Article 87 during performance of the Work.
- C. Safety Regulations: Comply with requirements of all applicable Federal, State and local safety rules and regulations. Contractor shall be solely responsible for jobsite safety.
- D. Barricades and Barriers: As required by governing authorities having jurisdiction, provide substantial barriers, guardrails and enclosures around Work areas and adjacent to embankments and excavations for protection of workers and the public.

1.4 PRODUCTS

The following products, or approved equals, shall be used in all locations within new work and/or path of travel to, or within existing work, and/or as directed by the University.

- A. Plywood / wood Framing – For use for semi-permanent long term temporary closure and opening protection as directed by the University. Public facing side shall be painted white.
- B. Pro-Tect (www.pro-TECT.com) – Floor protection for existing materials and/or newly installed materials.
- C. Pro-Tect EZ Prop System (www.pro-TECT.com) – Temporary enclosure for dust control to enclosure interior work space within an existing space.
- D. Pro-Tect 1-2-3 Door Shield (www.pro-TECT.com) – Door and jamb protection for use to protect new or existing doors and frames.
- E. Pro-Tect Dust Door with zipper (www.pro-TECT.com)
- F. Pro-Tect Corner guards (www.pro-TECT.com) – for use to protect existing or new finished wall corners.
- G. Pro-Tect Tacky Mats (www.pro-TECT.com) – for use as walk off mats both inside and outside of new to existing work.

1.5 INTERIOR AND EXTERIOR PROTECTION OF EXISTING IMPROVEMENTS

- A. Walking surface protection: Provide non-destructive compatible walking surface protection over all floor finishes remaining in-place during the period of construction
- B. Carpeting: Use Pro-Tect brand adhesive plastic sheeting roller over entire surface, PC60-500 (5' wide) or approved equal.
- C. Wood, Vinyl or Concrete Flooring: Use RAM BOARD or Pro-Tect Hardboard-WR brand floor over entire surface, HARDBOARD-WR or approved equal.
- D. Ingress and egress protection: Provide protection for the surfaces of doors, door frames and outside corners.
- E. Door surfaces: Use Pro-Tect brand Door Shield, PTDS.30,.40 or approved equal.
- F. Door Frames: Use Pro-Tect brand FPB Jamb Protector, FPB60 or approved equal.
- G. Corner Guards: Use Pro-Tect brand corner guards, PCCG-1 or approved equal.
- H. Walk-off Mats: Use Pro-Tect brand walk-off mats, PTM-2-3624 or approved equal.
- I. Stairs: Use Pro-Tect brand red rosin paper with painter's tape, PTRP or approved equal.
- J. Shoe Covers: Use Pro-Tect brand removable shoe covers when traveling inside the construction area to outside the construction area, PBDG or approved equal.
- K. Dust and Dirt reduction and elimination: Provide the entry and exit close off protection to eliminate the spread of construction dust and dirt.
- L. Construction Area Entrance: Use Pro-Tect brand Zipper, ZPU-7.25 or approved equal.
- M. Ceiling Protection: Use Pro-Tect brand Clip and Snap connectors to hold plastic sheeting, PTCSB-1 or PTCSR-1 or approved equal.
- N. Provide seal-off and/or HEPA filtering of HVAC system air delivery and exhaust systems. The type and location of protection shall be instituted with the consultation of the University facilities maintenance staff's direct input. This protection shall include lighting, HVAC ductwork, audio/visual, laboratory and any other equipment, materials or systems which may be vulnerable to dust and dirt.
- O. Ductwork Closures: Use Pro-Tect brand Duct Shield, PDS24, 36 or approved equal.

- P. Provide protective coverings over casework, countertops, tables, desk and etc.
Countertop/Casework Protection: Use Pro-Tect brand Multi-use Red Film, PMR24, 36, 48 or approved equal.
- Q. Miscellaneous Protection: Provide protective devices and materials to protect fire sprinkler heads, fire alarm devices and the like. Contact the device manufacturer for the correct protective covers for their devices.
- R. Fire Alarm Devices: Use Simplex brand dustproof device covers. University provided Heat Detectors can replace existing smoke detectors only when approved by the State Fire Marshal.
- S. Elevators and accessibility lifts: Provide floor, wall and ceiling protective devices in all vertical circulation systems. Maintain clear access to the controls for these systems. Use protection cab wall blankets where hooks are available. Where cab wall hooks are not available use MDO plywood connected to bump/hand rails and supported from the cab floor. Rails used for connection shall be first individually protected with a cushioned cover wrap.
- T. Safe Exiting: All protective measures shall be designed, installed and maintained so they do not interfere with the safe exiting of the area's occupants in an emergency. If lighting systems have been disabled, the Contractor shall install temporary construction lighting sufficient to safely perform the work.

1.6 MAINTENANCE OF CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- A. Maintenance: Use all means necessary to maintain temporary barriers and enclosures in proper and safe condition throughout progress of the Work.
- B. Replacement: In the event of loss or damage, promptly restore temporary barriers and enclosures by repair or replacement at no change in the Contract Sum or Contract Time.

1.7 TEMPORARY BARRIERS, ENCLOSURES AND PASSAGEWAYS

- A. Temporary Barriers, General: Provide temporary fencing, barriers and guardrails as necessary to provide for public safety, to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
 - 1. Note requirements for continued occupancy and use of existing buildings and site areas during construction
 - 2. Comply with applicable requirements of California Building Code (CBC) and authorities having jurisdiction, including industrial safety regulations. Review requirements with University's Representative
 - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting
 - 4. Paint temporary barriers and enclosures with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard
 - 5. Where appropriate and necessary, provide warning lighting, including flashing red or amber lights

- B. Temporary Closures: Provide temporary closures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior
1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate closures with ventilating and material drying or curing requirements to avoid dangerous conditions and effects such as mold
 2. Vertical openings: Close openings of 25 sq. ft. (2.3 sq. m) or more with plywood or similar materials. Public facing side shall be painted white.
 3. Horizontal openings: Close ALL openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 - a. Any penetration subject to water infiltration shall be made water tight with protective measures until all work is completed.
 4. Install tarpaulins securely using wood framing and other suitable materials
 5. Where opening size exceeds 64 sq. ft. in area, use fire-retardant-treated framing and plywood. Public facing side shall be painted white.
- C. Temporary Partitions: Erect and maintain temporary partitions and temporary closures to limit dust and dirt migration, including migration into existing facilities, to separate areas from fumes and noise and to maintain fire-rated separations
1. Dust Barriers: Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch (100-mm) studs, 2 layers of 3-mil (0.07-mm) polyethylene sheets, inside and outside temporary enclosure.
 - a. Overlap and tape full length of joints
 2. Include 5/8" thick gypsum board at temporary partitions serving as noise barrier
 3. Insulate partitions to minimize noise transmission to adjacent occupied areas
 4. Seal joints and perimeter of temporary partitions
- D. Dust barrier passages: Where passage through dust barrier is necessary, provide gasketed doors or heavy plastic sheets that effectively prevent air passage
1. Construct a vestibule and airlock at each entrance to temporary enclosure with not less than 48" between doors
 2. Maintain water-dampened foot mats in vestibule where passage leads to existing occupied spaces
 3. Equip doors with security locks
- E. Fire-rated temporary partitions: Maintain fire-rated separations, including corridor walls and occupancy separations, by construction of stud partitions with gypsum board faces
1. Construction details shall comply with recognized time-rated fire-resistive construction. Typically, 1-hour rated partitions shall be 2x4 wood studs at 16" on center or 3-1/2" metal studs at 16" on center, with 5/8" thick Type X gypsum board at both faces, with joints filled, taped and topped

2. Seal partition perimeters with acceptable fire stopping and smoke seal materials
 3. Construct fire-rated temporary partitions whenever existing time-rate fire-resistive construction is removed for 12 hours or more.
- F. HVAC Protection: Provide dust barriers at HVAC return grilles and air inlets to prevent spread of dust and clogging of filters
- G. Temporary Floor Protection: Protect existing floors from soiling and damage
1. Cover floor with 2 layers of 3-mil polyethylene sheets, extending sheets 18" up the side walls
 2. Cover polyethylene sheets with 3/4" fire-retardant plywood
 3. Provide 'sticky' floor mats to clean dust from shoes
- H. Security Closures and Lockup: Provide substantial temporary closures of openings in exterior surfaces and interior areas as appropriate to prevent unauthorized entrance, vandalism, theft and similar violations of security. Provide doors with self-closing hardware and locks.
- I. Weather Closures: Provide temporary weather-tight closures at exterior openings to prevent intrusion of water, to create acceptable working conditions, to protect completed Work and to maintain temporary heating, cooling and ventilation. Provide access doors with self-closing hardware and locks.
- J. Provide temporary lighting, illuminated interior exit signage, non-illuminated directional and instructional signage, and temporary security alarms for temporary exits and exit passageways.
- K. Temporary measures shall suit and connect to existing building systems, and shall be approved by University's Representative and authorities having jurisdiction.

1.8 PROTECTION OF INSTALLED WORK

- A. Protection of Installed Work, General: Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- B. Protective Coverings: Provide protective coverings at walls, projections, jambs, sills, and soffits of openings as necessary to prevent damage from construction activities, such as coatings applications, and as necessary to prevent other than normal atmospheric soiling.
- a. Carpeting: Use Pro-Tect brand adhesive plastic sheeting roller over entire surface, PCD2430 or approved equal.
 - b. Wood, Vinyl or Concrete Flooring: Use RAM BOARD or Pro-Tect Hardboard-WR brand floor over entire surface, HARDBOARD-WR or approved equal. Kraft or Red Rosin Paper is NOT Acceptable.
 - c. Door surfaces: Use Pro-Tect brand Door Shield, PTDS.30.40 or approved equal.
 - d. Door Frames: Use Pro-Tect brand FPB Jamb Protector, FPB60 or approved equal.
 - e. Corner Guards: Use Pro-Tect brand corner guards, PCCG-1 or approved equal.
 - f. Casework: Cardboard all vertical and horizontal surfaces
- C. Traffic Protection:
- a. Protect finished floors, stairs and other surfaces from traffic, soiling, wear and marring.
 - b. Temporary covers shall not slip or tear under normal use

1.9 REMOVAL OF TEMPORARY BARRIERS AND ENCLOSURES

- A. Removal of Temporary Barriers and Enclosures: Unless otherwise mutually agreed by University's Representative and Contractor, remove temporary materials, equipment, services, and construction prior to Contract Completion review.
- B. Cleaning and Repairs: Clean and repair damage, soiling and marring caused by installation or use of temporary barriers and enclosures.

END OF SECTION

SECTION 01 57 23

STORM WATER POLLUTION PREVENTION

PART 1 - GENERAL

1.1 DESCRIPTION.

The work includes, but is not limited to, the development, implementation, maintenance, reporting, inspection procedures and execution of the project Storm Water Pollution Prevention Plan (SWPPP), in compliance with the State of California Construction General Permit.

- A. Contractor shall provide all material, labor, and equipment for the development, installation, implementation, and maintenance of all storm water pollution prevention measures. Including conveyance, detention, filtration, and treatment facilities. Scope of work to include:
 - 1. Contract the development of a SWPPP by a California Certified Qualified SWPPP Developer (QSD). Contractor shall pay all costs associated with development, engineering, and implementation of the SWPPP.
 - 2. Contractor shall be responsible for hiring or contracting for the services of a California certified Qualified SWPPP Practitioner (QSP).
 - 3. Prior to start of construction the Contractor shall submit 3 complete sets of the SWPPP as follows; one hard copy set and 2 electronic sets; one in MS Word and one in Portable Document Format (pdf), to the University and Architect of Record for review and approval.
 - 4. The University Department of Environmental Health and Safety will be responsible for submitting the approved SWPPP and all associated permit fees to the State Water Resources Control Board.
 - 5. Contractor's QSP shall be responsible for providing and implementing all measures of the Approved SWPPP, including continuous maintenance throughout the life of the project, especially before, during, and after rain events.
 - 6. Contractor shall be responsible for all water samples testing required by the SWPPP.
 - 7. Contractor shall modify and amend the SWPPP as necessary based on project conditions, durations, weather and seasonal changes.
 - 8. The minimum compliance basis shall be that of the California General Permit (NPDES) 2009-009-DWQ as modified by 2010-0014-DWQ.
- B. Contractor shall have storm drain pollution prevention measures in place and functioning at all times. The Construction General Permit (CGP) does NOT recognize a rainy season.
- C. Contractor shall not allow any non-storm water discharges, including ground water, to enter the storm drain system. Examples of non-storm water discharges include but are not limited to: domestic supply water used to wash streets, construction materials, tools, equipment and vehicles.
- D. Discharges not covered by the Construction General Permit shall be discharged as required per appropriate city, county, or state standard.

1.2 RELATED WORK

- A. Section 01 41 00: Regulatory Requirements
- B. Section 01 57 00: Temporary Controls
- C. Section 01 57 23a: Storm Water Management Monthly Report
- D. Section 01 52 00: Construction Facilities
- E. Section 01 77 00: Contract Closeout Procedures

1.3 REFERENCE STANDARDS

- A. California Stormwater Quality Association – Construction BMP Handbook Portal / SWPPP Template - <http://www.casqa.org>
- B. California Environmental Protection Agency – State Water Resources Control Board <http://www.swrcb.ca.gov>
- C. National Oceanic and Atmospheric Administration United States Department of Commerce <http://www.noaa.gov>
- D. Clean Water Act, United States Environmental Protection Agency, and Porter-Cologne Clean Water Act, State of California
- E. Los Angeles Regional Water Quality Control Board's current Water Quality Control Plan (Basin Plan)
- F. State Water Resources Control Board Order No. 2009-0009-DWQ, as amended by Order No. 2010-014-DWQ, NPDES No. CAS000002 – General Construction Permit http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml
- G. American Public Works Association – Standard Specifications for Public Works Construction, latest edition. Building News Inc. www.bnibooks.com

1.4 SUBMITTALS

- A. Product Data: Manufacturer's literature and data including; location, applicable size, material, source, rated capacity, effective opening size, listing/approvals, or other labeling for the following:
 - 1. Draft SWPPP Plan developed by a qualified QSD in hard copy, editable electronic copy, and pdf. Approved final copy to be submitted electronically to the University for upload to SWRCB website. Hard copy drawings for submittal shall be on full size sheets. SWPPP document shall include the following:
 - a. Names and California certificate numbers of project QSD and QSP
 - b. Water Sampling Procedures
 - c. List of Laboratories certified in the "Environmental Laboratories Accreditation Program (ELAP)" that may be used on the project.
 - d. Erosion Control Products (ECPs)
 - e. Silt fencing
 - f. Inlet protection
 - g. Soil Binders
 - h. Any other manufactured products used to implement Best Management Practices (BMP) including filters, tanks, pumps, and other devices.

- i. Monthly BMP Inspection Reports – due monthly at the end of each month. Complete and submit, including detailed list of corrective actions taken for non compliances.
 - j. Annual Report – Complete all documentation necessary for Project’s Annual Report as required by the SWRCB for all construction activities, ending June 30th of each year, and submit to the University by August 1st of the same year.
 - k. Notice of Termination
 - i. Photographs of the completed project
 - ii. Annual Report documents covering the time period from the last annual report to the completion of the project
 - iii. Complete the Notice of Termination information for the project in SMARTS for approval by the University.
- B. Shop Drawings and Calculations: Contractor shall provide shop drawings for review and approval that shall depict the location, site, and size, type, and function of all BMP components. Supporting calculations shall be included as necessary to validate sizing and effectiveness of components for the following systems if used:
 - 1. Active treatment systems
 - 2. Pumping systems
 - 3. Filter system

1.5 DEFINITIONS

- A. Active Areas of Construction: All areas undergoing land surface disturbance activities related to the project including, but not limited to, project staging areas, immediate access areas and storage areas. All previously active areas are still considered active until final stabilization is complete.
- B. Active Treatment System (ATS): A treatment control BMP that reduces turbidity of the construction site runoff by adding chemicals or using electrical current to enhance flocculation, coagulation and settling of suspended sediment. The two major types of systems are flow through treatment and batch treatment.
- C. Best Management Practices (BMPs): Includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent, eliminate, or reduce the pollution of water leaving a site. BMPs also include treatment requirements, operating procedures, and practices to control site runoff spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
- D. Construction Activity: Includes clearing, grading, excavation, and all Contractor activities that could result in soil disturbance or contribute to water pollution.
- E. Dewatering Operations: Practices that manage the discharge of pollutants when water must be removed from a work location to proceed with construction work or to provide vector control.
- F. Discharge: A release of flow of storm or non-storm water or other substance from a conveyance system or storage container off-site to a storm drain, flood control channel, etc.
- G. Effluent Limitations: Limitations on amounts of pollutants that may be contained in a discharge.

- H. Erosion Control: Erosion control is any source control practice that prevents water pollution by protecting the soil surface and preventing soil particles from being detached by rainfall, flowing water, or wind.
- I. Construction General Permit (CGP): The National Pollutant Discharge Elimination System (NPDES) permit issued by the California State Water Resources Control Board for the discharge of storm water associated with construction activities from soil disturbance of one acre or more.
- J. Gross Pollutants: Visible pollutants such as trash, debris and floatables, which may create an aesthetic "eye sore" in waterways, and heavy metals, pesticides, or bacteria in storm water. Gross pollutants also include plant debris (such as leaves and lawn clippings), animal excrement, street litter, and other organic matter.
- K. Hazardous Waste: A waste or combination of wastes that, because of its quantity, concentration, or physical, chemical or infectious characteristic, may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness: or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. Or possess at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on EPA or state lists as hazardous. Hazardous Waste is regulated under the Federal Resource Conservation and Recovery Act and the California Health and Safety Code.
- L. High Risk of High pH Discharge: A "high risk of high pH discharge" can occur during utility construction, vertical construction, and during any portion of any construction phase where significant amounts of materials are placed directly on the land at the site in a manner that could result in significant alterations to the background pH of any discharge.
- M. Illicit Discharge: Any discharge to a receiving water that is not in compliance with applicable laws and regulations, e.g. is not discharged pursuant to the applicable NPDES permit.
- N. Inactive Areas of Construction: Areas of construction activity that have been disturbed but which are not currently being worked and are not scheduled to be re-disturbed for at least 14 days.
- O. Legally Responsible Person (LRP): The person possessing the title of the land on which the construction activities will occur. When ownership is by a corporation or public agency, the LRP is the appropriate corporate officer or public official as defined in the General Permit.
- P. Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances; including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, channels or storm drains: (i) designed or used for collecting or conveying storm water;(ii) which is not a combined sewer; and (iii) which is not part of a Publicly Owned Treatment Works (POTW) as defined at Title 40 of the Code of Federal Regulations (CFR) 122.2.
- Q. Non-Storm water Discharge: Any discharge to a MS4 or receiving water that is not composed entirely of storm water.
- R. Non-Point Sources Pollution: Pollution that originates from diffuse contamination that does not originate from a single discrete source and specifically does not come from a point source as defined by the Clean Water Act. Non-point surface pollution can originate from aerial diffuse sources, agriculture, forests, and irrigation runoff.

- S. Notice of Intent (NOI): Part of the required Permit Registration Documents, which provides information on the owner, location, type of project, and verifies that the owner will comply with the conditions of the Construction General Permit.
- T. Notice of Termination (NOT): Formal notice to SWRCB submitted by owner/developer that a construction project is complete and the project has met the conditions to terminate the permit.
- U. NPDES Permit: NPDES is an acronym for National Pollutant Discharge Elimination System. NPDES is the national program for administering and regulating Sections 307, 318, 402, and 405 of the CWA. In California, the State Water resources Control Board (SWRCB) has issued a General Permit for storm water discharges associated with construction activities.
- V. Numeric Action Level (NAL): An allowable range or threshold for a particular water quality measurement to gauge the performance of the measures or practices used at a site to minimize the discharge of pollutants. The NAL is used to determine if it is necessary to take corrective action. The general Permit includes NALs for pH and turbidity; however these action levels are not directly enforceable.
- W. Numeric Effluent Limitation (NEL): The Numeric Effluent Limitations (NELs) for pH and turbidity contained in Order 2009-0009-DWQ are no longer in effect as of December 27, 2011. In addition, because receiving water monitoring is required only if the NELs are triggered, all receiving water monitoring requirements are also suspended.
- X. Permit Registration Documents (PRD): A set of documents that serve as the formal notice to SWRCB, submitted by the owner of a construction site, that says said owner seeks coverage under the Construction General Permit for discharges associated with construction activities.
- Y. Point Source: Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agriculture storm water runoff.
- Z. Precipitation: Any form of rain or snow.
- AA. Qualified SWPPP Developer (QSD): Individual who is authorized to develop and revise SWPPPs.
- BB. Qualified SWPPP Practitioner (QSP): Individual assigned responsibility for the implementation of all elements of the SWPPP, including non-storm water and storm water visual observations, sampling and analysis, and preparation of Rain Event Action Plans.
- CC. Qualifying Storm or Rain Event: Any event that produces 0.5 inches or more precipitation within a 48 hour or greater period between rain events.
- DD. Rain Event Action Plan (REAP): Written document, specific for each rain event, that when implemented is designated to protect all exposed portions of the site within 48 hours of any likely precipitation event. REAPs are prepared by the QSP based on the predicted rain event and construction activities.
- EE. Receiving water: A storm drainage system, channel, river, lake, stream, estuary, bay, or ocean into which runoff is discharged.
- FF. Rolled Erosion Control Products (RECPs): Prefabricated product such as mulch-control nets, open-weave geotextiles, and erosion-control blankets. Typically manufactured from wood excelsior, straw, jute, coir, polyolefins, PVC and nylon. Designed to control erosion and assist in establishment of vegetation.

- GG. **Runoff:** Water originating from rainfall, melted snow, and other sources (e.g., sprinkler irrigation) that flows over the land surface to drainage facilities, rivers, streams, lakes, and wetlands.
- HH. **Run-on:** Off-site storm water or other surface flow that flows onto a project site.
- II. **Significant Materials:** Includes materials such as; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; materials used in food processing or production; hazardous substances designed under Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm and non-storm water discharges.
- JJ. **Significant Quantities:** The volume, concentrations, or mass of a pollutant in storm water discharge that can cause or threaten to cause pollution, contamination, or a nuisance that adversely impact human health or the environment and causes or contributes to a violation of the EPA Clean Water Act.
- KK. **Storm Water:** Defined as runoff and snowmelt runoff consisting only of those discharges, which originate from precipitation events. Storm water is that portion of precipitation that flows across a surface to the storm drain system or receiving waters.
- LL. **Storm Water Multiple Application and Report Tracking System (SMARTS)** - SMARTS has been developed by the SWRCB to provide an online tool to assist dischargers in submitting their Permit Registration Documents (PRD), No Exposure Certification (NEC) if applicable, NOTs and Annual Reports, as well as viewing and printing receipts of fee payments, monitoring the status of submitted documents, and viewing application and renewal fee statements.
- MM. **Storm Water Pollution Prevention Plan (SWPPP):** A written plan that documents the series of phases and activities that characterizes the project site and describes the necessary actions to implement to prevent the pollution of storm and non-storm water discharges during construction.
- NN. **Storm Drainage System** – In this document, the term “storm drainage system” shall include storm water conduits, storm drain inlets and other storm drain structures, gutters, channels, water courses, creeks and lakes.
- OO. **Traditional Construction Project:** Most construction projects, including but not limited to commercial, residential, industrial, educational, and roadway construction projects. Does not included those projects defined as Linear Underground Projects (LUPs) in the CGP.
- PP. **Waste Management:** Source control management practices that prevent pollution by limiting or reducing potential waste pollutants at their source, before they come into contact with storm or non-storm water. Practices under this category are “good housekeeping” and include procedural and structural BMPs for handling, storing, and disposing of waste generated by the construction project.
- QQ. **Wind Erosion Control:** Methods used to minimize wind erosion. Controls consist of covering or applying water or other dust palliatives to prevent and alleviate dust nuisance.
- RR. **Construction Site Stormwater Manager (CSSM):** Contractor’s designated staff person or sub Contractor with the responsibility of managing the implementation of the SWPPP on the project site. The CSSM shall have the authority to direct work on the job site as necessary to maintain compliance with the SWPPP program. CSSM shall be a Qualified SWPPP Practitioner (QSP).

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Materials, Equipment and Procedures suitable for SWPPP implementation.
 - 1. Contractor to provide an engineered SWPPP signed by a California Certified QSD for electronic submittal by the University to the State Water Resources Control Board. Contractor shall provide a descriptive project site drawing depicting all BMPs for: run-on and run-off controls and good housekeeping measures, as well as storm and non-storm water control measures that will be used on the site. All erosion and sediment control BMP measures shall be listed in the project SWPPP and indicated on the water pollution control plan. SWPPP shall include water sampling criteria as required.
 - 2. Rolled Erosion Control Products (RECPs): Use degradable erosion control blanket appropriate for required protection duration.
 - a. Mulch Control netting: A planar woven natural fiber or extruded geosynthetic mesh used as a temporary degradable rolled erosion control product to anchor loose fiber mulches.
 - b. Open weave textile: A temporary degradable rolled erosion control product composed of processed natural or polymer yarns woven into a matrix, used to provide erosion control and facilitate vegetation establishment.
 - c. Erosion control blanket: a temporary degradable rolled erosion control product composed of processed natural or polymer fibers mechanically, structurally or chemically bound together to form a continuous matrix to provide erosion control and facilitate vegetation establishment
- B. Straw Wattle/Fiber Rolls: A pre-manufactured roll of rice or wheat straw, wood excelsior, or coconut fiber encapsulated within photodegradable plastic or biodegradable jute, sisal, or coir fiber netting.
 - 1. Netting: shall have a minimum durability of one year after installation. The netting shall be secured tightly at each end of the roll. Rolls shall be between 8 inches and 12 inches in diameter. Rolls between 8 inches and 10 inches in diameter shall have a minimum weight of 1 pound per linear foot and a minimum length of 20 feet. Rolls between 10 inches and 12 inches in diameter shall have a minimum weight of 3 pounds per linear foot and a minimum length of 10 feet.
 - 2. Stakes: Wood stakes shall be a minimum of 1" x 2" x 24". Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots and other defects, which would render them, unfit for the purpose intended. Metal stakes shall not be used.
 - 3. Rope: Rope shall be biodegradable, such as sisal or manila, with a minimum diameter of 1/4 inch.
- C. Flocculent: Chemical added to a fluid to promote the coagulation and sedimentation of suspended material in the Automatic Treatment System (ATS) if required.
 - 1. Must be Chitosan or approved equivalent.

2. Jar tests shall be conducted using water samples selected to represent typical site conditions and in accordance with ASTM D2035-08 (2003)
 3. The discharger shall conduct, at minimum, six site-specific jar tests for each project to determine the proper polymer and dosage levels for the ATS.
- D. Filter Fabric: Shall comply with SSPWC Section 213 - Engineering Fabric, of Standard Specifications.
- E. Hydroseed Mix: Shall consist of seed, tackifier, and mulch. Mix shall comply with SSPWC Section 308-4.9 Erosion Control Planting.
1. Seed: The species and application rates of grass, legume, and cover crop seed furnished shall be as stipulated herein.
 - a. Seed shall be furnished separately or in mixtures in standard containers with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed.
 - b. The Contractor shall furnish the Architect (1) one signed copy and the University (1) signed copy of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed.
 - c. Seeds shall be applied as follows:

LBS/AC	SPECIES/COMMON NAME
7	Vulpia microstachys, Small Fescue
2	Vulpia octoflora, Six weeks fescue

2. Fertilizer: Must be a pelleted or granular form and must be one of the following:

Organic Fertilizer Products	Guaranteed Chemical Analysis (N-P-K) (%)	Company
Biosol Mix® - Granular	7-2-3	Rocky Mountains Bioproducts Edwards, CO
Fertil-Fibers™	6-4-1	Quattro Environmental Coronado, CA
Sustane®	5-2-4	Natural Fertilizer of America Cannon Falls, MN
Approved Equal ¹	(N) 5 to 7 (P) 1 to 5 (K) 2 to 10	

¹Approved equal must be within the ranges shown for N-P-K. The cumulative (N) release rate must be no more than 70 percent the first 70 days after incubation (86° F) with 100 percent at 350 days or more.

3. Straw: Shall comply with CSS Section 20-2.06 of Standard Specifications
4. Tackifier: Tackifier shall be plant based and applied at an appropriate rate and ratio as indicated by the manufacturer.
 - a. Guar (Plant based)
 - b. Psyllium (Plant based)
 - c. Starch (Plant based)
5. Fiber: Fiber shall be free from lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, chlorine bleach, and synthetic or plastic materials. Fiber shall be, at most, 7 percent ash. Fiber shall be one of the following products:
 - a. Wood: wood shall comply with the following:
 - 1) Long strand, whole wood fibers, thermo-mechanically processed from clean, whole wood chips
 - 2) Not made from sawdust, cardboard, paper, or paper byproducts
 - 3) At least 25 percent of fibers 3/8 inch long
 - 4) At least 40 percent held on a No.25 sieve
 - b. Cellulose: Cellulose Fiber shall be made from natural or recycled pulp fiber, such as wood chips, sawdust, newsprint, chipboard, corrugated cardboard, or a combination of these materials
 - c. Alternate: Alternate fiber shall comply with the following:
 - 1) Long strand, whole natural fibers made form clean straw, cotton, corn, or other natural feed stock.
 - 2) At least 25 percent of fibers 3/8 inch long
 - 3) At least 40 percent held on a No. 25 sieve
 - d. A combination of wood, cellulose, or alternate
6. Coloring Agent: Use a biodegradable, nontoxic coloring agent free from copper, mercury, and arsenic.
- F. Mulch: Mulch shall comply with SSPWC Section 212-1.2.5 Mulch and shall be, tree bark, wood chips, shredded bark, or a combination of thereof at the Contractor's option.
- G. Silt Fencing Fabric: Geosynthetic fabric for temporary silt fence shall consist of one of the following:
 1. Polyester, Polypropylene, Combined polyester and polypropylene fabric:

Property	ASTM Designation	Specification	
		Woven	Non-woven

Grab breaking load 1-inch grip, lb., min. in each direction	D 4632	120	120
Apparent elongation percent, min., in each direction	D 4632	15	50
Water Flow Rate max. average roll value, gallons per minute/square foot	D 4491	10-50	100-150
Permittivity 1/sec., min.	D 4491	0.05	0.05
Apparent opening size max. average roll value, U.S. Standard sieve size	D 4751	30	30
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	D 4595	70	

- a. Sample under ASTM D 4354, Procedure C.
 - b. Test under ASTM D 4759. All properties shall be based on Minimum Average Roll Value (MARV).
 - c. Identify, store, and handle under ASTM D 4873.
2. Protect geosynthetics from moisture, sunlight, and damage during shipping and storage. Label each unit with the manufacturer's name, identifying information, and product identification.
 3. Posts: Posts must be wood or steel
 - a. Wood posts must:
 - i. Untreated fir, redwood, cedar, or pine and cut from sound timber
 - ii. Straight and free of loose or unsound knots and other defects that would render the stakes unfit for use
 - iii. Pointed on the end to be driven into the ground
 - iv. At least 2" x 2" in size, and 4 feet long
 - b. Steel posts must:
 - i. Have a "U," "T," "L," or other cross-sectional shape that can resist failure from lateral loads.
 - ii. Be pointed on the end to be driven into the ground.
 - iii. Weigh at least 0.75-pound per foot.
 - iv. Be at least 4 feet long.
 - v. Have a safety cap attached to the exposed end. The safety cap must be orange or red plastic and fit snugly to the metal post.
 - H. Inlet protection:
 1. Sediment filter bag:
 - a. Must be made of fabric
 - b. Must be sized to fit the catch basin or drainage inlet

- c. Must include a high-flow bypass
 - d. May include a metal frame, sediment bags that do not have a metal frame and are deeper than 18 inches must:
 - i. Include lifting loops and dump straps
 - ii. Include a restraint cord to keep the sides of the bag away from the walls of the catch basin
- 2. Gravel-filled bag fabric must:
 - a. Be made from fabric
 - b. Have inside dimensions from 24 to 32 inches in length, and from 16 to 20 inches in width
 - c. Have the opening bound to retain the gravel. The opening must be sewn with yarn, bound with wire, or secured with a closure device
 - d. Weigh from 30 to 50 pounds when filled with gravel
- 3. Gravel for gravel filled bags must be:
 - a. From 3/8 inch to 3/4 inch in diameter
 - b. Clean and free from clay balls, organic matter, and other deleterious material
- I. Soil Binders:
 - 1. The soil binder must be:
 - a. Nonflammable
 - b. Nontoxic to aquatic organisms
 - c. Free from growth or germination inhibiting factors
 - d. A plant-based product
 - 2. Soil binder classified as a plant-based product must be:
 - a. A natural high molecular weight polysaccharide
 - b. A high viscosity hydrocolloid that is miscible in water
 - c. Functional for at least 180 days
 - d. Labeled as either guar, psyllium, or starch
 - 3. Guar must be:
 - a. A guar gum based product derived from the ground endosperm of the guar plant, *Cyamopsis tetragonolobus*
 - b. Treated with dispersant agents for easy mixing
 - c. Able to be diluted at the rate of 1 to 5 pounds per 100 gallons of water
 - 4. Psyllium must be:
 - a. Made of finely ground myceloid coating of *Plantago ovata* or *Plantago ispaghula* seeds
 - b. Able to dry and form a firm but re-wettable membrane

5. Starch must be a non-ionic, water-soluble granular material derived from corn, potato, or other plant-based source.
6. Coloring agent: Use a biodegradable, nontoxic coloring agent free from copper, mercury and arsenic to ensure the hydraulic mulch contrasts with the application area.

PART 3 - EXECUTION

3.1 ROLES AND RESPONSIBILITIES

- A. General: During the Construction and Closeout phases of the project the Contractor is responsible for all of the duties identified in the project SWPPP, including overall compliance with the SWPPP and GCP, and the physical implementation and maintenance of all site BMPs.
- B. Contractor shall provide an engineered SWPPP Plan signed by QSD for electronic submittal by the University Department of Environmental Health and Safety to the State Water Resources Control Board.
- C. Pre-Construction
 1. General: The Contractor shall participate in meetings, training sessions, and coordination efforts with the owner to refine the project SWPPP and define communication protocols.
 2. Construction Site Stormwater Manager: The Contractor shall designate a single qualified person to be the project Construction Site Stormwater Manager (CSSM). This person shall be on-site during work hours and shall be available to address construction stormwater concerns. A backup CSSM shall be designated to perform the duties of the CSSM in the event they are unable to do so or not reachable during an emergency.
 3. Training: Both the CSSM and their designated back-up shall be a QSP prior to the start of construction, and maintain certification for the project duration.
 4. Coordination of project SWPPP: The Contractor is responsible for participating in the coordination of the SWPPP. This shall include but is not limited to the following.
 - a. Attend a pre-construction meeting with the owner to present the site logistics plan for all phases of the project and discuss how BMPs will be integrated to the plan. Prime Contractor is responsible to provide SWPPP amendments as required. Amendments must be prepared by a Qualified SWPPP Developer (QSD).
- D. Construction Phase
 1. Daily Tasks: The CSSM shall be responsible for performing the following daily tasks.
 - a. Check daily weather forecast on NOAA site for greater than 50 percent likely hood of rainfall.
 - b. Maintain the sub-Contractor log.
 - c. Provide copies of BMP information to sub-Contractors regarding implementation around their areas of work.
 - d. Perform visual inspection of the site and all installed BMPs.
 - e. Make corrections to faulty or poorly performing BMPs within 24 hours.
 - f. Contractor shall post and maintain a copy of the BMPs in their project office.

- g. A hard copy of the SWPPP document must be kept on-site at all times. In the event there is not an onsite field office, the binder shall be kept in the CSSM's vehicle and be onsite during work hours.
 - 2. Event Specific Tasks: The CSSM shall be responsible for performing the following tasks based on a specific event. For each event the CSSM shall report and implement the necessary measures within 24 hours unless noted otherwise.
 - a. Rain Event Action Plan (REAP): For Risk Levels 1, 2 or 3 projects, when the CSSM determines there is a greater than 50 percent likelihood of rainfall per the NOAA forecast, the CSSM shall prepare and implement a REAP.
 - b. BMP Maintenance: When a visual inspection or deficiency notice identifies that a site BMP is damaged, improperly installed, or otherwise in need of repair the Contractor shall be responsible for ensuring the BMP is repaired within 24 hours.
 - c. Non-Storm Water Run-Off Reporting: In the event of a spill or release of material that may cause non-storm water runoff, all Contractors and sub-Contractors employees are responsible for immediately notifying the CSSM and containing the spill for clean up, removal, and required analysis.
 - d. The Contractor shall provide, operate and maintain any and all storm water conveyance, detention, and or treatment facilities required to meet the CGP Risk Level Requirements appropriate for the project.
 - 3. Periodic Tasks: The CSSM shall be responsible for performing the following tasks as necessary during the course of construction.
 - a. BMP Maintenance: As needed for the project duration.
 - b. Annual Report: Assist and coordinate with owner to fulfill annual reporting requirements. Submit all records and documentation requested by the SMARTS system and the CGP.
 - 4. At all qualifying Rain Events the QSP shall take samples in accordance with the SWPPP and the GCP.
- E. SWPPP Closeout Phase
- 1. The Contractor shall ensure that all temporary BMPs, equipment, and construction materials have been removed from the project site
 - 2. The Contractor shall ensure that all permanent planting and landscaping has been installed and established and prepare documentation to demonstrate the minimum 70-percent coverage has been established.
 - 3. The Contractor shall ensure that all permanent post-construction BMPs have been installed.
 - 4. The Contractor shall stencil with Thermoplastic paint, "Do Not Dump, Drains to Ocean" on every drain inlet, catch basin, exterior drain contained within the project site AND within 100' of the boundary of the perimeter of the project on all sides.
 - 5. The design of the stencil shall be approved by the University Department of Environmental Health and Safety prior to placement.

- F. Contractor Transition: Where the project site will continue under the current approved SWPPP, however responsibility will transition to a different Contractor:
1. The Contractor shall leave the site in a condition acceptable to both the owner and the incoming Contractor.
 2. The CSSM shall walk the site with the incoming Contractor no less than two weeks prior to the planned transition of job site responsibility. At that time the condition of all BMPs will be reviewed and those requiring repair and/or replacement identified. The Contractor shall perform all identified repair and/or replacement prior to the transition of site responsibility.

3.2 BEST MANAGEMENT PRACTICES (BMPs) INSTALLATION AND IMPLEMENTATION:

For each applicable section below, the Contractor shall delineate the items on the site map.

- A. Areas of Disturbed Soil - Contractor shall clearly identify on the site map all areas of soil disturbance. These areas shall include soil removal or augmentation, such as holes, pits, excavations, trenches, berms, slopes, fill, and imported top soil.
- B. Areas of Existing Vegetation - Contractor shall protect existing vegetation that is to be preserved on the site from mechanical or other injury during the project. Areas of existing vegetation shall be clearly delineated on the site map.
- C. Dust Suppression-Water Management - Contractor shall use best available dust suppression equipment and methods to control dust so that the dust does not cause discomfort or nuisance to occupants of the project site neighboring property. Contractor shall control dust suppression water so that it is effective in controlling dust, but does not enter the storm drain system.
- D. De-Watering and Sediment Management - Ground water encountered in excavations is not covered under the CGP. Removal and discharge of ground water must be handled with separate permit. If groundwater is encountered on the project site the Contractor shall stop all construction activities in the immediate area and notify the University Representative and Project Architect before proceeding. The Contractor is required to contact the local sanitary sewer and/or storm water agency for discharge requirements and prohibitions. Storm water in excavations that has not mixed with ground water is covered by the CGP. Water quality must comply with discharge regulations.
- E. Site Ingress and Egress Tracking Prevention - The Contractor shall ensure that soil is not tracked off the project site or onto public or campus rights of way.
- F. Storm Drain Inlet Protection - The Contractor shall protect storm drain inlets from receiving sediment, hazardous chemicals, gasoline, diesel, oil or grease, trash, debris or other pollutants from the construction site.
- G. Construction Materials Storage - The Contractor shall cover and berm around materials that could contribute storm water pollution.
- H. Concrete, Mortar, Saw cutting - Concrete, Mortar, and Saw cutting: Proper procedures for concrete, mortar, and saw cutting activities are designed to prevent these materials from coming into contact with storm water flows and raising or lowering pH to levels outside the acceptable range. Concrete, mortar, and saw cutting also create potential problems for air pollution, and

deliver and storage. Refer to 2010 CASQA Handbook, WM-1 "Concrete Waste Management", WM-3 "Stockpile Management", and WM-8 "Concrete Waste Management" for proper procedures and practices.

- I. Vehicle and Equipment cleaning, fueling, and maintenance
 1. Vehicle and Equipment Cleaning: Proper vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to storm water from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures. Refer to 2010 CASQA Handbook, NS-8 "Vehicle and Equipment Cleaning" for proper procedures and practices.
 2. Vehicle and Equipment fueling: Vehicle Equipment fueling procedures and practices are designated to prevent fuel spills and leaks, and reduce or eliminate contamination of storm water. This can be done by using offsite facilities, fueling in designated areas only, enclosed or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures. Refer to 2010 CASQA Handbook, NS-9 "Vehicle and Equipment Fueling" for proper procedures and practices
 3. Vehicle and Equipment Maintenance: Proper vehicle and Equipment Maintenance procedures and practices are designed to prevent or reduce the contamination of storm water resulting from vehicle and equipment maintenance by running a "dry and clean site" The best option would be to perform maintenance activities at an offsite facility. If his option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures. Refer to 2010 CASQA Handbook, NS-10 "Vehicle and Equipment Maintenance" for proper procedures and practices
- J. Spill Prevention and Control: Proper spill Prevention and Control procedures and practices are designed to prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees. Refer to 2010 CASQA Handbook, WM-10 "Spill Prevention and Control" for proper procedures and practices. WM-1 "Materials Delivery and Storage", and WM-2 "Material Use", also contain useful information on spill prevention.
- K. Rolled Erosion Control Products (RECPs)
 1. General procedure: prepare a stable and firm soil surface free of rocks and other obstructions. Apply soil amendments as necessary to prepare seedbed. Place fertilizer, water, and seed in accordance with manufacturer, local/state regulations, or engineer/specifiers requirements. Typically, RECPs are unrolled parallel to the primary direction of flow. Endure the product maintains intimate contact with the soil surface over the entirety of the installation. Do not stretch or allow material to bridge over surface inconsistencies. Staple/stake RECPs to the soil such that each staple/stake is flush with the underlying soil.

Install anchor trenches, seams and terminal ends as specified. Install RECPs after application of seed, fertilizer, mulches (if necessary) and other necessary soil amendments.

2. Installation: Anchor Trenches, Seams and Terminal Ends: Utilize one of the methods below for initial anchoring of Upslope Anchor RECPs
 - a. Staples: Install the RECPs 3 ft (900 mm) beyond the shoulder of the slopes onto flat final grade. Secure roll ends with a single row of stakes/staples on 1 ft (300 mm) centers
 - b. Anchor trench: Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Extend the upslope terminal end of the RECPs 3 ft. (900 mm) past the anchor trench. Use stakes or staples to fasten the produce into the bottom of the anchor trench on the 1 ft. (300 mm) centers. Backfill the trench and compact the soil into the anchor trench. Apply seed and any necessary soil amendments to the compacted soil and cover with remaining 1 ft. (300 mm) terminal end of the RECPs. Fold product over compacted soil in anchor trench to overlap downslope material. Secure terminal ends of RECPs with a single row of stakes or staples on 1 ft. (300 mm) centers
 - c. Staple Check: Construct a stake/staple check slot along the top edge of the RECPs by installing tow rows of staggered stakes/staples 4 in. (100 mm) apart on 4 in. (100 mm) centers
 - d. Single net product anchor trench: Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Position roll such that the leading end of the roll is downslope and upside down. Apply seed and necessary soil amendments. Extend product 1 ft. downslope of anchor trench and place material in anchor trench (upside down). Secure terminal end and material in anchor trench with staples at 1 ft. intervals. Fill anchor trench with soil and compact. Apply seed and necessary soil amendments to fill placed in anchor trench. Move remaining roll over and downslope of anchor trench and proceed unrolling RECP downslope (since roll was initially reversed, folding material over anchor trench will result in the net side up, and rolling correctly downslope over the anchor trench).
3. Seams – Utilize one of the methods below for seaming of RECPs
 - a. Adjacent seams: Overlap edges of adjacent RECPs by 2 to 4 in. (50 to 100 mm) or by abutting products as defined by manufacturer. Use a sufficient number of stakes or staples to prevent seam or abutted rolls from separating.
 - b. Consecutive rolls: Shingle and overlap consecutive rolls 2 to 6 in. (50 to 150 mm) in the direction of flow. Secure staples through seam at 1 ft. (300 mm) intervals
 - c. Check seam: Construct a stake/staple check seam along the top edge of RECPs for slope application and at specified intervals in a channel by installing two staggered rows of stakes/staples 4 in. (100 mm) apart on 4 in. (100 mm) centers.
 - d. Slope interruption check slot: excavate a trench measuring 6 in. wide by 6 in. deep (150 mm by 150 mm). Secure produce to the bottom of the trench. Fold product over upslope material and fill and compact the trench on the downslope side of check slot and seed fill. Continue rolling material downslope over trench.
4. Terminal Ends – Utilize one of the methods below for all terminal ends of RECPs

- a. Staples: Install the RECPS 3 ft. (900 mm) beyond the end of the channel and secure end with a single row of stakes/staples on 1 ft. (300 mm) centers. Stakes/staples for securing RECPS to the soil are typically 6 in (150 mm) long.
 - b. Anchor trench: Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Extend the terminal end of the RECPs 3 ft. (900 mm) past the anchor trench. Use stakes or stapes to fasten the product into the bottom of the anchor trench. Apply seed and any necessary soil amendments to the compacted soil and cover with remaining 1 ft. (300 mm) terminal end of the RECPs. Secure terminal end of RECPs with a single row of stakes or staples on 1 ft. (300 mm) centers.
 - c. Check slot: Construct a stake/staple check slot along the terminal end of the RECPs by installing two rows of staggered stakes/staples 4 in. (100 mm) apart on 4 in. (100 mm) centers.
 - i. Slope installations: At the top of slope, anchor the RECPs according to one of the methods detailed above. Securely fasten all RECPs to the soil by installing stakes/staples at a minimum rate of 1.3/yd² (1.5/m²) within the body of the blanket. For the most effective RECP installation use stake/staple patterns and densities as recommended by manufacturer. For adjacent and consecutive rolls of RECPs follow seaming instructions detailed above. The terminal end of the RECPs installation must be anchored using one of the methods detailed above.
 - d. Recommended maximum gradient for RECPs slope applications
 - i. Mulch Control Nets: 5:1(H:V)
 - ii. Netless Rolled Erosion Control Blankets: 4:1 (H:V)
 - iii. Single-net Erosion Control Blankets & Open Weave Textiles: 3:1 (H:V)
 - iv. Double-net Erosion Control Blankets: 2:1 (H:V)
5. Straw Wattle/Fiber Rolls Installation:
- a. Fiber rolls: Rope and notched stakes shall be used to restrain the fiber rolls against the slope. Stakes shall be driven into the slope until the notch is even with the top of the fiber roll. Rope shall be knotted at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the fiber roll tightly to the slope. Furrows will not be required.
 - b. Fiber rolls shall be placed 10 feet apart along the slope for slope inclination (horizontal: vertical) of 2:1 and steeper, 15 feet apart along the slope for slope inclination between 2:1 and 4:1, 20 feet apart along the slope for slope inclination between 4:1 and 10:1, and a maximum of 50 feet apart along the slope for slope inclination of 10:1 and flatter.
 - c. The bedding area for the fiber rolls shall be cleared of obstructions including rocks, clods, and debris greater than one inch in diameter before installation.
 - d. If cross slope drainage is desired, replace the following with "The installed angle of the fiber roll to the slope contour shall create a 2 percent to 5 percent grade from the center of the slope to the slope conform at the limit of disturbance." The limit of disturbance refers to the edge of a disturbed soil area (DSA) created by grading, vegetation removal, etc. Edit as needed.

- e. Fiber rolls shall be installed approximately parallel to the slope contour.
 - f. If the intended function of the fiber rolls to disperse concentrated water runoff and to reduce runoff velocities is impaired, the Contractor shall take action to repair or replace the fiber rolls. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping fiber rolls shall be repaired with additional stakes or replaced. Locations where rills and other evidence of concentrated runoff have occurred beneath the rolls shall be corrected. Fiber rolls shall be repaired or replaced within 24 hours of identifying the deficiency.
- L. Filter Fabric: Shall comply with SSPWC Section 213 – Engineering Fabric”, of Standard Specifications.
- M. Silt Fence Installation: Silt fence must be:
- 1. Constructed with silt fence fabric, posts, and fasteners
 - 2. Prefabricated or assembled at the job site
 - 3. Attached to posts using these methods:
 - a. If prefabricated silt fence is used, posts must be inserted into sewn pockets
 - b. If assembled on the job site:
 - i. If wood posts are used, fasteners must be staples or nails
 - ii. If steel posts are used, fasteners must be tie wires or locking plastic fasteners
 - iii. Spacing of the fasteners must be no more than 8 inches apart
 - 4. Installation:
 - a. Placing the bottom of the fabric in a trench that is at least 6 inches deep
 - b. Securing with posts placed on the downhill side of fabric
 - c. Backfilling the trench with soil and hand or mechanically tamping to secure the fabric in the trench
 - d. Silt fence sections connected by:
 - i. Joining separate sections of silt fence to form reaches that are no more than 500 feet long
 - ii. Securing the end posts of each section by wrapping the tops of the posts with at least two wraps of 16-gage diameter tie wire
 - iii. Ensuring that each reach is a continuous run of silt fence from an end to an opening, including joined panels
 - iv. Place silt fence approximately parallel to the slope contour. For any 50 foot section of silt fence, do not allow the elevation at the base of the fence to vary more than 1/3 of the fence height.
 - v. If you mechanically push the silt fence fabric vertically through the soil, you must demonstrate that the silt fence fabric will not be damaged and will not slip out of the soil, resulting in sediment passing under the silt fence fabric.
 - vi. If you reinforce the silt fence fabric with wire or plastic mesh, you may increase the post spacing to a maximum of 10 feet. The field-assembled reinforced silt fence must be able to retain saturated sediment without collapsing.

5. Maintenance: Maintain temporary silt fence to provide sediment holding capacity and to reduce runoff velocities by:
 - a. Removing sediment from behind the silt fence when sediment is 1/3 the height of the silt fence above ground
 - b. Repairing or adjusting the silt fence when rills and other evidence of concentrated runoff occur beneath the silt fence fabric
 - c. Repairing or replacing the silt fence fabric when it become split, torn, or unraveled within 24 hours of discovering damage unless engineer approves a longer period
 - d. Removing sediment deposits, trash, and debris from temporary silt fence as needed or when directed by the Architect. If removed sediment is deposited within project limits, it must be stabilized and not subject to erosion by wind or water. Trash and debris must be removed and disposed of properly.

N. Hydroseed:

1. The quantity of tackifier in the mixture shall be as recommended by the manufacturer.
2. The ratio of water to fiber and tackifier in the mixture shall be as recommended by the manufacturer. The proportions of various erosion control materials may be changed by the Architect to meet field conditions. Use hydroseeding equipment to apply hydroseed.
3. Apply hydroseed:
 - a. At application rate recommended by manufacturer. Successive applications or passes may be needed to achieve the recommended rate:
 - i. To form a continuous mat with no gaps between the mat and the soil surface
 - ii. From 2 or more directions to achieve a continuous mat
 - iii. In layers to avoid slumping and to aid drying
 - b. During dry weather or at least 24 hours before predicted rain
 - c. The ratio of total water to total tackifier in the mixture shall be as recommended by the manufacturer.
 - d. Seed may be dry applied at the rate recommended by the manufacturer for small areas not accessible by the hydroseeding equipment, when approved in writing by the Architect. Dry applied seed shall be incorporated into the soil a maximum depth of 1/4 inch by raking or dragging.
 - e. Hydraulic application of erosion control (Hydroseed) materials for rolled erosion control product (Netting) areas shall be applied by hose, from the ground. Erosion control (Hydroseed) materials must be applied onto the slope face such that the materials are well integrated into the rolled erosion control product (Netting) and in contact with ground surface. Application must be perpendicular to the slope face such that rolled erosion control product (Netting) materials are not damaged or displaced. Complete tackifier application on the same day as straw work began for that area.
 - f. The CSSM may change the application rates of erosion control (Hydroseed) materials to meet field conditions.

- g. For any area where erosion control (Hydroseed) materials are to be applied, the application of all erosion control (Hydroseed) materials to be applied to that area must be completed within 72 hours from when the first materials were applied.
 - h. Immediately after the application of the hydroseed, sprinklers shall be operated just long enough to wash excess material from previously planted materials and site features. Care shall be taken to avoid washing or eroding materials from area.
 - i. Follow-up applications shall be made as needed to cover weak spots and to maintain adequate soil protection.
 - j. Contractor shall provide regular irrigation as required until hydroseeding is well established. Contractor shall review in the field with the SWMR to determine when irrigation can cease.
- O. Mulch: Spread mulch to a uniform thickness. Extend mulch to the edge of retaining walls, dikes, paving and to within 4 feet from the flow line of paved and unpaved drainage ditches.
- P. Inlet Protection: Install per manufacturers recommendations and maintain as required based on field conditions and inspections.
- Q. Soil Binders:
 - 1. Apply soil binder:
 - a. Per the manufacturer's recommendations for the job site soil conditions. Pre-wet the area if recommended by the manufacturer.
 - b. From 2 or more directions to achieve a continuous cover.
 - c. During dry weather at least 24 hours before predicted rain.
 - 2. Do not apply soil binder if:
 - a. Water is standing on or moving across the soil surface
 - b. Soil is frozen
 - c. Air temperature is below 40 °F during the tackifier-curing period unless allowed by the manufacturer and approved by the engineer. Note: Do not over-spray soil binder onto the traveled way, sidewalks, lined drainage channels, or existing vegetation.
 - 3. Maintenance:
 - a. Reapply soil binder within 24 hours of discovering visible erosion, unless the Architect approves a longer period
 - b. Temporary soil binder disturbed or displaced by the Contractor's vehicles, equipment, or operations must be reapplied at the Contractor's expense.

END OF SECTION

SECTION 01 58 00
TEMPORARY PROJECT SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Temporary project signage including informational signs.

1.3 RELATED SECTIONS

- A. Section 01 35 43 – Environmental Protection: Coordination of signage for environmental protection.
- B. Section 01 52 00 – Construction Facilities: Coordination of signage locations.
- C. Section 01 55 00 – Vehicle and Pedestrian Controls: Coordination of signage w/ parking & traffic control
- D. Section 01 74 19 – Construction Waste Management: Coordination of signage associated with the Waste Management and Recycling Plan.

1.4 SUBMITTALS

- A. Temporary Project Signage Submittal: In coordination with the Construction Area Plan submittal, which identifies the locations and types of signs for the purposes of construction, the Temporary Project Signage submittal shall include the graphic design and signage material information to demonstrate compliance with project requirements.
 - 1. Due within 21 Days of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. During the course of construction, submit any proposed revisions for acceptance prior to implementing any changes.
 - 2. The Temporary Project Signage submittal shall include a copy of the signage graphics for all temporary signs to be used as part of the construction process, including, but not limited to the Project Identification Sign(s), traffic control signs, informational, and directional signs.

PART 2 - PRODUCTS

2.1 SIGN MATERIALS

- A. Sign Structure and Framing: Contractor shall provide new materials, wood or metal, structurally adequate to support sign panel and suitable for specified finish.

- B. Sign Surfaces: Sign surfaces shall be minimum 5/8-inch thick, exterior grade, softwood plywood with medium or high-density phenolic sheet overlay, standard large sizes to eliminate joints. Contractor shall provide sheet thickness as required to span across framing members and provide even, smooth surface without waves or buckles.
- C. Hardware: Hardware shall be hot-dip galvanized steel.

2.2 PROJECT IDENTIFICATION SIGN

- A. In addition to signage otherwise required, contractor shall provide not less than one project sign per General Conditions 4.23. The sign may be 3 feet by 5 feet securely mounted in an approved location. Submit sign graphics and proposed location for approval. The sign shall be of durable construction and quality graphics with no advertising.
 - 1. Name of the Project;
 - 2. Description of the work;
 - 3. Name and/or logo the University;
 - 4. Name and/or logo the Contractor;
 - 5. Name and/or logo of the Architect and their primary consultants;
 - 6. Contractor's field office phone number;
 - 7. University emergency phone number.

2.3 PROJECT INFORMATIONAL SIGNS

- A. Restrictions: Contractor shall not display signs other than Project Identification Sign specified above and Project Informational Signs specified below without written approval of University's Representative.
- B. Project Informational Signs: Informational signs, necessary for conduct of construction activities or required by governmental authorities having jurisdiction, may be displayed when in conformance to sign construction and graphic requirements specified in this Section.
 - 1. Adequacy of signage for safety and conformance to requirements of authorities having jurisdiction and trade practices shall be solely Contractor's responsibility.
 - 2. The University reserves the right to reject signage that does not meet the University's standards.
- C. Sign Design: Informational signage shall be produced by professional sign painters or graphics designers and be of size and lettering style consistent with use. Colors shall be as required by authorities having jurisdiction and, if not otherwise required, of colors consistent with Project graphics. Where sign is related to vehicular access, comply with Caltrans standard details.

PART 3 – EXECUTION

3.1 TEMPORARY PROJECT SIGNAGE INSTALLATION

- A. Project Identification Sign Construction: Construct sign support structure and install panels in durable manner, to resist high winds.

- B. Project Identification Sign Installation: Erect Project Identification Sign on site at a lighted location of public visibility, adjacent to the main entrance to site, as approved by University.
 - 1. Contractor shall install sign at height for optimum visibility, on ground-mounted poles or attached to portable structure on skids.
 - 2. Portable structures shall resist overturning force of wind.
- C. Field Painting: Paint all surfaces and edges of sign face and support for finished appearance.

3.3 SIGNS MAINTENANCE

- A. Signs Maintenance: Contractor shall maintain signs and supports in a neat, clean condition. Contractor shall repair all damage and weathering to structure, framing and signage.
- B. Sign Relocation: Contractor shall relocate signs as required by progress of the work.

3.4 REMOVAL

- A. Project Signage Removal: Contractor shall remove Temporary Project Signage when directed, but no later than at the Final Completion. Contractor shall coordinate removal with requirements specified in Section 01 52 00 – Construction Facilities.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. General requirements for products used for the Work, including:
 - 1. General characteristics of products
 - 2. Product options
 - 3. System completeness
 - 4. Transportation and handling requirements
 - 5. Storage and protection of products
 - 6. Installation of products.

1.3 RELATED REQUIREMENTS

- A. Section 01 25 00 - Substitution Procedures: Requirements for product substitutions.
- B. Section 01 33 00 - Submittal Procedures: Requirements applicable to submittals for "or equal" and "or approved equal" and/or alternates and substitute products.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - 1. Schedule delivery to minimize long-term storage at site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to site in undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products upon delivery to ensure compliance with Contract Documents and to ensure that products are undamaged and properly protected.
 - 5. Store products at site in manner that will facilitate inspection and measurement of quantity or counting of units.

6. Store products subject to damage by elements above ground, under cover in weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

1.5 PRODUCT SELECTION

- A. General: Comply with requirements of the Contract General Conditions.
- B. Product Selection Procedures: Contract Documents and governing regulations govern product selection. Procedures governing product selection include following:
 1. General: Comply with requirements of the Contract General Conditions.
 2. Products Specified by Reference Standards or Description Only: Any product meeting those standards or description.
 3. Products Specified by Indicating Basis for Design: Design and approval is based on systems, products, and assemblies of manufacturer indicated. Equivalent systems, products, and assemblies of other named manufacturers may be used, however, Contractor is responsible for additional approvals required, for coordination with remainder of Contract Documents, and for costs of redesign or recalculation required. Comply with Section 01 25 00 to obtain approval for use of unnamed product.
 4. Products Specified by Naming One or More Manufacturers: Products of named manufacturers meeting Specifications. Submit request for substitution for manufacturer not specifically named.
 - a. Products of acceptable manufacturers are subject to requirements of Specifications for specified product.
 5. Products Specified by Naming One or More Manufacturers with No Known Equals: Products of named manufacturers meeting Specifications: no options, no substitutions.
 - a. Products of acceptable manufacturers are subject to requirements of Specifications for specified product.
 6. Descriptive Specification Requirements: Where Specifications describe product or assembly, listing exact characteristics required, with or without use of brand or trade name, provide product or assembly that provides characteristics and otherwise complies with Contract requirements.
 7. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application indicated.
 - a. Manufacturer's recommendations may be contained in published product literature or by manufacturer's certification of performance.
 8. Compliance with Standards, Codes, and regulations: Where Specifications only require compliance with imposed code, standard, or regulation, select product that complies with standards, codes, or regulations specified.
 9. Visual Matching: Where Specifications require matching established Sample, Architect's decision will be final on whether proposed product matches satisfactorily.

- a. Where no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of Section 01 25 00 for selection of matching product in another product category.
10. Visual Selection: Where specified product requirements include phrase "... as selected from manufacturer's standard colors, patterns, textures..." or similar phrase, select product and manufacturer that complies with other specified requirements. Architect will select color, pattern, and texture from product line selected.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Installation of Products:
 1. Contractor shall comply with manufacturer's instructions and recommendations for installation of products, except where more stringent requirements are specified and necessary due to Project conditions or are required by authorities having jurisdiction.
 2. Contractor shall anchor each product securely in place, accurately located and aligned with other Work.
 3. Contractor shall clean exposed surfaces and provide protection to ensure freedom from damage and deterioration at time of Contract Completion review. Contractor shall refer to additional requirements specified in Section 01 74 00 - Cleaning Requirements.

END OF SECTION

SECTION 01 71 00

EXAMINATION AND PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Requirements for preparation prior to installing, applying and placing products to determine acceptable conditions for the Work.
- B. Layout of the Work and other engineering services necessary to accomplish the Work.

1.3 RELATED REQUIREMENTS

- A. Section 01 78 10 - Survey and Layout Data: Requirements for survey and layout data submittals.
- B. Individual Division 2 through 33 Product Specification Sections: Specific requirements for preparation prior to performance of the Work.

1.4 LAYOUT OF WORK

- A. Surveyor: Contractor shall select and pay for services of a land surveyor, registered in the State of California, for proper performance of the Work.
 - 1. Services of surveyor shall be suitable for layout and verification of location of utilities and site elements.
 - 2. For the Project record, Contractor shall submit the name, address and telephone number of land surveyor before starting survey Work.

PART 2 - PRODUCTS

Not applicable to this section.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Manufacturer's Requirements: Contractor shall determine product manufacturer's requirements and recommendations prior to commencing Work.
- B. Preparations: Contractor shall perform preparation actions according to manufacturer's instructions and recommendations and according to specified procedures.
 - 1. Contractor shall perform surface preparation as necessary to create suitable substrates for application, installation and placement of products.

2. Contractor shall notify University's Representative in writing of unsuitable conditions preventing proper performance of the Work.
- C. Existing Utility Information: Contractor shall furnish information to serving utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Contractor shall coordinate with University's Representative and with authorities having jurisdiction.
- D. Existing Utility Interruptions: Contractor shall not interrupt utilities serving facilities occupied by University or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Contractor shall notify University's Representative not less than two weeks in advance of proposed utility interruptions.
 2. Contractor shall not proceed with utility interruptions without written permission from University's Representative.
- E. Field Measurements: Contractor shall take field measurements as required to fit the Work properly. Contractor shall recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, Contractor shall verify dimensions of other construction by field measurements before fabrication. Contractor shall coordinate fabrication schedule with construction progress to avoid delaying the Work.
- F. Space Requirements: Contractor shall verify space requirements and dimensions of items shown diagrammatically on Drawings.
- G. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents, Contractor shall submit a Request for Interpretation (RFI) to Architect. Contractor shall include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Contractor shall submit requests in accordance with requirements specified in Section 01 26 13 - Requests for Interpretation (RFI), using form as directed by University's Representative.
- H. Verification of Construction Layout: Before proceeding to layout the Work, Contractor shall verify layout information shown on Drawings, in relation to the property survey and existing benchmarks, and locate survey reference points. If discrepancies are discovered, Contractor shall promptly notify University's Representative, Architect and Project Inspector.

3.2 FIELD ENGINEERING

- A. Examination: Contractor shall verify locations of survey control and reference points prior to starting Work. If discrepancies are discovered, Contractor shall promptly notify University's Representative, Architect and Project Inspector.
- B. Survey Control and Reference Points: Refer to Article 1.5 in Section 01 78 10 - Survey and Layout Data.

3.3 SURVEYING AND FIELD ENGINEERING SERVICES

- A. Surveying and Field Engineering Services: Contractor shall provide surveying and field engineering services as necessary for performance of the Work. Refer to Section 01 78 10 - Survey and Layout Data.
 - 1. Contractor shall be responsible for the accuracy and adequacy of surveying and field engineering services.
 - 2. Contractor shall utilize recognized engineering practices.
 - 3. Contractor shall check the location, level and plumb, of every major element as the Work progresses.
 - 4. Contractor shall preserve construction survey stakes and marks for the duration of their usefulness.
 - 5. If construction survey stakes are lost or disturbed, and require replacement, Contractor shall perform replacement at no change in Contract Sum and Contract Time.
 - 6. Contractor shall excavate all holes necessary for line and grade stakes.
- B. Surveying for Layout and Control of the Work: Contractor shall establish elevations, lines and levels for all Work under the Contract. Contractor shall locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements, including pavements, curbs, headers, sewers, storm drains, structures, and paving. Note on Project Record Drawings utility locations, slopes and invert elevations.
 - 2. Stakes for cutting, filling, grading and topsoil placement, to establish finished grade or flow line indicated on Contract Drawings.
 - a. Contractor shall preserve construction survey stakes and marks for the duration of their usefulness.
 - b. If construction survey stakes are lost or disturbed, and require replacement, Contractor shall perform replacement at no change in Contract Sum and Contract Time.
 - c. Contractor shall excavate all holes necessary for line and grade stakes.
 - 3. Grid or axis for structures, building foundation, column locations and ground floor elevations.
 - 4. Contractor shall establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 5. Contractor shall establish dimensions within tolerances indicated. Contractor shall not scale Drawings to obtain required dimensions.
 - 6. Contractor shall inform installers of lines and levels to which they must comply.
 - 7. When deviations from required lines and levels exceed allowable tolerances, Contractor shall notify University's Representative, Architect and Project Inspector.
 - 8. Contractor shall close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Monuments: Contractor shall establish a minimum of two permanent monuments on site, referenced to established control points. Contractor shall record locations, with horizontal and vertical data, on Project Record Drawings.

1. In accordance with Business and Professions Code section 8772, any monument set by a licensed land surveyor or registered civil engineer to mark or reference a point on a property or land line shall be permanently and visibly marked or tagged with the certificate number of the surveyor or civil engineer setting it, each number preceded by the letters "L.S." or "R.C.E." respectively, as the case may be, or, if the monument is set by a public agency, it shall be marked with the name of the agency and the political subdivision it serves.
 2. Nothing in this Section shall prevent the inclusion of other information on the tag, which will assist in the tracing, or location of survey records, which relate to the tagged monument.
 3. Contractor shall ensure that centerline ties filed with the County Surveyor will be checked for compliance with this law.
- D. Site Grading Verification: Upon completion of grading, Contractor shall survey graded areas and establish that elevations are correct and within acceptable tolerances for paving and finish grading.
- E. Verification of Work: Contractor shall periodically verify layout and completed conditions of the Work by same means.

END OF SECTION

SECTION 01 73 00

EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. General requirements for installing, applying and placing products.
- B. General requirements for correction of defective Work.

1.3 RELATED REQUIREMENTS

- A. Individual Division 2 through 33 Product Specification Sections: Specific requirements for installing, applying and placing products.

1.4 EXECUTION

- A. Manufacturer's Requirements: Contractor shall determine product manufacturer's requirements and recommendations prior to commencing Work.
- B. Execution: Contractor shall perform installation, application and placement actions according to manufacturer's instructions and recommendations and according to specified procedures.
 - 1. Contractor shall perform surface preparation as necessary to create suitable substrates for application, installation and placement of products.
 - 2. Contractor shall notify University's Representative in writing of unsuitable conditions preventing proper performance of the Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 INSTALLATION, APPLICATION AND PLACEMENT OF PRODUCTS

- A. Manufacturer's Instructions: Contractor shall comply with manufacturer's written instructions and recommendations for installing, applying, placing and finishing products.
- B. Installation, Application and Placement, General: Contractor shall locate the Work and components of the Work accurately, in correct alignment, orientation and elevation, as indicated.
 - 1. Contractor shall make vertical work plumb and make horizontal work level.

2. Where space is limited, Contractor shall install components to maximize space available for maintenance and ease of removal for replacement.
 3. Contractor shall install products at the time and under conditions that will ensure the best possible results. Contractor shall maintain conditions required for product performance until acceptance of the Work.
 4. Contractor shall conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- C. Tools and Equipment: Contractor shall not use tools or equipment that produce harmful noise levels.
- D. Anchors and Fasteners: Contractor shall provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, Contractor shall mount components at heights directed by Architect.
 2. Contractor shall allow for building movement, including thermal expansion and contraction.
- E. Joints: Contractor shall make joints of uniform width. Where joint locations in exposed work are not indicated, Contractor shall arrange joints for the best visual effect. Contractor shall fit exposed connections together to form hairline joints.
- F. Hazardous Materials: Contractor shall use products, cleaners, and installation materials that are not considered hazardous.
- G. Cleaning: Contractor shall comply with requirements specified in Section 01 74 00 - Cleaning Requirements. See individual product Specifications Sections for specific cleaning procedures to be performed.
- H. Protection: Contractor shall provide barriers, covers and other protective devices as recommended by manufacturer and complying with general requirements specified in Section 01 71 00 – Examination and Preparation Requirements.
1. Contractor shall comply with manufacturer's written instructions for temperature and relative humidity.
 2. See individual product Specifications Sections for specific protective measures to be provided.
- I. Limiting Exposures: Contractor shall supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.2 UNIVERSITY-INSTALLED PRODUCTS (NOT USED)

3.3 CORRECTION OF THE WORK

- A. Correction of the Work, General: Contractor shall repair or remove and replace defective construction. Contractor shall restore damaged substrates and finishes to match original and new surrounding construction.

1. Contractor shall comply with requirements in Section 01 73 29 - Cutting and Patching Requirements.
 2. Repairing shall include replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
 3. Contractor shall remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
 4. Contractor shall repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
 5. Contractor shall remove and replace chipped, scratched, and broken glass.
- B. Restoration of Existing Conditions: Contractor shall restore permanent facilities used during construction to their original condition or to match new construction.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This section specifies administrative and procedural requirements for cutting and patching.
- B. Work included in this Section:
 - 1. Cutting and patching not required to be performed as part of the Work specified in other Sections.
 - 2. Cutting and patching existing construction altered or disturbed to accommodate new construction.
 - 3. Cutting and patching existing construction damaged or defaced during new construction as required to restore to existing or better condition at the time of award of Contract.
 - 4. Cutting and patching required to:
 - a. Install or correct non-coordinated Work.
 - b. Remove and replace defective and non-conforming Work.
 - c. Remove samples of installed Work for testing.
 - 5. All concrete sidewalk, driveways, approaches shall be removed and replaced scoreline-to-scoreline. Partial removal and saw cutting is no allowed. Contractor shall match existing concrete thickness when replacing any removed section.
- C. Refer to other Sections and drawings for specific requirements of the extent and limitations applicable to cutting and patching, demolishing, or altering existing construction of individual parts of the Work.
 - 1. Requirements of this Section also apply to mechanical and electrical installations. (Refer to Division 22, Division 23 and Division 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations).

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposed work plan describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed from the University. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required and how it is to be performed.

2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
3. List products to be used and firms or entities that will perform work.
4. Indicate dates when cutting and patching is to be performed.
5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves addition of reinforcement to structural elements, submit details to show how reinforcement is integrated with the original structure.
7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.
8. Effects on University operations and on concurrent operations construction by other contractors.

1.4 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
 1. Obtain approval from the Architect of the cutting and patching proposal before cutting and patching the following structural elements:
 - Bearing and retaining walls
 - Structural concrete
 - Structural steel
 - Lintels
 - Timber and primary wood framing
 - Structural decking
 - Stair systems
 - Miscellaneous structural metals
 - Equipment supports
 - Piping, ductwork, vessels and equipment
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety-related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety-related systems:
 - Primary operational systems and equipment
 - Air or smoke barriers
 - Water, moisture, or vapor barriers
 - Membranes and flashings
 - Fire protection systems
 - Noise and vibration control elements and systems

- Control systems
 - Communication systems
 - Electrical wiring systems
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.
- D. If possible retain the original installer or fabricator throughout construction phases to cut and patch the following categories of exposed work, or if it is not possible to engage the original installer or fabricator, Contractor shall engage another recognized experienced and specialized firm:
- Concrete finishes
 - Masonry
 - Stucco and ornamental plaster
 - Acoustical ceilings
 - Painting
 - Wall covering
 - HVAC enclosures, cabinets or covers

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use materials that are identical to existing materials unless not available. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. BEFORE PROCEEDING CONTRACTOR SHALL OBTAIN APPROVAL OF THE ARCHITECT.
- B. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
1. Before proceeding, meet at the site with parties involved in cutting and patching, including asbestos abatement, mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

2. Beginning of cutting or patching shall be interpreted to mean that existing conditions were found by Contractor to be acceptable.
3. After uncovering existing Work, Contractor shall inspect conditions affecting proper accomplishment of Work.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut where required.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General
 1. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 2. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting
 1. Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
 2. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 3. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 4. Cut through concrete and masonry using a cutting machine such as carborundum saw or diamond core drill.
 5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by passing and cutting.
 6. Provide fire-safe seals to maintain fire rating at all penetrations.
- C. Patching
 1. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

2. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 3. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 4. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials if necessary to achieve uniform color and appearance.
 5. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken wall section containing the patch, after the patched area has received primer and second coat.
 6. Patch, repair or re-hang existing ceilings as necessary to provide an even plane surface of uniform appearance.
 7. Replace concrete walkways to nearest construction joint. Any required repair to a portion of a walkway panel shall require full replacement of said panel from joint to joint in both the north-south and east-west direction.
- D. Plaster Installation: Comply with manufacturer's instructions and install thickness and coats as indicated.

3.4 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 01 74 00

CLEANING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Cleaning during construction.
- B. Cleaning for Contract Completion review and final acceptance of the Work.

1.3 RELATED REQUIREMENTS

- A. Additional Requirements: Cleaning for specific products or elements of Work are described in individual product Specification Sections in Divisions 2 through 33. Contractor shall comply also with University's Contractor Safety Handbook.

1.4 SUBMITTALS

- A. Product List: Contractor shall submit complete list of all cleaning agents and materials for University's Representative's review and approval.
- B. Cleaning Procedures: Contractor shall submit description of cleaning processes, agents and materials to be used for final cleaning of the Work. Processes and degree of cleanliness shall be as directed by University's Representative. All cleaning processes, agents and materials shall be subject to University's Representative's review and approval.

1.5 QUALITY ASSURANCE

- A. Cleaning and Disposal Requirements, General: Contractor shall conduct cleaning and disposal operations in compliance with all applicable codes, ordinances and regulations, including environmental protection laws, rules and practices.
- B. Cleaning Workers: Contractor shall employ experienced workers or professional cleaners for final cleaning. Contractor shall clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Contractor shall comply with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents and Materials: Contractor shall use only those cleaning agents and materials which will not create hazards to health or property and which will not damage or degrade surfaces. Contractor shall:
 - 1. Use only those cleaning agents, materials and methods recommended by manufacturer of the material to be cleaned.
 - 2. Use cleaning materials only on surfaces recommended by cleaning agent manufacturer.

PART 3 - EXECUTION

3.1 CLEANING DURING CONSTRUCTION

- A. Garbage Control: Contractor shall control accumulation of debris, waste materials and rubbish. Periodically, Contractor shall dispose of debris, waste and rubbish off-site in a legal manner.
- B. Cleaning, General: Contractor shall clean sidewalks, driveways and streets frequently to maintain public thoroughfares free of dust, debris and other contaminants.
- C. Cleaning of Existing Facilities: Contractor shall clean surfaces in existing structures where alteration and renovation Work is being performed or where other construction activities have caused soiling and accumulation of dust and debris. Contractor shall:
 - 1. Clean dust and soiling from floor surfaces.
 - 2. Clean dust from horizontal and vertical surfaces.
- D. Parking Area Cleaning: Contractor shall keep parking areas clear of construction debris, especially debris hazardous to vehicle tires.
- E. Thoroughfare Clearing and Cleaning: Contractor shall keep site accessways, parking areas and building access and exit facilities clear of mud, soiling and debris. Contractor shall:
 - 1. Remove mud, soil and debris and dispose in a manner which will not be injurious to persons, property, plant materials and site.
 - 2. Comply with runoff control requirements stated above and as required by governing authorities having jurisdiction.
- F. Cleaning Frequency: At a minimum, Contractor shall clean Work areas daily.
- G. Failure to Clean: Should cleaning by Contractor not be sufficient or acceptable to University's Representative, especially regarding paths of travel, University may engage cleaning service to perform cleaning and deduct costs for such cleaning from sums owed to Contractor.

3.2 CONTRACT COMPLETION REVIEW CLEANING, GENERAL

- A. Contract Completion Review Cleaning, General: Contractor shall execute a thorough cleaning prior to Contract Completion review by University's Representative and Architect. Contractor shall complete final cleaning before submitting final Application for Payment. Contractor shall:

1. Conduct cleaning in compliance with regulations of authorities having jurisdiction and industrial safety standards for cleaning.
 2. Employ professional building cleaners to thoroughly clean building.
 3. Complete cleaning operations specified below before requesting inspection for Certification of Completion. Contractor shall:
 - a. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Leave concrete floors broom clean.
 - b. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - c. Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.
- B. Waste Disposal, Contractor shall:
1. Remove waste materials from the site and conduct disposal in a lawful manner.
 2. Do not burn waste materials.
 3. Do not bury debris or excess materials on the University property.
 4. Do not discharge volatile, harmful or hazardous materials into drainage systems.
 5. Where extra materials of value remaining after completion of associated work have become the University's property, arrange for disposition of these materials as directed.

3.3 INTERIOR CLEANING

- A. Interior Cleaning, Contractor shall:
1. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program.
 2. Remove labels that are not permanent labels.
 3. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from all visible interior and exterior surfaces.
 4. Remove dust from all horizontal surfaces not exposed to view, including light fixtures, ledges and plumbing fixtures.
 5. Clean all horizontal surfaces to dust-free condition, including tops of door and window frames, tops of doors and interiors of cabinets and casework.
 6. Remove waste and surplus materials, rubbish and temporary construction facilities, utilities and controls.
- B. Floor Cleaning: At unoccupied spaces, Contractor shall leave concrete floors broom clean.

3.4 EXTERIOR CLEANING

- A. Building Exterior Cleaning: Contractor shall clean exterior of adjacent facilities where construction activities have caused soiling and accumulation of dust and debris. Contractor shall:
1. Remove labels that are not permanent labels.

2. Wash down exterior surfaces to remove dust.
 3. Clean exterior surfaces of mud and other soiling.
 4. Clean exterior side of windows, storefronts and curtainwalls, including window framing.
- B. Glass and Mirror Cleaning: Contractor shall clean all glass. Contractor shall replace chipped or broken glass and other damaged transparent materials.
- C. Site Cleaning: Contractor shall broom clean exterior paved surfaces. Contractor shall rake clean other surfaces of the grounds. Contractor shall:
1. Wash down and scrub where necessary all paving soiled as a result of construction activities. Thoroughly remove mortar droppings, paint splatters, stains and adhered soil.
 2. Remove from the site all construction waste, unused materials, excess soil and other debris resulting from the Work. Legally dispose of waste.

3.5 CLEANING INSPECTION

- A. Cleaning Inspection: Prior to Final Payment or acceptance by University for partial occupancy or beneficial use of the premises, Contractor and University's Representative shall jointly conduct an inspection of interior and exterior surfaces to verify that entire Work is acceptably clean.
- B. Inadequate Cleaning: Should final cleaning be inadequate, as determined by University's Representative, and Contractor fails to correct conditions, University may engage cleaning service under separate contract and deduct cost from Contract Sum.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

Section includes requirements and procedures for ensuring optimal diversion of construction and demolition (C&D) waste materials generated by the Work from landfill disposal within the limits of the Construction Schedule and Contract Sum.

- A. California State law (Public Resources Code sections 40000 et seq.) requires the California State University to develop source reduction, re-use, recycling, and composting programs to divert 65% of all solid waste from landfill disposal by 2020. Construction waste materials generated by the Work are targeted to achieve and maintain these diversion rates.
- B. The Work of this Contract requires that a minimum of 65% by weight of the construction and demolition materials generated in the Work is diverted from landfill disposal through a combination of re-use and recycling activities (Current California Green Building Standards Code).
- C. For LEED® projects, requirements for submittal of LEED documentation in compliance with the Materials and Resources category, Construction and Demolition Waste Management credit.
- D. Requirements for submittal of Contractor's Construction Waste and Recycling Plan prior to the commencement of the Work.
- E. Contractor's quantitative reports for construction waste materials as a condition of approval of the third progress payment.

1.3 DEFINITIONS

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A Class III landfill must have a solid waste facilities permit from CalRecycle and is regulated by the Enforcement Agency (EA).
- B. Construction and Demolition Debris: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous as defined in California Code of Regulations, Title 22, and Section 66261.3 et seq. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The debris may be commingled with rock, soil, tree stumps, and other

vegetative matter resulting from land clearing and landscaping for construction or land development projects.

- C. C&D Recycling Center. A facility that receives only C&D material that has been separated for reuse prior to receipt, in which the residual (disposed) amount of waste in the material is less than 10% of the amount separated for reuse by weight.
- D. Disposal. Final deposition of construction and demolition or inert debris into land, including stockpiling onto land of construction and demolition debris that has not been sorted for further processing or resale, if such stockpiling is for a period of time greater than 30 days; and construction and demolition debris that has been sorted for further processing or resale, if such stockpiling is for a period of time greater than one year, or stockpiling onto land of inert debris that is for a period of time greater than one year.
- E. Enforcement Agency. Enforcement agency as defined [i.e. in Public Resources Code 40130].
- F. Inert Disposal Facility or Inert Waste Landfill: A disposal facility that accepts only inert waste such as soil and rock, fully cured asphalt paving, uncontaminated concrete (including fiberglass or steel reinforcing rods embedded in the concrete), brick, glass, and ceramics, for land disposal.
- G. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- H. Mixed Debris Recycling Facility: A processing facility that accepts loads of commingled construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing the non-recyclable residual materials.
- I. Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
- J. Reuse. The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.
- K. Separated for Reuse. Materials, including commingled recyclables, that have been separated or kept separate from the solid waste stream for the purpose of additional sorting or processing those materials for reuse or recycling in order to return them to the economic mainstream in the form of raw material for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace, and includes materials that have been "source separated."
- L. Solid Waste: All putrescible and non-putrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by State law.
- M. Source-Separated: Materials, including commingled recyclables, that have been separated or kept separate from the solid waste stream at the point of generation for the purpose of additional sorting or processing of those materials for reuse or recycling in order to return them to the

economic mainstream in the form of raw materials for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace.

- N. Waste Hauler: A company that possesses a valid permit from the local waste management authority to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal in the locality.

1.4 SUBMITTALS

I. Contractor's Construction Waste and Recycling Plan

- A. Review Contract Documents and estimate the types and quantities of materials under the Work that are anticipated to be feasible for on-site processing, source separation for re-use or recycling. Indicate the procedures that will be implemented in this program to effect jobsite source separation, such as, identifying a convenient location where dumpsters would be located, putting signage to identify materials to be placed in dumpsters, etc.
- B. Prior to commencing the Work, submit Contractor's Construction Waste and Recycling Plan. Submit in format provided (Section 01 74 19A). The Plan must include, but is not limited to the following:
1. Contractor's name and project identification information;
 2. Procedures to be used;
 3. Materials to be re-used and recycled;
 4. Estimated quantities of materials;
 5. Names and locations of re-use and recycling facilities/sites;
 6. Tonnage calculations that demonstrate that Contractor will re-use and recycle a minimum 65% by weight of the construction waste materials generated in the Work.
- C. Contractor's Construction Waste and Recycling Plan must be approved by the Construction Administrator prior to the start of Work.
- D. Contractor's Construction Waste and Recycling Plan will not otherwise relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.

II. Contractor's Reuse, Recycling, and Disposal Report

- A. Submit Contractor's Reuse, Recycling, and Disposal Report on the form provided (Section 01 74 19B) with each application for progress payment. Failure to submit the form and its supporting documentation will render the application for progress payment incomplete and delay progress payments. Include manifests, weight tickets, receipts, and invoices specifically identifying the Project for re-used and recycled materials:
1. Reuse of building materials or salvage items on site (i.e. crushed base or red clay brick).
 2. Salvaging building materials or salvage items at an off-site salvage or reuse center (i.e. lighting, fixtures).
 3. Recycling source separated materials on site (i.e. crushing asphalt/ concrete for base course, or grinding for mulch).

4. Recycling source separated material at an offsite recycling center (i.e. scrap metal or green materials).
 5. Use of material as Alternative Daily Cover (ADC) at landfills.
 6. Delivery of soils or mixed inert material to an inert landfill for disposal (inert fill).
 7. Disposal at a landfill or transfer station (where no recycling takes place).
 8. Other (describe).
- B. Contractor's Reuse, Recycling, and Disposal Report must quantify all materials generated in the Work, disposed in [Class III] landfills, or diverted from disposal through recycling. Indicate zero (0) if there is no quantity to report for a type of material.
- C. As indicated on the form:
1. Report disposal or recycling either in tons or in cubic yards: if scales are available at disposal or recycling facility, report in tons; otherwise, report in cubic yards. Report in units for salvage items when no tonnage or cubic yard measurement is feasible.
 2. Indicate locations to which materials are delivered for reuse, salvage, recycling, accepted as daily cover, inert backfill, or disposal in landfills or transfer stations.
 3. Provide legible copies of weigh tickets, receipts, or invoices that specifically identify the project generating the material. Said documents must be from recyclers and/or disposal site operators that can legally accept the materials for the purpose of re-use, recycling, or disposal.
- D. Indicate project title, project number, progress payment number, name of the company completing the Contractor's Report and compiling backup documentation, the printed name, signature, and daytime phone number of the person completing the form, the beginning and ending dates of the period covered on the Contractor's Report, and the date that the Contractor's Report is completed.
- III. For LEED Projects, complete the LEED Construction and Demolition Waste Management Calculator in format provided under the most current version of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program. Include a signed cover letter with calculation summary on company letterhead.
- A. Certify that the project has completed a waste management plan and diverted construction, demolition, and land clearing waste to uses other than landfill.
 - B. Provide quantities of diverted materials and means of diversion in accordance with the results table in the LEED Construction and Demolition Waste Management Calculator.
 - C. Indicate how and where waste was diverted.
 - D. Indicate quantities of waste diverted in tons [or cubic yards].
 - E. Letter will also include: Total quantity of diverted waste, total quantity of waste, and the percentage of waste diverted.
 - F. Include name, organization, and role in project. Provide signature and date completed.

- G. Include legible copies of weigh tickets, receipts, or invoices that specifically identify the project generating the material. Said documents must be from recyclers and/or disposal site operators that can legally accept the materials for the purpose of re-use, recycling, or disposal.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SALVAGE, RE-USE, RECYCLING AND PROCEDURES

- A. Identify re-use, salvage, and recycling facilities.
- B. Develop and implement procedures to re-use, salvage, and recycle new construction and excavation materials, based on the Contract Documents, the Contractor's Construction Waste and Recycling Plan, estimated quantities of available materials, and availability of recycling facilities. Procedures may include on-site recycling, source separated recycling, and/or mixed debris recycling efforts.
 - 1. Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
 - 2. Source separate new construction, excavation and demolition materials including, but not limited to the following types:
 - a. Asphalt.
 - b. Concrete, concrete block, slump stone (decorative concrete block), and rocks.
 - c. Drywall.
 - d. Green materials (i.e. tree trimmings and land clearing debris).
 - e. Metal (ferrous and non-ferrous).
 - f. Miscellaneous construction debris.
 - g. Paper or cardboard.
 - h. Red clay brick.
 - i. Reuse or salvage materials
 - j. Soils.
 - k. Wire and cable.
 - l. Wood.
 - m. Other (describe)
 - 3. Miscellaneous Construction Debris: Develop and implement a program to transport loads of mixed (commingled) new construction materials that cannot be feasibly source separated to a mixed materials recycling facility.

3.2 DISPOSAL OPERATIONS AND WASTE HAULING

- C. Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.
- D. Use a permitted waste hauler or Contractor's trucking services and personnel. To confirm valid permitted status of waste haulers, contact the local solid waste authority.
- E. Become familiar with the conditions for acceptance of new construction, excavation and demolition materials at recycling facilities, and prior to delivering materials.
- F. Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.
- G. Do not burn, bury or otherwise dispose of solid waste on the project job-site.

3.3 RE-USE AND DONATION OPTIONS

- A. Implement a re-use program to the greatest extent feasible. Options may include:
 - 1. California Materials Exchange (CAL-MAX) is a free program sponsored by CalRecycle and is designed to help connect businesses, organizations, manufacturers, schools, and individuals with the most effective online resources for exchanging materials. Go to <http://www.calrecycle.ca.gov/CalMAX/>. Public Surplus is a government agency surplus auction system used by many universities. Go to <https://www.publicsurplus.com> for more information.

3.4 REVENUE

- A. Revenues or other savings obtained from recycled, re-used, or salvaged materials shall accrue to Contractor unless otherwise noted in the Contract Documents.

END OF SECTION

SECTION 01 75 00

STARTING AND ADJUSTING PROCEDURES (NOT USED)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

1.3 RELATED REQUIREMENTS

- A. Section 01 45 00 - Quality Control
- B. Section 01 78 23 - Operation and Maintenance Data
- C. Commissioning Guideline for CSU Capital Projects

1.4 STARTING SYSTEMS

- A. Contractor shall coordinate schedule for start-up of various equipment and systems.
- B. Contractor shall notify University's Representative, Architect, Commissioning Provider and Project Inspector in writing at least seven calendar days prior to start-up of each item.
- C. Contractor shall verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions, which may cause damage.
- D. Contractor shall verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Contractor shall verify that wiring and support components for equipment are complete and tested.
- F. Contractor shall execute start-up under supervision of applicable manufacturer's representative and/or Contractor's personnel in accordance with manufacturer's instructions.
- G. When specified in individual specification Sections, Contractor shall require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Contractor shall submit a written report in accordance with Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Contractor shall demonstrate operation and maintenance of Products to University's personnel at least two weeks prior to date of Contract Completion review.
- B. Contractor shall demonstrate Project equipment and instruct in a classroom environment located at the University. The instruction shall be done by a qualified manufacturers' representative who is knowledgeable about the Project.
- C. Contractor shall utilize operation and maintenance manuals as basis for instruction. Contractor shall review contents of manual with University's personnel in detail to explain all aspects of operation and maintenance.
- D. Contractor shall demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled agreed time and at equipment/designated location.
- E. Contractor shall prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. The amount of time required for instruction on each item of equipment and system is that specified in individual sections. If no time is specified in individual sections, Contractor shall include in his/her bid sum a reasonable sum to perform instruction to the satisfaction of the University.

1.6 TESTING, ADJUSTING, AND BALANCING

- A. Testing Agency: Contractor shall appoint, employ, and pay for services of an independent firm to perform testing, adjusting and balancing.
- B. Reports will be submitted by the independent firm to University's Representative, Architect and Project Inspector indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.
- C. University reserves the right to hire its own independent testing and balancing company to check the work and the report submitted by the Contractor's testing and balancing firm.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Final inspection procedures.
 - 2. Operating and maintenance manual submittal
 - 3. HVAC balance report
 - 4. Spare parts/materials
 - 5. Keys/keying
 - 6. Submittal of warranties
 - 7. Training
 - 8. As-built drawings
 - 9. As-built schedule
 - 10. State Fire Marshal inspection
 - 11. Elevator inspection
 - 12. Other regulatory inspections
 - 13. Removal of temporary facilities
 - 14. Final cleaning and pest control
 - 15. Landscape maintenance
 - 16. Commissioning/equipment startup

1.3 PUNCH LIST INSPECTION

- A. When each building/phase is, in the opinion of the Contractor, complete in all respects, the Contractor shall call for a punch-list inspection.
- B. Inspection Procedures: On receipt of a request for inspection, the University Representative will schedule the Inspection. If, in the judgment of the University Representative and the Architect, the project is not sufficiently complete in all respects, the University Representative will so advise the Contractor and discontinue the inspection.
 - 1. The University Representative and Architect will repeat inspection when requested and assured that the work has been completed.

2. Results of the completed inspection will form the basis of requirements for final acceptance punch-list.

1.4 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents set as a working drawing set for construction purposes. Protect from deterioration and loss in a secure, fire-resistive location. Provide access to record documents for The University' and the Architect's reference during normal working hours throughout the course of the Project.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies from the Work as originally shown or specified. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the work.
 2. Mark new information that is important to the University, but was not shown on Contract Drawings or Shop Drawings. Show all utilities, obstructions, etc. not previously noted in the Contract Documents, but discovered through completion of the work.
 3. Note related Change Order, Field Instruction and RFI numbers where applicable.
 4. Update Record Drawings at a minimum of once per week throughout the course of the Project. Review as-builts a minimum of once per week with IOR and/or University Representative to demonstrate that all changes have been recorded completely and accurately.
 5. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
 6. Upon completion of the work, submit Record Drawings to the University Representative for further processing per section 01 78 39 Project Record Documents.
- C. Record Specifications: Maintain one complete copy of the Project Specifications, including addenda, and one copy of other written construction documents such as Change Orders, Field Instructions, RFI's and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.
 1. Upon completion of the work, submit record Specifications to the Architect for the University's records.
- D. Operating and Maintenance Manuals: Submit one (1) set to the Architect for review and approval. Once approved send one hard copy set and one electronic set to the University with a transmittal to be signed and accepted by the Construction Administrator.

1.5 CLOSEOUT PROCEDURES: CLOSEOUT MEETING

- A. The University Representative will call for a Project closeout meeting approximately four to six weeks prior to the anticipated completion date.
 - 1. At this meeting, a completion Action List will be prepared listing all major items to be completed prior to the issuance of the Notice of Completion.
 - 2. The Action List shall assign a responsibility and a projected completion date to each item.
 - 3. The Contractor shall be solely responsible for the timely completion of all required closeout items.

1.6 FINAL CLEANING

- A. General Cleaning: General cleaning during the construction period is required by the General Conditions and included in Section 01 52 00, Construction Facilities.
- B. Cleaning Standards: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
 - 1. Complete the following cleaning operations before requesting inspection for Certification of Completion.
 - a. Remove labels that are not permanent labels. Remove temporary protective coverings from finish hardware, toilet accessories and other items.
 - b. Clean transparent materials, including mirrors and glass in doors and windows (inside and outside). Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced finishes to a dust free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition.
 - d. Leave concrete floors broom clean. Thoroughly clean all finish flooring materials in accordance with manufacturer recommendations to as-new condition. Remove any stains, films, or foreign materials. Thoroughly vacuum all carpets and shampoo if necessary.
 - e. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean and polish plumbing fixtures to a sanitary condition. Clean light fixtures, lamps and lenses.
 - f. Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.
- C. Pest Control: Engage an experienced licensed exterminator to make a final inspection, and rid the project of rodents, insects and other pests.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction and repair site to previous conditions.

- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner. Where extra materials of value remaining after completion of associated work have become the University's property, arrange for disposition of these materials as directed.

1.7 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for certification of University and Architect's final acceptance, complete the following:
 - 1. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Architect and the University Representative.
- B. Re-inspection Procedure: The University and Architect will re-inspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the University.
 - 1. Upon completion of re-inspection, the Architect will prepare and submit to the University, a certificate of final acceptance, or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 - 2. Upon final acceptance by the University and the Architect, the University Representative will then prepare a final document stating that the project has been constructed in accordance with the contract documents and is complete in all respects.
- C. Completion Schedule: All punch list corrections shall be completed by Contractor within 30 days after Substantial Completion or the contract completion date, whichever is earlier. The University reserve the right to complete any outstanding punch list work remaining after the thirty-day period at Contractor's expense.
- D. Additional Inspections: Should additional re-inspections be required, Contractor shall reimburse University for University Representative's and Architect's account for time spent in conducting additional re-inspections at a rate of 3.2 times rate of Direct Personnel Expense (DPE). Direct Personnel Expense is defined as direct salaries of University Representative's and Architect's personnel engaged on Project and portion of costs of mandatory and customary contributions and benefits related thereto, including employment taxes and other statutory benefits, insurance, sick leave, holidays, vacations, pensions, and similar contributions and benefits.

1.8 FINAL PAYMENT

- A. Final Payment: After completion of all items listed for completion and correction and after submission of all documents and products and after final cleaning, Contractor shall submit final Application for Payment, identifying total adjusted Contract Sum, previous payments and sum remaining due. Payment will not be made until the following are accomplished:

1. All Project Record Documents have been received and accepted by the Architect.
2. All extra materials and maintenance stock have been transferred and accepted by University.
3. All warranty documents and operation, maintenance data, service agreements, maintenance contracts, final waste and recycling reports, and salvage materials have been received and accepted by University's Representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 10
SURVEY AND LAYOUT DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Administrative requirements for survey and layout data submittals.

1.3 RELATED REQUIREMENTS

- A. Section 01 71 00 – Examination & Preparation Requirements: Layout of the Work and other engineering services required for accomplishing the Work.
- B. Section 01 77 00 - Contract Closeout Procedures: Submittals for occupancy, Acceptance and Final Payment.

1.4 LAYOUT OF THE WORK

- A. Responsibility for Layout of the Work: Contractor shall be solely responsible for complete, timely and accurate layout of the Work including, but not necessarily limited to, horizontal and vertical control and dimensional coordination as necessary to construct the Work in accordance with the Contract Documents. Contractor shall:
 - 1. Employ a Land Surveyor or a Civil Engineer, registered in the State of California, to perform survey work.
 - 2. Employ a Professional Engineer, of the discipline required for the specific service on the Project, and licensed in the State of California where required in the specifications in Divisions 2 through 33.

1.5 PROJECT SURVEY CONTROL POINTS

- A. Survey Reference Points: Existing basic horizontal and vertical control points are shown on the Contract Documents, or location of control points will be furnished by the University Representative. Contractor shall use the University Survey, provided by the University Representative, as the Basis of Bearings for survey horizontal control, and shall tie at least one Project site control point to a point on the University Survey. NAVD 29 and NAD 83 shall be used for vertical and horizontal control. Contractor shall:
 - 1. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.
 - 2. Make no changes or relocations without prior written notice to Architect.

3. Report to University Representative and Architect when any reference point is lost or destroyed. Lost or destroyed reference control points.
 4. Require a surveyor to replace project control points, which may be lost or destroyed. Establish replacements based on original survey control.
- B. Contractor shall establish a minimum of two permanent benchmarks on the project site that are referenced to control points identified in the Contract Documents. Document horizontal and vertical location of benchmarks on the project record documents.

1.6 SUBMITTALS

- A. Submit, name, address, and telephone number of Surveyor before starting survey work.
- B. On request of Architect, submit documentation to verify accuracy of field engineering work.
- C. Submit certificate signed by the Land Surveyor, licensed to practice in the State of California, certifying that elevations and locations of improvements are in conformance with the requirements of the Contract Documents.

1.7 SURVEY RECORD DOCUMENTS

- A. Survey Record Documents: Contractor shall maintain a complete and accurate log of control and survey work as Work progresses. Upon completion of foundation walls, infrastructure, and major site improvements, Contractor shall prepare a certified survey illustrating dimensions (horizontal NAD 83 and vertical NAVD 29), locations, angles and elevations of new construction and site work. The certified survey shall also document existing infrastructure encountered during construction. Contractor shall submit survey record documents as specified in Section 01 77 00 - Contract Closeout Procedures.
- B. Locations provided on the certified survey shall be provided by a licensed land surveyor and coordinated with the control points tied to the University Record of Survey as per paragraph 1.4-A above.
- C. For each new Project utility or improvement which is not to be owned and maintained by the University, Contractor shall provide a legal description and plot, stamped and signed by a properly licensed surveyor or Civil Engineer, and which will use the University Record of Survey as the Basis of Bearings and will provide a Point of Commencement shown on said Record of Survey.

1.8 CONTRACTOR'S REVIEW

- A. Scope of Contractor's Review: Contractor shall review Survey and layout data prior to submission for University's review or filing. Contractor shall sign each submittal copy certifying that:
 1. Field measurements have been determined and verified.
 2. Field construction criteria have been verified.
 3. Conformance with Drawings and Specifications requirements is confirmed.
- B. Contractor's Review Action: Contractor shall indicate clearly on survey and layout data whether the dimensions and coordinates are in compliance with Contract requirements. Contractor shall

note clearly and sign each submittal certifying that reported data "Conforms" or "Does Not Conform".

- C. Changes and Deviations: Contractor shall identify all deviations from requirements of Drawings and Specifications. Changes in the Work shall not be authorized by submittals review actions. No review action, implicit or explicit, shall be interpreted to authorized changes in the Work. Changes shall only be authorized by separate written Change Order or Field Instruction, in accordance with the Contract General Conditions.

1.9 REVIEWS BY UNIVERSITY'S REPRESENTATIVE AND ARCHITECT

- A. Reviews by University's Representative and Architect, General: Reviews of survey and layout data by University's Representative and Architect, or other responsible design professional, shall be only for general conformance with the design concept and requirements based on the information presented. Neither Architect nor other responsible design professional shall verify submitted survey and layout data.
- B. Contract Requirements: Reviews by University's Representative, Architect or other responsible design professional shall not relieve the Contractor from compliance with requirements of the Drawings and Specifications. Changes shall only be authorized by separate written Change Order or Field Instruction, in accordance with the Contract General Conditions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Format and content of operation and maintenance manuals.
 - 1. Data requirements for materials and finishes.
 - 2. Data requirements for equipment and operating systems.
- B. Instruction of University's personnel.
- C. Submission of operation and maintenance manuals.

1.3 RELATED REQUIREMENTS

- A. Section 01 31 13 - Coordination: Coordination documents and models prepared for performance of the Work, to be incorporated into operation and maintenance data submitted to University's Representative at Contract closeout.
- B. Product Specifications Sections in Divisions 2 through 33: Specific requirements for operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
 - 1. Trained and experienced in maintenance and operation of described products.
 - 2. Familiar with requirements of this Section.
 - 3. Skilled as technical writer to the extent required to communicate essential data.
 - 4. Skilled as draftsman competent to prepare required drawings.

1.5 SUBMITTALS

- A. Submittal for Review: Contractor shall submit one electronic bookmarked PDF copy to University Representative for review and approval.
- B. Final Submittal: Contractor shall submit one electronic PDF copy prior to submission of final Application for Payment.

1.6 SUBMITTAL FORMAT

- A. Format for Operation and Maintenance Data Manuals: Contractor shall prepare data in the form of an instructional manual. Contractor shall comply with the general requirements specified below and comply with specific requirements for types of products used in the project.
- B. Electronic File: Contractor shall also provide all operation and maintenance data into a single PDF bookmarked file with a table of contents. The table of contents shall be linked to the various sections in the PDF file.

1.7 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
 - 1. Include name of Contractor, name of responsible principal, address and telephone number.
 - 2. Include a list of each product required to be included, indexed to content of the volume.
 - 3. List, with each product, the name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Local source of supply for replacement parts.
 - 4. Identify each product-by-product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
 - 1. Include only those sheets that are pertinent to the specific product.
 - 2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.
- C. Drawings:
 - 1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of Component parts of equipment and systems.
 - b. Control and flow diagrams.
 - 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
 - a. Do not use Project Record Documents as maintenance drawings.
- D. Provide written text as required to supplement product data for the particular installation:
 - 1. Organize in a consistent format under separate headings for different procedures.
 - 2. Provide logical sequence of instructions for each procedure.
- E. Provide a copy of each warranty, bond and service contract issued.
 - 1. Provide information sheet for Owner's personnel, including:

- a. Proper procedures in event of failure.
 - b. Instances that might affect validity of warranties or bonds.
- F. Provide a copy of each Material Safety Data Sheet (MSDS) received with products or materials delivered to the site for incorporation into the Project, for Owner's future reference.

1.8 MANUAL FOR MATERIALS AND FINISHES

- A. Content, for architectural products, applied materials and finishes:
 - 1. Manufacturer's data, giving full information on products.
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for re-ordering special manufactured products.
 - 2. Instructions for care and maintenance.
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods that are detrimental to the product.
 - c. Recommended schedule for cleaning and maintenance.
- B. Content, for moisture-protection and weather-exposed products:
 - 1. Manufacturer's data, giving full information on products.
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
 - 2. Instructions for inspection, maintenance, and repair.
- C. Additional requirements for maintenance data: Refer to other sections of Specifications.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Content for each unit of equipment and system, shall be as follows (as appropriate):
 - 1. Description of unit and component parts
 - a. Function, normal operating characteristics, and limiting conditions
 - b. Performance curves, engineering data and tests
 - c. Complete nomenclature and commercial number of replaceable parts
 - 2. Operating Procedures:
 - a. Start-up, break-in, routine and normal operating instructions
 - b. Regulation, control, stopping, shutdown, and emergency instructions
 - c. Seasonal operating instructions
 - d. Special operating instructions
 - 3. Maintenance Procedures:
 - a. Routine operations
 - b. Guide to "trouble shooting"
 - c. Disassembly, repair and re-assembly
 - d. Alignment, adjusting and checking

4. Servicing and lubrication schedule.
 - a. List of lubricants required
 - b. Servicing schedule
 5. Manufacturer's printed operating and maintenance instructions
 6. Description of sequence of operation by control manufacturer
 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for Maintenance
 - a. Predicted life of parts subject to wear
 - b. Items recommended to be stocked as spare parts
 8. As-installed control diagrams by controls manufacturer
 9. Each contractor's coordination drawings
 - a. As-installed color-coded piping diagrams
 10. Charts of valve tag numbers, with location and function of each valve
 11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage
 12. Other data as required under pertinent sections of specifications
- B. Content, for each electric and electronic system, as appropriate:
1. Description of system and component parts
 - a. Function, normal operating characteristics and limiting conditions
 - b. Performance curves, engineering data and tests
 - c. Complete nomenclature and commercial number of replaceable parts
 2. Circuit directories of panel boards.
 - a. Electrical service
 - b. Controls
 - c. Communications
 3. As-installed color coded wiring diagrams
 4. Operating procedures:
 - a. Routine and normal operating instructions
 - b. Sequences required
 - c. Special operating instructions
 5. Maintenance procedures:
 - a. Routine operations
 - b. Guide to "trouble-shooting."
 - c. Disassembly, repair and reassembly.
 - d. Adjustment and checking.
 6. Manufacturer's printed operating and maintenance instructions.
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 8. Other data as required under pertinent sections of specifications.

- C. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
- D. Additional requirements for operating and maintenance data: As required by other sections of specifications.

1.10 INSTRUCTION OF UNIVERSITY PERSONNEL

- A. Operating and maintenance manual shall constitute the basis of instruction.
 - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.
- B. Complete additional training as specified in other sections of the Specifications. Refer to Section 01 75 00, Starting and Adjusting Procedures.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 36

WARRANTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers' standard guaranties, warranties on products and special warranties.
- B. Refer to the General conditions for terms of the Contractor's special warranty of workmanship and materials.
- C. Specific requirements for warranties for the work and products and installations that are specified to be guaranteed or warranted are included in the individual Sections of Divisions 2 through 16.
- D. Certifications and other commitments and agreements for continuing services to the University are specified elsewhere in the Contract Documents.
- E. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 RELATED REQUIREMENTS

- A. Section 01 77 00 - Closeout Procedures: General requirements for closeout of the Contract.
- B. Section 01 78 23 - Operation and Maintenance Data: Operating and maintenance data binders, to include copies of warranties and bonds.
- C. Product Specification Sections in Divisions 2 through 33: Special Project warranty requirements for specific products or elements of the Work; commitments and agreements for continuing services to University.

1.4 DEFINITIONS

- A. The terms product guarantee or warranty are synonymous for this Project and shall be taken to mean the required guarantee or warranty required by the Contract General Conditions or by the Contract Drawings or Specifications.
- B. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the University.

- C. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the University. Special Warranties shall be in writing.

1.5 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the University has benefited from use of the work through a portion of its anticipated useful service life.
- D. University's Recourse: Written warranties made to the University are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the University can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The University reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The University reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.6 SUBMITTALS

- A. Submit a copy of the Standard or Special written warranties to the University for each Specification Section as part of the complete submittal package for review and approval by the University.
- B. Submit written warranties to the University prior to the date of acceptance by the University. Submittal of the project Guarantees and Warranties is a requirement precedent to the filing of the Notice of Completion by the University.
 - 1. When a designated portion of the work is completed and occupied or used by the University, by separate agreement with the Contractor during the construction period but prior to acceptance of the entire project, Contractor shall submit properly executed warranties to the University within fifteen days of occupancy or use of that designated portion of the work.
- C. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate

terms and identification, ready for execution by the required parties. Submit a draft to the University for approval prior to final execution.

- D. Form of Submittal: At Final Completion, compile each required warranty and bond properly executed by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual. Use guarantee form at the end of this Section. Document to be submitted as a bookmarked PDF for University review and approval.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)



PROJECT _____	PROJECT No. _____
CONTRACTOR _____	CONTRACT No. _____
ARCHITECT _____	DATE _____

GUARANTEE QUALITY AND PERFORMANCE

We the undersigned hereby guarantee that the:

which we have installed on the subject campus has been done in accordance with the plans and specifications and that all the work as installed will fulfill the requirements of the guarantees included in the specifications. We further agree to repair or replace any or all of our work, together with any other adjacent work which may be displaced in so doing, that may prove to be defective in its materials, workmanship or installation within a period of _____ year(s) from the date of official acceptance of the project as complete, by the Trustees of the California State University or any Officer or Employee authorized to act on its behalf. The repairs or replacement shall be done without any expense whatsoever to the Trustees of the California State University, ordinary wear and tear and unusual abuse or neglect excepted. Within _____ days after being notified in writing by the Trustees of any defects in the work, we agree to commence and prosecute the work necessary with due diligence in order to fulfill the terms of this guarantee, and to complete the work within a reasonable period of time, and in the even of our failure to so comply, we, separately and collectively, do hereby authorize the Trustees of the California State University to proceed to have such work done at our expense and will honor and pay the costs thereof upon demand.

By: _____ Subcontractor or Supplier	Date: _____
By: _____ General Contractor	Date: _____

Construction Mgmt.
702.19 • 6/07

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Requirements for Project Record Documents to be submitted for Contract closeout.

1.3 PROJECT RECORD DOCUMENTS

- A. General:
 - 1. Contractor shall not use Record Documents for construction purposes.
 - 2. Contractor shall protect from deterioration and loss in a secure, fire-resistive location; provide access to Record Documents for the University's and the Architect's reference during normal working hours.
 - 3. Contractor shall keep Project Record Documents current, as they will be reviewed for completeness by Architect, Inspector, and University's Representative as condition for certification of each Progress Payment Application.
- B. Record Drawings: Contractor shall record information continuously as Work progresses. Contractor shall not conceal Work permanently until all required information is recorded. Contractor shall:
 - 1. Maintain a clean, undamaged set of blue or black line white prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately.
 - 2. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 - 3. Legibly and to scale, mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the work.
 - 4. Mark new information that is important to the University but was not shown on Contract Drawings or Shop Drawings. Record actual construction, including:
 - a. GPS X, Y and Z coordinate of manholes interior corner and each utilidor where it leaves the steam manhole.

- b. The following for underground utilities and valves installed and encountered:
 - i. Shoot horizontal centerline, width and vertical top of pipe/utility locations and valves, referenced to permanent ground improvements along with GPS X, Y and Z coordinates.
 - ii. Service type.
 - iii. Pipe/utility size.
 - iv. Pipe/utility material.
 - c. Field changes of dimension and detail.
 - d. Details not on original Contract Drawings. Application of copies of details produced and provided by Architect during construction will be accepted.
5. Note related Change Order numbers where applicable.
6. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
7. Store Record Documents separate from documents used for construction.
- C. Record Specifications: Contractor shall record changes made by Addenda and Change Orders. Contractor shall legibly mark and record in red ink actual Products installed or used, including:
- 1. Manufacturer's name and product model or catalog number.
 - 2. Product substitutions or alternates utilized.
- D. Record Photos: Contractor shall photograph all work before covering up, including:
- 1. All open trenches and manholes shall be photographed.
 - 2. All exposed utilities should be identified in the photos.
 - 3. Show photographs locations on Record Drawings.
- E. Initial Submission:
- 1. Prior to the date of the Notice of Completion, Contractor shall submit color PDF scanned record prints and one paper-copy set of marked Record Documents to University Representative for Architect's review and approval.
 - 2. Prior to the date of the Notice of Completion, Contractor shall submit annotated PDF electronic file and one paper-copy set of marked Record Specifications to University Representative for Architect's review and approval.
 - 3. Architect will indicate whether general scope of changes, additional information recorded, and quality of mark-ups are acceptable.
- F. Final Submission:
- 1. Submit color PDF record prints of marked Record Documents.
 - 2. Print each drawing, whether or not changes and additional information were recorded.
 - 3. Submit annotated PDF electronic file of marked Record Specifications.
 - 4. Submit annotated PDF electronic file of Record Photographs.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

This Page Left Intentionally Blank.

Section 05

Metals

SECTION 05700

ORNAMENTAL METAL AND RAILING

PART 1 GENERAL

1.1 SUMMARY

A. Work Included in this Section:

1. Provision of custom fabricated ornamental metal work including, but not necessarily limited to, the following:
 - a. All steel guardrails and handrails, and any site conditions requiring guardrail protection.
 - b. All exterior fence special conditions, extensions, etc.

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.

1. American Society for Testing and Materials (ASTM).
2. State of California, California Code of Regulations, Title 24 (CCR Title 24).
3. National Association of Architectural Metal Manufacturers':
 - a. "Heavy Duty Metal Bar Grating Manual", (ANSI /
 - b. "Metal Stairs", (AMP 510-92). NAAMM MBG 532-94).
 - c. "Pipe Railing Manual" (ANSI/ NAAMM AMP 521-01).

1.3 QUALITY ASSURANCE

A. Design Criteria:

1. Drawings show external profiles required. Minor modifications for greater strength may be proposed for the Trustees' approval.
2. Fabricate in accordance with NAAMM-MS standards from steel sections noted. All ornamental metal shall be fabricated to meet NAAMM-Metal Stair Manual standards "Architectural Class" and NAAMM-Pipe Railing Systems Manual standards "Type 1" as a minimum.



3. Work not specifically sized on the Drawing shall be designed to support normally imposed loads as noted in CCR Title 24 Table 23-B.

1.4 SUBMITTALS

- A. Product Data.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Pack, ship, unload, store, and protect materials to prevent abuse, damage, and defacement such as stains, discolorations, scratches, abrasions, or soiling from any source.
 1. Deliver materials only after proper facilities are available.
 2. Store indoors in clean, dry location free from dust and corrosive fumes.

1.6 PROJECT CONDITIONS

- A. Temporary Protection:

1. From fabrication through construction period, protect materials from damage using protective sleeves, polyethylene sheets, or other suitable means.
2. Remove protective devices only when required to perform work for in absence of damage-producing conditions prior to the Trustees' final acceptance.

- B. Coordination:

1. Coordinate layout and fabrication of ornamental metal work with other trades to ensure proper assembly.
2. Coordinate details with details of adjacent work to assure proper attachments and clean junctions.
3. Provide materials such as backing, sleeves, etc. to be installed by the Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Pipe: ASTM A53-07.
- B. Steel Tubing: ASTM A500-07, A501-07.
- C. Steel Plate: ASTM A6/A6M-08.
- D. Steel Sheet: ASTM A1011-07 or A1008-07a
- E. Steel Bars: ASTM A283-03 (2007), A1011-07, A633/A633M-01 (2006).
- F. Stainless Steel: ASTM A167-99 (2004), Type 304.



- G. Mechanical Fasteners (Bolts, nuts, washers, screws and other fasteners necessary for proper erection or assembly of ornamental work): Stainless steel; type and size as required.
 - 1. Stainless Steel Bolts, Nuts, Washers, Etc.: Type 316 stainless steel, socket head cap screws, with washers, nuts, and spacers.
- H. Brazing and Soldering Materials: As required.
- I. Items for Permanent Protection from Dissimilar Metals and Materials:
 - 1. Formerly Zinc Chromate Primer (VOC compliant): (meeting Fed Spec TT-P-641G) !CI's No. 4120 Devguard "Multi-Purpose Metal Primer"; or approved equal.
 - 2. Rust-Inhibiting Primer: (meeting Fed Spec TT-P-641G, TT-P-645B, TT-P-615D, TT-P-636D)
 - 3. !CI's No. 4160 Devguard "Multi-Purpose Tank & Structural Primer"; or approved equal.
 - 4. Aluminum Metal and Masonry Paint: (meeting Fed Spec TT-P-641G) !CI's No. 4348 Devguard "Alkyd Industrial Enamel"; or approved equal.
 - 5. Bituminous Paint: Fed. Spec. TT-C-494A.
 - 6. Compressible Tape: Closed cell black neoprene tape meeting requirements of ASTM C509-06, size as noted, with adhesive system as recommended by the manufacturer

2.2 FABRICATION

- A. Do not begin fabrication of ornamental metal work until Shop Drawings have been reviewed by the Trustees.
- B. Accurately fabricate ornamental metal work to desired profile, design, and dimensions in accordance with Preliminary Plans, and as reviewed in submitted Shop Drawings.
- C. Employ only skilled workmen, especially trained, and experienced in this Work.
- D. Perform fabrication operations prior to finishing.
- E. Fabricate work true to detail with sharp, clean profiles, straight, and free from defects impairing strength or appearance.
- F. Welds: Make uniform and grind smooth. Ease all exposed edges of plates and bars.
- G. Screws shall be flat head, countersunk and finish smooth and flush, unless otherwise noted.
- H. Accurately machine joints.
- I. Steel Pipe Railings, Handrails, and Guardrails:
 - 1. Fabricate in largest sections practicable and in accordance with NAAMM-PRM Standards.
 - 2. Shop weld joints; fit field joints with concealed pins and sleeves.
 - 3. Flush fittings may be used for crosses and tees.



4. Return all handrail rails to wall.
5. Provide galvanize sleeve and cover flange at post.
6. Close ends with welded cap and ease edges.
7. Handrail brackets shall be of "cast" type
8. All exposed welded joints to be continuous around entire joint perimeter and ground smooth, with even fillet radiuses and all pockets or dimples filled and sanded smooth to NAAMM-PRM standards for Architectural Class Stairs and Railing Joint Construction System - Type 1 Ornamental Quality.
9. Provide all materials for complete installation.

2.3 FINISHES

- A. Typical Exterior Exposed Ornamental Metal Work: All steel handrails shall receive a factory-applied powder-coat finish over properly prepared surfaces, in color as selected by the Architect, providing a uniform, durable, and corrosion-resistant coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive work and verify that dimensions and adjoining work are correct to permit proper installation.
- B. Do not start installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install ornamental work plumb, level, square, true to line, securely anchored and in proper alignment and relationship to adjoining work.
- B. Protect dissimilar metals from contact with each other or other materials causing corrosion.

3.3 CLEANING

- A. Before the Trustees' final acceptance, remove soil or other forms of discoloration.

END OF SECTION



This Page Left Intentionally Blank.

Section 26

Electrical

SECTION 26 00 00

ELECTRICAL

PART 1 GENERAL

1.1 INCLUDED

- A. This section covers electrical work, complete. Work includes furnishing, installing, calibrating, adjusting, testing, documenting, and starting up equipment in accordance with these Specifications, the accompanying Plans, and the directions of the Engineer.

1.2 LICENSES, PERMITS, AND FEES

- A. The Contractor shall provide, procure, and pay for all licenses, permits, fees, etc. as required to carry on and complete their work.

1.3 CODES AND STANDARDS

- A. All work shall be done in code with all applicable local, state, and federal building safety codes, ordinances, and regulations. Additionally, all work shall conform to the latest editions of the following standards:
 - 1. National Fire Protection Association.
 - 2. Underwriters Laboratories.
 - 3. Titles 8, 17, 19, 21, 24 of the California Code of Regulations.
 - 4. California Electric Code.
- B. When the Contract Documents call for materials or construction of a higher standard than is required by the above, the Contract Document requirements shall take precedence over the requirements of the applicable laws, ordinances, rules, or regulations. Nothing in the Contract Documents shall be interpreted as permitting work in violation of said laws, rules, and/or regulations.
- C. The Contractor for this work shall furnish, without extra charge, any additional materials and/or labor as may be required for compliance with these laws, rules, and/or regulations though such materials and/or labor are not specially set forth in the Contract Documents.

1.4 LICENSING REQUIREMENTS

- A. All work of Division 26 shall be performed by an appropriately licensed contractor. The licenses shall be current, valid through the term of the contract and in the name of the contractor.



- B. The contractor must also be an or hire an approved Acceptance Test Employer with Acceptance Test Technicians (ATT). The ATT will be responsible for performing all required acceptance testing and associated forms.

1.5 SUBMITTALS

A. General Requirements

1. Submittal lists and drawings shall include identifying marks assigned by the Drawings and Specifications.
2. Review of drawings and other material submitted shall not be construed as complete check or constitute a waiver of the requirements of the Drawings and Specifications, but will indicate that the material submitted is acceptable in quality and utility. This review shall not relieve the Contractor of the responsibility to fit the proposed materials to the spaces provided, and to effect necessary rearrangements or construction of other work.
3. All fixtures, materials, and equipment equal in quality and utility to these herein mentioned will be accepted. When specific names are used in describing fixtures, materials, and equipment they are mentioned as standards only, but this implies no right on the part of the Contractor to use other fixtures, material, and equipment or methods, unless approved as equal in quality and utility by the Architect.
4. Before any fixtures, materials, or equipment are purchased, the Contractor shall submit to the Architect for approval, a complete list of materials, fixtures, and equipment, giving the manufacturer's names, catalog number, capacity, size, power requirements, etc.
5. The Contractor shall submit for the approval of the Architect, shop drawings of proposed material and equipment that differ from the specified materials and equipment, and of any specified materials and equipment with special conditions and/or arrangements. These drawings shall show necessary modifications of owner, plumbing, electrical, and mechanical work required by the proposed materials and equipment.

B. Submittal - Product Data

1. Submit manufacturer's product data for all electrical equipment, in compliance with specifications.

1.6 COOPERATION WITH OTHER TRADES

- A. Cooperate fully with other trades doing work on the project as may be necessary for the proper completion of the project. Refer to the Structural, Plumbing, and Electrical Drawings for details of the building structure and equipment installation that will tend to overlap, conflict with or require coordination with the work of this Section, and schedule this work accordingly.



- B. Any work done without regard for other trades shall be moved, replaced, or redone as required, without extra charges to Owner.

1.7 AS-BUILT DRAWINGS

- A. A complete set of Contract Drawings shall be maintained at the work site, and all changes in the work shall be recorded on this set, on a daily basis. The final as-built drawings shall be submitted to the Architect for approval.

1.8 DESIGN DRAWINGS

- A. The drawings indicate diagrammatically the general layout of the electrical systems and other related work. Field verification of scaled dimensions taken from the Drawings is required.
- B. The Contractor shall review and compare the Architectural, Civil, Structural, and Electrical Drawings and all Owner supplied equipment Drawings, and adjust their work to be in conformity with the conditions indicated thereon. Discrepancies between drawings, between drawings and actual field conditions, or between Drawings and Specifications, shall promptly be brought to the attention of the Architect for a determination of the modifications to be affected. In the event that a major modification is required, a Change Order will be prepared.

1.9 VERIFICATION OF EXISTING CONDITIONS AND DEMOLITION

- A. Before installation of any new work, verify the location, size, and other conditions at all points of connection to services or other existing piping, and at all locations where new work will cross or pass near existing piping, electrical, or other facilities.
- B. Deliver removed material to the Owner as directed by the Architect. Dispose of all other removed material offsite.

1.10 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Furnish three sets of typewritten instructions covering maintenance, adjustment, and operation of each piece of apparatus, bound in a hard cover loose-leaf binder. Neatly obscure or cross out inapplicable data from manufacturer's literature. Submit data to the Architect.
- B. Operating instructions shall show sequence of operations, lubrication, care, and maintenance requirements of all equipment. Final acceptance of the work will not be made until a satisfactory submission of this material is received and approved by the Architect.
- C. The Owner's authorized representative shall be instructed in the operation and servicing of all power & lighting systems.

1.11 ACCURACY OF DATA



- A. The data given herein and on the Drawings are as exact as could be reasonably secured, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc. will be governed by shop drawings, the building itself, and actual field conditions.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall be responsible for delivery, storage, protection, and placing of all equipment and materials.
 - 1. Contractor shall protect the work and materials from damage during construction. Equipment stored at the job site shall be protected from dust, water, or other damage, and be covered if equipment is exposed to weather. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.
 - 2. Any items damaged shall be repaired or replaced, at no additional cost to the Owner.

1.13 WARRANTIES

- A. Equipment warranties shall be provided for all equipment, with all necessary information filled in, except purchase date, in favor of the Owner.
- B. The contractor shall guarantee that all work under this Section is free from defects in material and workmanship for a period of one year from the date of filing the Notice of Completion. Replacement of defective work and damage caused to work of other trades as a result of such defective work shall be the responsibility of the Contractor, and shall be made at no cost to the Owner.

1.14 ALTERNATIVE MATERIALS AND METHODS

- A. These plans and specifications describe the general scope of the electrical systems. These plans and specifications do not preclude the submittal of alternative methods or materials. Manufacturer's names and catalog numbers are stated to identify the type and quality of the equipment or materials required for the project.
- B. The contractor may submit shop drawings and/or technical information on alternative equipment, materials or installation details to accomplish the intent of the plans and specifications. Approval of the alternative equipment, materials or installation details shall not relieve the contractor of any responsibility for complying with the intent of the plans and specifications. Submit the manufacturers' technical information, shop drawings, and/or written description of alternative methods for each item described by manufacturer's name and catalog number and for each component, equipment, material, or installation detail required.

1.15 SITE EXAMINATION



- A. Thoroughly examine the site and verify the actual work conditions. No extra compensation will be allowed for expenses due to failure to discover site conditions which affect the work.

PART 2 PRODUCTS

2.1 GENERAL

- A. Unless otherwise indicated, provide all first-quality new materials, free from any defects, and suitable for the intended use and the space provided. Provide materials approved by UL wherever standards have items not specifically shown or specified which are required to provide the complete systems specified herein. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.
- B. Equipment Finish: Unless otherwise indicated, finish for electrical equipment and enclosures shall be manufacturer's standard gray or ANSI 61 gray over a primer and rust inhibitor.

2.2 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

A. Metal Conduits and Fittings

1. Metal Conduit:

- a. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- b. GRC: Comply with ANSI C80.1 and UL 6.
- c. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1) Comply with NEMA RN 1.
 - 2) Coating Thickness: 0.040 inch, minimum.
- d. EMT: Comply with ANSI C80.3 and UL 797.
- e. FMC: Comply with UL 1; zinc-coated steel.
- f. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

2. Metal Fittings:

- a. Comply with NEMA FB 1 and UL 514B.



- b. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - c. Fittings, General: Listed and labeled for type of conduit, location, and use.
 - d. Fittings for EMT:
 - 1) Material: Steel.
 - 2) Type: Setscrew.
 - e. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - f. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
3. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

B. Non-metallic Conduits and Fittings

1. Nonmetallic Conduit:
- a. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - b. ENT: Comply with NEMA TC 13 and UL 1653.
 - c. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
 - d. LFNC: Comply with UL 1660.
2. Nonmetallic Fittings:
- a. Fittings, General: Listed and labeled for type of conduit, location, and use.
 - b. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - 1) Fittings for LFNC: Comply with UL 514B.
 - c. Solvents and Adhesives: As recommended by conduit manufacturer.



C. Boxes, Enclosures and Cabinets

1. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
2. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
3. Metal Floor Boxes:
 - a. Material: Cast metal or sheet metal.
 - b. Type: Fully adjustable.
 - c. Shape: Rectangular.
 - d. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
5. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
6. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.

D. Handholes and boxes for exterior underground wiring

1. General Requirements for Handholes and Boxes:
 - a. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 - b. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
 - a. Standard: Comply with SCTE 77.
 - b. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 - c. Cover: Weatherproof, secured by tamper-resistant locking devices and having



structural load rating consistent with enclosure and handhole location.

- d. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- e. Cover Legend: Molded lettering, "ELECTRIC."
- f. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
- g. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.3 LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

A. Copper Building Wire

- 1. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- 2. Standards:
 - a. Listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and use.
 - b. RoHS compliant.
 - c. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- 3. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- 4. Conductor Insulation: Type THHN and Type THWN-2: Comply with UL 83, 90°C dry or 75°C wet.

B. Connectors and Splices

- 1. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and use.
- 2. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- 3. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - a. Material: Copper.



b. Type: Two hole with standard barrels.

c. Termination: Compression.

2.4 IDENTIFICATION FOR ELECTRICAL SYSTEMS

A. Labels

1. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
2. Snap-around Labels: Slit, pre-tensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.
3. Self-adhesive Wraparound Labels: 3-mil-thick, polyester flexible label with acrylic pressure-sensitive adhesive.
 - a. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 - b. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
4. Self-Adhesive Labels: Polyester, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 - a. Minimum Nominal Size:
 - 1) 1-1/2 by 6 inches for raceway and conductors.
 - 2) 3-1/2 by 5 inches for equipment.
 - 3) As required by authorities having jurisdiction.

B. Tape

1. General purpose, flame retardant: 7 mil, vinyl plastic, rated for 90°C minimum; complies with requirements of UL 510.
2. Flame retardant, cold and weather resistant: 8.5 mil, vinyl plastic.

C. Tags



1. Nonmetallic Preprinted Tags: Polyethylene tags, 0.015 inch thick, color-coded for phase and voltage level, with factory screened permanent designations; punched for use with self-locking cable tie fastener.
2. Write-on Tags:
 - a. Polyester Tags: 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment.
 - b. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

D. Signs

1. Baked-Enamel Signs:
 - a. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
 - b. 1/4-inch grommets in corners for mounting.
 - c. Nominal Size: 7 by 10 inches.
2. Metal-Backed Butyrate Signs:
 - a. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396- inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
 - b. 1/4-inch grommets in corners for mounting.
 - c. Nominal Size: 10 by 14 inches.
3. Laminated Acrylic or Melamine Plastic Signs:
 - a. Engraved legend.
 - b. Thickness:
 - 1) For signs up to 20 sq. in., minimum 1/16 inch thick.
 - 2) For signs larger than 20 sq. in., 1/8 inch thick.
 - 3) Engraved legend with black letters on white face.
 - 4) Framed with mitered acrylic molding and arranged for attachment at applicable equipment.



E. Cable Ties

1. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
 - a. Minimum Width: 3/16 inch.
 - b. Tensile Strength at 73 Deg F according to ASTM D 638: 7000 psi.
 - c. UL 94 Flame Rating: 94V-0.
 - d. Temperature Range: Minus 50 to plus 284 deg F.
 - e. Color: Black.

2.5 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

A. Description

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, by a qualified testing agency, and marked for intended location and application.
2. Comply with UL 467 for grounding and bonding materials and equipment.

B. Conductors

1. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
2. Bare Copper Conductors:
 - a. Solid Conductors: ASTM B 3.
 - b. Stranded Conductors: ASTM B 8.
 - c. Tinned Conductors: ASTM B 33.
 - d. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - e. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - f. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - g. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.



C. Connectors

1. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
2. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
3. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to the ground bus bar.
4. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
5. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
6. Straps: Solid copper, cast-bronze clamp. Rated for 600 A.

D. Grounding Electrodes

1. Ground Rods: Copper-clad steel, sectional type; 5/8 inch by 8 feet.
2. Ground Plates: 1/4 inch thick, hot-dip galvanized.

2.6 WIRING DEVICES

A. General Requirements

1. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with NFPA 70.
3. RoHS compliant.
4. Comply with NEMA WD 1.
5. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - a. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - b. Devices shall comply with requirements in this Section.
6. Devices for Owner-Furnished Equipment:



- a. Receptacles: Match plug configurations.
 - b. Cord and Plug Sets: Match equipment requirements.
7. Wall Plate Color: For plastic covers, match device color.
- B. Duplex Receptacles, 125 V, 20 A:
- 1. Description: Two pole, three wire, and self-grounding.
 - 2. Configuration: NEMA WD 6, Configuration 5-20R.
 - 3. Standards: Comply with UL 498 and FS W-C-596.
 - 4. Tamper-resistant: Provide device listed and labeled as complying with NFPA "Tamper Resistant Receptacles" in locations specified by NFPA 70 406.12.
 - 5. Weather-resistant: Provide device listed and labeled as complying with NFPA 70 "Receptacles in Damp or Wet Locations" in locations as shown on the plans.
- C. GFCI Receptacles, 125V, 20A
- 1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
 - 2. Configuration: NEMA WD 6, Configuration 5-20R.
 - 3. Type: Feed through.
 - 4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.
 - 5. Tamper-resistant: Provide device listed and labeled as complying with NFPA "Tamper Resistant Receptacles" in locations specified by NFPA 70 406.12.
 - 6. Weather-resistant: Provide device listed and labeled as complying with NFPA 70 "Receptacles in Damp or Wet Locations" in locations as shown on the plans.
- D. Wall Plates
- 1. Single and combination types shall match corresponding wiring devices.
 - a. Plate-Securing Screws: Metal with head color to match plate finish.
 - b. Material for Finished Spaces: Smooth, high-impact thermoplastic.
 - c. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.



- d. Material for Damp Locations: Thermoplastic with spring-loaded lift cover and listed and labeled for use in wet and damp locations.
- 2. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant thermoplastic with lockable cover.

2.7 LUMINAIRES

A. General Requirements:

- 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 2. California Title 24 compliant.

B. Fixtures: As shown on the plans.

2.8 LIGHTING CONTROLS

A. Control Units

- 1. Unit with integrated transformers shall be used to provide power to occupancy sensors and other control devices.
- 2. Unit shall be located within or connected to junction boxes.
- 3. Unit shall be 120-277V rated with no minimum load.
- 4. In some cases, multiple relays may be required to control the indicated switch legs or other loads.

PART 3 EXECUTION

3.1 WORKMANSHIP

- A. General: The installation of materials and equipment shall be performed in a neat, workmanlike and timely manner by an adequate number of craftsmen knowledgeable of the requirements of the Contract Documents. They shall be skilled in the methods and craftsmanship needed to produce a quality level of workmanship. Personnel who install materials and equipment shall be qualified by training and experience to perform their assigned tasks.
- B. Acceptable Workmanship: Acceptable workmanship is characterized by first-quality appearance and function, conforming to applicable standards of building system construction, and exhibiting a high degree of quality and proficiency which is judged by the



Architect as equivalent as or better than that ordinarily produced by qualified industry tradesmen.

1. Comply with NECA 1 and NFPA 70.

- C. Performance: Personnel shall not be used in the performance of the installation of material and equipment who, in the opinion of the Architect, are deemed to be careless or unqualified to perform the assigned tasks. Material and equipment installations not in compliance with the Contract Documents, or installed with substandard workmanship and not acceptable to the Architect, shall be removed and reinstalled by qualified craftsmen, at no change in the contract price.

3.2 PROTECTION AND CLEAN UP

- A. Protection and Restoration: Suitably protect equipment provided under this Division during construction. Restore damaged surfaces and items to "like new" condition before a request for substantial completion inspection.
- B. Handling: Materials shall be properly protected and Raceway openings shall be temporarily closed by the Contractor to prevent obstruction and damage. Post notice prohibiting the use of systems provided under this Contract, prior to completion of work and acceptance of systems by the Owner's representative. The Contractor shall take precautions to protect his materials from damage and theft.
- C. Safeguards: The Contractor shall furnish, place and maintain proper safety guards for the prevention of accidents that might be caused by the workmanship, materials, equipment or systems provided under this contract.
- D. Cleanup: Keep the job site free from debris and rubbish. Remove debris and rubbish from the site and leave premises in clean condition on a daily basis.

3.3 SYSTEMS GUARANTEE

- A. General: Provide a one-year guarantee. This guarantee shall be by the Contractor to the Owner for any defective workmanship or material, which has been provided under this Contract at no cost to the Owner for a period of one year from the date of substantial completion of the System. The guarantee shall include lamps, for ninety days after date of Substantial Completion of the System. Explain the provisions of guarantee to the Owner at the "Demonstration of Completed System".

3.4 FINAL OBSERVATION

- A. General: Work shall be completed, and forms and other information shall be submitted for acceptance one week prior to the request for final observation of the installation.

3.5 SPECIAL CONSIDERATIONS



- A. Comply with special requirements imposed at site by Owner. This may include badging of employees, prohibition of smoking, special working hours, or special working conditions.

3.6 METHODS FOR RACEWAY INSTALLATION

A. Raceway Application

1. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - a. Exposed Conduit: GRC, RNC, or Type EPC-40-PVC.
 - b. Concealed Conduit, Aboveground: GRC.
 - c. Underground Conduit: RNC, Type EPC-40-PVC.
 - d. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - e. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.
2. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - a. Exposed, Not Subject to Physical Damage: EMT.
 - b. Exposed, Not Subject to Severe Physical Damage: EMT.
 - c. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - d. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - e. Damp or Wet Locations: GRC.
 - f. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
3. Minimum Raceway Size: 3/4-inch trade size.
4. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - a. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - b. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.



- c. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- 5. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- 6. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

B. Raceway Installation

- 1. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- 2. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- 3. Complete raceway installation before starting conductor installation.
- 4. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- 5. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- 6. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- 7. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- 8. Support conduit within 12 inches of enclosures to which attached.
- 9. Raceways Embedded in Slabs:
 - a. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - b. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - c. Arrange raceways to keep a minimum of 1 inch of concrete cover in all directions.
 - d. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.



10. Stub-ups to Above Recessed Ceilings:

- a. Use EMT or RMC for raceways.
- b. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

11. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions:
Apply listed compound to threads of raceway and fittings before making up joints.
Follow compound manufacturer's written instructions.

12. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

13. Install raceways square to the enclosure and terminate at enclosures with locknuts.
Install locknuts hand tight plus 1/4 turn more.

14. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

15. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

16. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

17. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

18. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

- a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
- b. Where an underground service raceway enters a building or structure.
- c. Conduit extending from interior to exterior of building.



- d. Conduit extending into pressurized duct and equipment.
 - e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - f. Where otherwise required by NFPA 70.
19. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
20. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
- a. Use LFMC in damp or wet locations subject to severe physical damage.
 - b. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
21. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
22. Locate boxes so that cover or plate will not span different building finishes.
23. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
24. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

C. Installation of Underground Conduit

- 1. Direct-Buried Conduit
 - a. Excavate trench bottom to provide firm and uniform support for conduit.
 - b. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.
 - c. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.



- d. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - 1) Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - 2) For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
- e. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits but a minimum of 6 inches below grade. Align planks along centerline of conduit.

D. Installation of Underground Handholes and Boxes

- 1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- 2. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- 3. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- 4. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- 5. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.7 METHODS FOR CONDUCTOR INSTALLATION

A. Materials Applications

- 1. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.



2. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

B. Conductor Insulation and Wiring Methods

1. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
2. Feeders; exposed or concealed: Type THHN/THWN-2, single conductors in raceway.
3. Branch Circuits; exposed or concealed: Type THHN/THWN-2, single conductors in raceway.

C. Installation of Conductors and Cables

1. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
2. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
3. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
4. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

D. Connections

1. Tighten electrical connectors and terminals according to manufacturer's published torque- tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
2. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
3. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.
4. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

E. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
2. Colors for 240-V Circuits:



- a. Phase A: Black.
 - b. Phase B: Red.
3. Colors for 208/120-V Circuits:
- a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
4. Colors for 240-V Circuits:
- a. Phase A: Black.
 - b. Phase B: Red.
5. Colors for 480/277-V Circuits:
- a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
6. Color for Neutral: White.
7. Color for Equipment Grounds: Bare copper.

3.8 METHODS FOR ELECTRICAL SYSTEM IDENTIFICATION

A. Installation of Identification Products

- 1. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- 2. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- 3. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:



- a. "EMERGENCY POWER."
 - b. "POWER."
 - c. "UPS."
4. Vinyl Wraparound Labels:
- a. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - b. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
5. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
6. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
7. Self-Adhesive Labels:
- a. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 - b. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1- 1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
8. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.
9. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
10. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
11. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
12. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
13. Underground Line Warning Tape:
- a. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple



tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

- b. Install underground-line warning tape for direct-buried cables and cables in raceways.

14. Metal, Nonmetallic Preprinted, and Write-on Tags:

- a. Place in a location with high visibility and accessibility.
- b. Secure using UV-stabilized and plenum-rated cable ties.

15. Baked-Enamel, Metal-backed Butyrate, and Laminated Acrylic Signs:

- a. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- b. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

16. Cable Ties: General purpose, for attaching tags, except as listed below:

- a. Outdoors: UV-stabilized nylon.
- b. In Spaces Handling Environmental Air: Plenum rated.

B. Identification Schedule

- 1. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- 2. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- 3. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
- 4. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- 5. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:



- a. "EMERGENCY POWER."
 - b. "POWER."
 - c. "UPS."
6. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.
- a. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
7. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
8. Equipment Identification Labels:
- a. Indoor Equipment: Laminated acrylic or melamine sign.
 - b. Outdoor Equipment: Laminated acrylic or melamine sign.
 - c. Equipment to Be Labeled:
 - 1) Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive, engraved, laminated acrylic or melamine label.
 - 2) Enclosures and electrical cabinets.
 - 3) Switchboards.
 - 4) Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
 - 5) Enclosed switches.
 - 6) Enclosed circuit breakers.
9. For equipment labels, follow the convention examples below:
- | | |
|---------------------------|------------------|
| PANEL A | HEAT PUMP HP-1 |
| FED FROM MSB | FED FROM PANEL M |
| 400A, 120/240V, 1Ø 22KAIC | |



XFMR A
FED FROM PANEL A
480:120/240V, 1Ø, 75KVA

MOTOR CONTACT ENCLOSURE
FED FROM PANEL A

3.9 METHODS FOR GROUNDING AND BONDING

A. Applications

1. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
2. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
3. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - a. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
 - b. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
4. Conductor Terminations and Connections:
 - a. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - b. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - c. Connections to Structural Steel: Welded connectors.

B. Grounding at the Service

1. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

C. Grounding Separately Derived Systems

1. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.

D. Equipment Grounding

1. Install insulated equipment grounding conductors with all feeders and branch circuits.



2. Install insulated equipment grounding conductors with the following items, in addition to those required by CEC:
 - a. Feeders and branch circuits.
 - b. Lighting circuits.
 - c. Receptacle circuits.
 - d. Single-phase motor and appliance branch circuits.
 - e. Three-phase motor and appliance branch circuits.
 - f. Flexible raceway runs.
 - g. Armored and metal-clad cable runs.
 - h. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
3. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

E. Installation

1. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
2. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
3. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to CEC; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
 - a. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
 - b. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.10 METHODS FOR WIRING DEVICE INSTALLATION



A. Installation

1. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
2. Coordination with Other Trades:
 - a. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - b. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - c. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - d. Install wiring devices after all wall preparation, including painting, is complete.
3. Conductors:
 - a. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 - b. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - c. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
 - d. Existing Conductors:
 - 1) Cut back and pigtail, or replace all damaged conductors.
 - 2) Straighten conductors that remain and remove corrosion and foreign matter.
 - 3) Pig-tailing existing conductors is permitted, provided the outlet box is large enough.
4. Device Installation:
 - a. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
 - b. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.



- c. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - d. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
 - e. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
 - f. Use a torque screwdriver when a torque is recommended or required by manufacturer.
 - g. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - h. Tighten unused terminal screws on the device.
 - i. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
5. Receptacle Orientation:
- a. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
6. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

B. Identification

- 1. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with white-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.11 METHODS FOR SWITCHBOARD AND PANELBOARD INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install panelboards and accessories according to NECA 407 and NEMA PB 1.1.



- C. Equipment Mounting: Attach panelboard to the vertical finished or structural surface behind the panelboard.
- D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- E. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- F. Mount panelboard cabinet plumb and rigid without distortion of box.
- G. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- H. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
 - 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- I. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- J. Install filler plates in unused spaces.
- K. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

3.12 METHODS FOR LOW-VOLTAGE TRANSFORMER INSTALLATION

- A. Install transformers level and plumb on a concrete base with vibration-dampening supports. Locate transformers away from corners and not parallel to adjacent wall surface.
- B. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
- C. Secure transformer to concrete base according to manufacturer's written instructions.
- D. Secure covers to enclosure and tighten all bolts to manufacturer-recommended torques to reduce noise generation.
- E. Remove shipping bolts, blocking, and wedges.

3.13 METHODS FOR ENCLOSED SWITCHES AND CIRCUIT BREAKERS INSTALLATION

- A. Enclosure Environmental Rating Applications



1. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 - a. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.

B. Installation

1. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
2. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
3. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.14 METHODS FOR EXTERIOR LIGHTING INSTALLATION

- A. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- B. Fasten luminaire to structural support.
- C. Supports:
 1. Sized and rated for luminaire weight.
 2. Able to maintain luminaire position after cleaning and relamping.
 3. Support luminaires without causing deflection of finished surface.
 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- D. Wiring Method: Install cables in raceways. Conceal raceways and cables.
- E. Coordinate layout and installation of luminaires with other construction.
- F. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

3.15 METHODS FOR LIGHTING CONTROLS INSTALLATION



A. Sensor Installation

1. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
2. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

B. Contactor Installation

1. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

C. Wiring Installation

1. Wiring within Enclosures: Separate power-limited and non-power-limited conductors according to conductor manufacturer's written instructions.
2. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
3. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.16 SUPPORTS AND HANGERS

- A. All hangers, supports, and attachments to the structure must be capable of withstanding three times the anticipated load.

3.17 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Perform the following visual and electrical tests:
 1. Conductors and Cables:
 - a. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors and all conductors #6 AWG and larger.
 - 1) Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.



- 2) Test bolted connections for high resistance using a low-resistance ohmmeter.
- 3) Inspect for correct identification.
- 4) Inspect cable jacket and condition.
- 5) Insulation-resistance test on each conductor for ground and adjacent conductors.
Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
- 6) Continuity test on each conductor and cable.
- 7) Uniform resistance of parallel conductors.

2. Grounding and Bonding

- a. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
- b. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- c. Report measured ground resistances that exceeds 25 ohms.
- d. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3. Wiring Devices

- a. Line Voltage: Acceptable range is 105 to 132 V.
- b. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
- c. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
- d. Using the test plug, verify that the device and its outlet box are securely mounted.
- e. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new and retest as specified above.

4. Switches



a. Visual and Mechanical Inspection

- 1) Inspect physical and mechanical condition.
- 2) Inspect anchorage, alignment, grounding, and clearances.
- 3) Verify that the unit is clean.
- 4) Verify blade alignment, blade penetration, travel stops, and mechanical operation.
- 5) Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
- 6) Verify correct phase barrier installation.
- 7) Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

b. Electrical Tests

- 1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- 2) Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- 3) Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

5. Molded Case Circuit Breakers

a. Visual and Mechanical Inspection

- 1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- 2) Measure contact resistance across each switchblade fuse holder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's



published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

- 3) Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- 4) Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."
- 5) Inspect operating mechanism, contacts, and chutes in unsealed units.
- 6) Perform adjustments for final protective device settings in accordance with the coordination study.

b. Electrical Tests

- 1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- 2) Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- 3) Perform a contact/pole resistance test. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- 4) Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two meg-ohms.
- 5) Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.



- 6) Verify operation of charging mechanism. Investigate units that do not function as designed.

6. Exterior Lighting

- a. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- b. Verify operation of photoelectric controls.
- c. Illumination Tests:
- d. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):
 - 1) IES LM-5.
 - 2) IES LM-50.
 - 3) IES LM-52.
 - 4) IES LM-64.
 - 5) IES LM-72.

7. Lighting Control Devices

- a. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - b. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Devices will be considered defective if they do not pass tests and inspections.

3.18 CLEANUP

- A. Upon completion of the work of this Section, remove all material, debris, and equipment associated with or used in the performance of this work.

END OF SECTION



This Page Left Intentionally Blank.

Section 31

Earthwork

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Furnishing all labor, materials and equipment necessary for all earthwork as indicated on drawings and specified here-in, or as required for completion of the Contract, as applicable. Includes items such as the following:
 - a. Rough grading.
 - b. Filling and backfilling.
 - c. Excavation.
 - d. Onsite utility verification.
 - e. Protection of work, people and existing site elements.
 - f. Seasonal limits.
 - g. Materials.
 - h. Execution of work.

B. Related Sections:

1. Section 01 50 00: Temporary Facilities and Controls.
2. Section 31 23 33: Trenching and Backfilling.

C. Reference Standards:

1. 2025 California Building Code (CBC).
2. ASTM-International (ASTM) D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft/lbf/ft³ [2,700 kN-m/m³]).
3. ASTM D422: Standard Test Method for Particle-Size Analysis of Soils.



4. ASTM D4318: Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
5. California Department of Transportation (Caltrans) Standard Specifications, Current Edition.
6. California Division of Occupational Safety and Health (Cal-OSHA), Title 8, Section 1590 (e).
7. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction, and shall not begin until all of those governing authorities have been notified.

1.3 SUBMITTALS

A. Refer to "Section 01 33 00 Submittal Procedures."

1. Import Materials: Submit information regarding all materials to be imported to the site for use as engineered fill, aggregate base, trench backfill, or other materials required to accomplish the earthwork element of this project.
2. Native Materials: Submit information regarding all native materials proposed to be used as engineered fill.
3. Project Record Drawings: Accurately record locations of utilities remaining, re-routed utilities, new utilities, and newly discovered utilities by horizontal dimensions, elevations, inverts, and slope gradients.

1.4 QUALITY ASSURANCE

- A. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- B. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- C. Geotechnical Investigation:
 1. A geotechnical investigation report has been prepared for this Project. Contractor is responsible for being aware of the requirements provided in the geotechnical report.
 2. Compaction densities specified for structural fills under footings, slabs, or pavements shall be determined in accordance with the geotechnical engineer's written recommendations.
 3. If there are any discrepancies between the project specifications and the project geotechnical report, the project geotechnical report shall govern.
- D. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the contractors or subcontractors for defects discovered in their work during or following completion of the project. Correcting inadequate compaction or moisture content is the sole responsibility of the Contractor.



- E. Tests: See Part 3 for Compaction Testing.
- F. Contractor shall be solely responsible for all subgrades built. Failures resulting from inadequate compaction or moisture content are the responsibility of the Contractor. Contractor shall be solely responsible for any and all repairs.

1.5 PROTECTION

- A. Protect all existing structures, fences, roads, sidewalks, paving, curbs, and other items as necessary from earthwork activity.
- B. Protect above or below grade utilities which are to remain.
- C. Repair damage to any existing site features which are to remain.
- D. Repair and restoration shall be equal to quality and appearance of prior condition and to the satisfaction of the Owner's Representative.

1.6 GRADE STAKES AND LINES

- A. All grading and subgrading shall be controlled by Contractor-installed intermediate grade stakes and lines necessary to obtain the finished grade elevations shown or implied in the Drawings. Subgrade and finish grade surfaces shall conform to the control planes established by these grade stakes and lines.
- B. Protect and maintain all existing benchmarks, monuments, and other reference points. If disturbed or destroyed, they shall be replaced at the Contractor's expense.
- C. Contractor shall set temporary benchmarks as necessary to properly complete construction operations.

1.7 SURVEYING

- A. Contractor shall be responsible for hiring a licensed professional surveyor to perform all surveying, layout, and staking.

1.8 WARRANTY

- A. Refer to General Conditions.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.



PART 2 PRODUCTS

2.1 MATERIALS

- A. Engineered Fill Materials: All fill shall be of approved local materials supplemented by imported fill if necessary. "Approved" local materials are defined as local soils tested and approved by Geotechnical Engineer. Refer to the project geotechnical investigation report for detailed guidance on engineered fill materials and compaction criteria.
1. Proposed Engineered Fill Materials:
 - a. Shall have less than 2 percent by dry weight of organic materials
 - b. Shall meet the gradation requirements specified in the project geotechnical investigation report.
 - c. Fine grained soil with a liquid limit greater than 35 and a plasticity index greater than 12 will not be allowed for use as engineered fill.
- B. Aggregate Base: Provide $\frac{3}{4}$ -inch Class 2 Aggregate Base conforming to standard gradation and material requirements specified in Caltrans Standard Specifications, Section 26. For Class 2 Aggregate Base below asphalt concrete paving or concrete flatwork, the aggregate shall have at least 50% crushed coarse particles with at least one fractured face using Caltrans Test Method 205. Aggregate for Class 2 aggregate base shall be free from organic matter and other deleterious substances and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base.
- C. Imported fill shall be free of contaminants and have corrosion characteristics within the acceptable limits. All import fill material shall be tested and approved by Geotechnical Engineer prior to transportation to the site. Proposed fill material shall comply with Department of Toxic Substance Control (DTSC) guidelines to include Phase 1 environmental site assessment and related tests. Refer to the October 2001 DTSC Information Advisory for clean imported fill material:
1. DTSC Testing: Site work Contractor is to coordinate testing with an analytical lab, hired by the owner, licensed by the State of California for the DTSC testing. The costs associated with the testing will be paid by the Contractor.
 2. DTSC testing shall include documentation as to the previous land use, location, and history. Soils shall be analyzed for all compounds of concern to ensure the imported soil is uncontaminated and acceptable. Testing shall be performed per the recommendations included in DTSC Imported Fill Advisory Soils shall be tested prior to import to the project site.
 3. Lab shall determine geographically which tests and analysis comparison will be appropriate for the testing. (CAM 17 / Title 22); Regional Water Quality Control Board (RWQCB); or Office of Environmental Health Hazard Assessment (OEHHA).
 4. Frequency of testing shall be conducted in accordance with DTSC's Imported Fill Advisory as follows:



Fill Material Sampling Schedule Area of Individual Borrow Area	Sampling Requirements
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location

Volume of Borrow Area Stockpile	
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for the first 1,000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

5. Results of the testing analysis shall be sent to the Owner; Architect; Project Inspector, Project Civil Engineer, DTSC.

D. Water: Contractor shall furnish all required water for construction purposes, including compaction and dust control. Water shall be potable.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Contractor shall acquaint himself with all site conditions. If unknown active utilities are encountered during work, notify Architect promptly for instructions. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
- B. Existing conditions are shown on the plans to the extent known. Should the Contractor encounter any deviation between actual conditions and those shown, they are to immediately notify the Owner before continuing work. Unknown buried utility lines may exist. If encountered, notify Owner's Representative immediately for direction and re-direct work to avoid delay. Failure to notify will make Contractor liable for damage to these utilities arising from Contractor's operations subsequent to discovery of such unknown active utilities.
 1. Cooperate and coordinate with Owner's Representative and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility district.
 2. Do not interrupt existing utilities serving occupied facilities without proper notification to, and written direction from, Owner's Representative.
- C. Excavation dewatering may be necessary. Contractor shall provide any and all tools, equipment and labor necessary for excavation dewatering no matter what the source. Dewatering shall be continuous until all site utilities are installed and backfilled.



3.2 ONSITE UTILITY VERIFICATION AND REPAIR PROCEDURES

A. Ground-breaking requirements:

1. All underground work performed by a Contractor must be authorized by the Owner's Construction Manager prior to start of construction.
2. The Contractor is to obtain and keep the original construction utility plans on site during all excavation operations. Contractor can contact the Owner to procure the drawings.

B. Underground Utility Locating:

1. Contractor shall hire an underground utility locating service to locate existing underground utility pathways in areas affected by the scope of work for excavation.
2. Contractor must use an Underground Utility Locator Service with a minimum of 3 years of experience. The equipment operator must have demonstrated experience.
3. The Underground Utility Locator Service must be able to locate existing utilities at a depth of at least 72 inches.
4. The Underground Utility Locator Service must be able to locate, but are not limited to, locating the following types of utility pathways:
 - a. All conduit pathways containing 110 volts or greater (50-60 hertz [Hz]) electrical wire.
 - b. All conduit pathways containing an active cable TV system.
 - c. All conduit pathways containing wire or conductor in which a signal can be attached and generated without damaging or triggering the existing systems.
 - d. All empty conduit pathways or pipe in which a signal probe or sonde (miniature transmitter) can be inserted.
 - e. All conduit pathways containing non-conductive cables or wires in which a signal probe or sonde (miniature transmitter) can be inserted.
 - f. All plastic and other nonconductive water lines in which a transmitter can be applied to create a low frequency pressure wave (signal) without damaging or triggering the existing systems.
 - g. All copper or steel waterlines and plastic or steel gas lines.
5. All markings made by the Underground Utility Locator Service or other shall be clear and visible.
6. The Contractor shall maintain all markings made by Underground Utility Locator Service or other throughout the entire length of the project.
7. The Underground Utility Locator Service shall provide the Contractor with two sets of maps showing the location of utilities and average depth. They will be referenced to permanent buildings. Contractor will deliver one copy to the Owner at no additional charge.



8. Contractor is responsible to contact Underground Service Alert (USA 800-642-2444) and receive clearance prior to any excavation operations.
9. Contractor shall inform the Owner no later than five (5) days prior to the date scheduled for the utility locator service to be on site.

3.3 PROTECTION

- A. Adequate protection measures shall be provided to protect workmen and passers-by on and off the site. Adjacent property shall be fully protected throughout the operations. Blasting will not be permitted. Prevent damage to adjoining improvements and properties both above and below grade. Restore such improvements to original condition should damage occur. Replace trees and shrubs outside the building area disturbed by operations.
- B. In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal working hours.
- C. Any construction review of the Contractor's performance conducted by the Geotechnical Engineer is not intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- D. Provide shoring, sheeting, sheet piles and or bracing to prevent caving, erosion, or gulying of sides of excavation.
- E. Surface Drainage: Provide for surface drainage during the period of construction in order to avoid creating nuisances to adjacent areas. The Contractor shall make a reasonable effort on a daily basis to keep all excavations and the site free from water during entire progress of work, regardless of cause, source, or nature of water.
- F. Adjacent streets and sidewalks shall be kept free of mud, dirt or similar nuisances resulting from earthwork operations.
- G. The site and adjacent influenced areas shall be watered as required to suppress dust nuisance. Dust control measures shall be in accordance with the local jurisdiction.

3.4 SEASONAL LIMITS

- A. No fill material shall be placed, spread, or rolled during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not be resumed until field tests indicate that moisture content and density of fill are satisfactory.
- B. Excessively wet fill material shall be bladed and aerated.

3.5 INSPECTION LAYOUT AND PREPARATION

- A. Prior to installation of the work of this section, carefully inspect and verify by field measurements that installed work of all other trades is complete to the point where this installation may properly commence.



- B. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, setup and maintain barricades and protection facilities prior to beginning actual earthwork operations. Layout and staking shall be done by a licensed Land Surveyor or Professional Civil Engineer.
- C. Verify that specified items may be installed in accordance with the approved design.
- D. In event of discrepancy, immediately notify Owner. Do not proceed in discrepant areas until discrepancies have been fully resolved.

3.6 PERFORMANCE

- A. General: Do all grading, excavating and cutting necessary to conform finish grade and contours as shown. All cuts shall be made to true surface of subgrade.
- B. Archaeological Artifacts: Should any artifacts of possible historic interest be encountered during earthwork operations, halt all work in area of discovery and immediately contact the Owner for notification of appropriate authorities.
- C. Degree of Compaction: Percentage of maximum density, hereinafter specified as degree of compaction required, means density equivalent to that percentage of maximum dry density and such expressed percentage thereof will be minimum acceptable compaction for specified work.
- D. Moisture Content: Moisture content shall be as noted below and as called for on the plans. Moisture content shall be maintained until subgrade is covered by surfacing materials.

3.7 DEMOLITION, DISPOSAL, AND DISPOSITION OF UNDESIRABLE MAN-MADE FEATURES

- A. All other obstructions, such as abandoned utility lines, septic tanks, concrete foundations, and the like shall be removed from site. Excavations resulting from these removal activities shall be cleaned of all loose materials and widened as necessary to permit access for compaction equipment. Areas exposed by any required over-excavation should be scarified to a depth of 12 inches, moisture-conditioned to near optimum moisture content, and recompacted to at least 90% of the maximum dry density.

3.8 TESTING AND OBSERVATION

- A. General: Refer to "Section 01 40 00 Quality Requirements."
- B. All grading and earthwork operations shall be observed by the Geotechnical Engineer or his representative, serving as the representative of the Owner.
- C. Field compaction tests shall be made by the Geotechnical Engineer or his representative. If moisture content and/or compaction are not satisfactory, Contractor will be required to change equipment or procedure or both, as required to obtain specified moisture or compaction. Notify Geotechnical Engineer at least 48 hours in advance of any filling operation.
- D. Earthwork shall not be performed without the notification or approval of the Geotechnical Engineer or his representative. The Contractor shall notify the Geotechnical Engineer at least 48 hours prior to commencement of any aspect of the site earthwork.



- E. If the Contractor should fail to meet the compaction or design requirements embodied in this document and on the applicable plans, they shall make the necessary readjustments until all work is deemed satisfactory, as determined by the Geotechnical Engineer.
- F. Costs of Geotechnical Engineer or his representative will be borne by Owner, except those costs incurred for re-tests or re-inspection will be paid by Owner and back charged to Contractor.
 - 1. If Contractor elects to process or mine onsite materials for use as Suitable Fill, Aggregate Sub Base, Aggregate Base, Rock, Crushed Rock or sand the cost of all testing of this material shall be paid for by the Contractor.
 - 2. Testing of import fill for compliance with Department of Toxic Substance Control (DTSC) shall be paid for by the Contractor.

3.9 CLEARING AND GRUBBING

- A. Prior to grading, remove all debris offsite. Remove trees and brush, including the root systems. Holes resulting from tree and brush removal should be prepared and backfilled. This may require deepening and/or widening the holes to adequately remove disturbed soil and provide room for compaction equipment. Strip the surface of all organics.

3.10 CUTTING

- A. Building pads that are located within a cut/fill transition area will have to be over-excavated to provide a semi-uniform fill beneath the building pad. The portions of building pads located in cut areas shall be over-excavated to provide no more than 1 foot difference in fill placed in the same building pad.
- B. Do all cutting necessary to bring finish grade to elevations shown on Drawings.
- C. When excavation through roots is necessary, cut roots by hand.
- D. Carefully excavate around existing utilities to avoid unnecessary damage. The Contractor shall anticipate and perform hand work near existing utilities, without additional claims or cost.

3.11 SUBGRADE PREPARATION

- A. Grade compact and finish all subgrades within a tolerance of 0.10 feet of grades as indicated on Drawings and so as not to pool water. Subgrade within building pads and concrete walks shall be within 0.05 feet of grades indicated.
- B. After clearing, grubbing and cutting, subsurface shall be plowed or scarified to a depth of at least 12 inches, until the surface is free from ruts, hummocks or other uneven features and is uniform and free from large clods. Moisture condition to optimum moisture content, recompact and proof-roll, unless otherwise stated in the project geotechnical report. If the existing soils are at a water content higher than specified, the Contractor shall provide multiple daily aerations by ripping, blading, and/or disking to dry the soils to a moisture content where the specified degree of compaction can be achieved. After 7 consecutive working days of daily aerations, and the moisture content of the soil remains higher than specified, the Contractor shall notify the Engineer. If the existing soils have a moisture content lower than specified, the Contractor shall scarify, rip, water and blade existing soil to achieve specified moisture content.



The Contractor shall make proper allowance in schedule and methods to complete this work.

- C. Compacted subgrade should be non-yielding under construction traffic, including a 10-wheel truck, such as a water truck or dump truck, in all pavement areas. Removal and subsequent replacement of some material (such as areas of excessively wet materials, unstable subgrade, or pumping soils) may be required.
 - 1. Proof-roll prepared subgrade surface below Class 2 Aggregate Base supporting concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 - 2. Completely proof-roll base in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 miles per hour (mph).
 - 3. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
- D. Subgrade preparation for pavement areas shall extend laterally at least 2 feet beyond the edge of pavement.
- E. Where Contractor over-excavates building pads through error, resulting excavation shall be recompacted as engineered fill at Contractor's expense.

3.12 PLACING, SPREADING, AND COMPACTING ENGINEERED FILL MATERIAL

- A. See the "Slope Construction" section of this specification for requirements when constructing in areas with existing slopes.
- B. Selected fill material shall be placed in loose horizontal lifts not exceeding 8 inches which, when compacted, shall not exceed 6 inches in compacted thickness. Each layer shall be spread evenly and thoroughly mixed to insure uniformity in moisture content.
- C. Selected fill material shall be moisture-conditioned to specified moisture content. Selected fill material shall be unfrozen. When moisture content of fill material is below that specified, add water until proper moisture content is achieved. When moisture content is above that specified, aerate by blading, or other methods noted in this section, until moisture content is satisfactory.
- D. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to the levels specified in the project geotechnical report and as shown on the project plans. Compact each layer over its entire area until desired density has been obtained.
- E. Compaction of Fill in Trenches: See Specification "Section 31 23 33 Trenching and Backfilling."
- F. Jetting of fill materials will not be allowed.

3.13 SLOPE CONSTRUCTION

- A. Cut slopes shall be constructed to no steeper than 2H:1V (horizontal to vertical). Fill slopes shall be constructed to no steeper than 2H:1V. Prior to placement of fill on an existing slope, the existing slope shall be benched. The benches shall be excavated in accordance with the project geotechnical report. The face of the fill slopes shall be compacted as the fill is placed, or the slope may be overbuilt and then cut back to the design grade. Compaction by track walking will not be allowed.



3.14 FINISH GRADING

- A. At completion of project, the site shall be finished graded, as indicated on Drawings. Finish grades shall be "flat graded" to grades shown on the drawing. Mounding of finish grades will not be allowed unless otherwise directed on the landscape drawings. Tolerances for finish grades in drainage swales shall be ± 0.05 feet. Tie in new and existing finish grades.
- B. Leave all landscaped areas in finish condition for lawn seeding. Landscaped planters shall be graded uniformly from edge of planter to inlets. If sod is used for turf areas, the finish grade on which it is placed shall be lowered to allow for sod thickness. All landscape areas shall be left free of rock or foreign material. All landscape areas shall be approved by Architect prior to any planting.

3.15 SURPLUS MATERIAL

- A. Excavated material not required for grading or backfill shall be removed from site at Contractor's expense.

3.16 CLEANING

- A. Remove from fill all vegetation, wood, form lumber, casual lumber, and shavings, in contact with ground; buried wood will not be permitted in any fill.

END OF SECTION



THIS PAGE INTENTIONALLY LEFT BLANK.



SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Trench excavation, shoring, dewatering, unsuitable subgrade removal and replacement, trench backfill and compaction, and all other associated work involved in trench excavations.
- B. Reference Standards:
 - 1. American Association of State Highway and Transportation Officials (AASHTO) T 180: Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-pound [lb]) Rammer and a 457-millimeter (mm; 18 inches [in.]) Drop.
 - 2. ASTM-International (ASTM) D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ [2,700 kN m/m³]).
 - 3. ASTM D6938: Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

- A. See "Section 01 33 00 Submittal Procedures."
- B. Material information for all backfill material.
- C. Mix design for slurry cement being used for trench backfilling.
- D. Load slips for all material delivery trucks shall be delivered to the job site with the truck. The Contractor shall retain all load slips and shall make them available to the Engineer upon request.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. Prevent contamination.
- C. Protect stockpiles from erosion and deterioration of materials.



PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. General: Material specifications listed on the Plans, where applicable, shall supersede those listed in this Section.
- B. Aggregate Base: Aggregate base shall be Class 2 aggregate base (3/4-inch maximum) and shall conform to Section 26 "Aggregate Bases" of the Caltrans Standard Specifications.
- C. Permeable Material: Permeable material shall consist of crushed rock conforming to the following gradation requirements, unless otherwise approved by the Engineer:

<u>Sieve Size</u>	<u>Percent Passing</u>
3/4-inch	90-100
1/2-inch	30-60
3/8-inch	0-20
No. 4	0-5

- 1. The portion of the material that is retained on a 3/8-inch sieve shall contain at least 50% of particles having three or more fractured faces. Not over 5% shall be pieces that show no fractured faces. Rounded rock material (commonly called "washed rock") that shows little evidence of the crushing process is not acceptable and will be rejected.
- D. Sand Bedding: Bedding around utilities shall consist of sand having a sand equivalent (SE) of at least 30. Bedding shall extend from 6 inches below to 1 foot above the utility pipe or conduit. Sand bedding shall be compacted to a minimum of 90 percent relative compaction.
- E. Slurry Cement Backfill: Slurry cement backfill shall conform to Section 19-3.02E, "Slurry Cement Backfill" of the Caltrans Standard Specifications and shall consist of a fluid, workable mixture of aggregate, cement, and water. Slurry cement backfill shall be either 1-sack, 1½-sack, or 2-sack mix, depending on the application. 1-sack mix shall contain 94 pounds of Portland cement per cubic yard of material; 1½-sack shall contain 141 pounds of Portland cement per cubic yard; 2-sack mix shall contain 188 pounds of Portland cement per cubic yard of material. Mix type used for each specific application shall be as indicated on the plans or as directed by the Engineer.
- F. Native Backfill: Native backfill shall consist of material excavated during the course of the project, shall be free of organic and other deleterious material, and shall have a sand equivalent (SE) greater than 15.
- G. Imported Topsoil: Imported topsoil shall be sandy loam, shall be friable, shall have a high degree of fertility, and shall be free of weeds, clods, roots, rocks, gravel, sticks, brush, and other deleterious material. An imported topsoil analysis shall be submitted to the Engineer for approval prior to delivery of any imported topsoil to the project site. Should the Engineer reject any portion of the delivered soil for any reason, it shall be removed immediately at no cost to the City. The Contractor shall be responsible for maintaining all placed topsoil until the project has been accepted.

- H. Native Topsoil: Native topsoil shall consist of material excavated from the upper soil layer (from the surface to a depth of approximately six inches) during the course of the project. Native topsoil shall be stockpiled separately from native subsoil.
- I. Provide soil material free from Organic matter and deleterious substances, containing no rocks or lumps over 2 inches in greatest dimensions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Utilities on the Plans may be shown incorrectly or not at all. The Contractor shall contact Underground Service Alert (USA) at 1-800-227-2600 at least forty-eight (48) hours, but not less than two (2) working days, prior to any demolition or excavation and request field markings of all underground utilities.
- B. Verify that survey benchmarks and intended elevations for the work are as indicated.

3.2 PREPARATION

- A. Take necessary steps to assure that service is not interrupted. If water or sewer service to any residents, buildings, or facilities within the work area will be interrupted during portions of the work, the Contractor shall notify all affected residents at least 2 (two) full working days in advance of anticipated water or sewer shutdowns. Unless otherwise noted on the Plans, the maximum duration for water shutdown is 8 hours.
- B. Identify required lines, levels, contours, and datum locations.
- C. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Engineer.

3.3 TRENCHING

A. Trench Excavation

- 1. The Contractor shall perform all excavation required to accomplish the construction, regardless of the type, nature, or condition of material encountered. Excavations within 24 inches of marked underground utilities shall be dug with hand tools.
- 2. The Contractor shall excavate the trench to the elevations, lines, and grades shown on the Plans. Allowance shall be made within the excavation for shoring, forms, working space, bedding, and backfill. Over-excavation below the grade lines shown on the Plans or established by the Engineer shall be backfilled at the Contractor's sole expense with trench backfill material approved by the Engineer and compacted to specified densities (including over-excavation required to remove existing utilities shown on the Plans as to be removed). Over-excavation required due to unsuitable subgrade soils is addressed in this specification.
- 3. The Contractor shall control excavations through careful backfill and shoring placement that prevents trench wall sloughing and shall remove all material that sloughs into the trench. In addition, all voids or cavities that result from sloughing trench walls shall be backfilled and



compacted with the same material at the same compaction/vibration requirements as shown on the trench detail for that section of trench. If, in the opinion of the Engineer, additional asphalt, concrete, or other surface material must be removed to adequately compact or vibrate the backfill placed in these voids or cavities, the Contractor shall sawcut and remove the surface material to the limits of the voids or cavities as directed by the Engineer. All costs associated with the removal of material that has sloughed into the trench; placement and compaction of the additional backfill material; and the sawcutting, removal, and patching of additional surface material shall be the sole responsibility of the Contractor, and no additional payment will be made to the Contractor for this work.

B. Trench Shoring and Safety

1. All trench excavations requiring shoring shall conform to the requirements of the California Occupational Safety and Health Act (Cal-OSHA). The Contractor shall furnish and install all shoring and bracing required to support the trench walls for the protection of all personnel working in the excavation. Shoring and bracing shall be removed in a manner that protects the workers and prevents sloughing of trench walls.
2. The Contractor is solely responsible for the safety of all workers, the general public, and private and public property within the project site for the duration of the project. This responsibility shall be in effect at all times.
3. For trenches requiring shoring or bracing, the Contractor shall submit to the Engineer a detailed plan showing the proposed design of shoring, bracing, or other provisions to be made to protect the trench from sloughing or collapse. Shoring and bracing plans shall be submitted at least 10 (ten) working days before the Contractor intends to begin trenching work.
4. If shoring and bracing plans vary from the shoring system standards established by the Construction Safety Orders of Cal-OSHA, the plans shall be prepared, sealed, and signed by a Civil or Structural Engineer currently registered in California. Signed and sealed copies of calculations necessary to qualify the system shall be included with the plans. If the Contractor proposes to use trench jacks or speed shores, shoring and bracing plans shall show the length and type of shoring, vertical and horizontal spacing, and any vertical or horizontal wales. Trench shields, when proposed or used, shall specify maximum allowed depth for the soils expected to be encountered.
5. It is the sole responsibility of the Contractor to submit shoring and bracing plans that either conform to the Construction Safety Orders of Cal-OSHA, or as approved by a California-licensed Civil or Structural Engineer. No shoring or bracing plans shall be submitted to the Engineer that do not meet either of these requirements.
6. The Engineer shall review the Contractor's shoring and bracing plans to verify the general scope of the work only. This review is not intended to include approval of the shoring system, or a review of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site. This review shall not in any way relieve the Contractor from sole responsibility for the design, construction or installation, proper maintenance, and safety of shoring and bracing systems.

C. Trench Dewatering



1. The Contractor shall dewater all excavations for pipelines, sewer laterals, water main fittings and valves, and other underground items to keep groundwater out of the excavation. Water and residual sewage will not be allowed in excavations during bedding, concrete pours, or backfill and compaction. If excessive groundwater is present and cannot be adequately controlled, the Engineer may deem the bottom of the trench unsuitable for placement of bedding material.
2. The Contractor shall have pumps on hand of sufficient capacity and horsepower to pump all residual water and sewage from sewer mains, laterals, and services that may be anticipated entering the trench, from existing water mains and services as they drain, and from existing sewer laterals downstream from the bypass point.
3. The Contractor shall provide/construct sedimentation measures to contain sediment from dewatering operations from migrating into the storm drain system of waterways.

D. Unsuitable Subgrade and Backfill

1. Unsuitable subgrade is native trench material at subgrade that, in the opinion of the Engineer, is unsuitable to use as a pipe bed and must be removed to provide a solid construction surface. Examples of this type of subgrade are plant material, logs, trash, wood chips and debris, mud, soft or spongy soil, and the like. It DOES NOT refer to material that sloughs into the trench from the sidewalls due to insufficient trench shoring and must be dug out. If unsuitable material is encountered under the pipe, the Engineer shall direct the Contractor as to the total volume of unsuitable material to be removed PRIOR to its removal from the trench.
2. Once the unsuitable material has been excavated to the satisfaction of the Engineer, the Contractor shall backfill the over-excavation up to the elevations, lines, and grades shown on the Plans or as shown on survey staking cut sheets provided by the Engineer or Project Surveyor. Backfill material for unsuitable over-excavations shall be Class 2 Aggregate Base, as approved by the Engineer, compacted to 90% relative compaction, unless otherwise directed by the Engineer or indicated on the plans.
3. If, upon over-excavation, the resulting subgrade, in the opinion of the Engineer, is still unsuitable to use as a compaction bed, the Contractor shall backfill the over-excavation up to the elevations, lines, and grades shown on the Plans Class 1 permeable material (3/4-inch maximum). If the length of the Permeable Material placement exceeds 20 feet as measured along the trench, the Contractor shall construct slurry cement waterstops that extend from 12 inches above the top of the pipe to the bottom of the over-excavation every 20 feet measured along the trench. Slurry cement waterstops placed under these conditions shall be considered as trench backfill, and no additional payment shall be made to the Contractor for their inclusion in the trench backfill.
4. If, in the opinion of the Engineer, an excessive amount of groundwater is flowing (not seeping) in the trench and cannot be removed from the trench by pumping, the Engineer may deem the trench subgrade unsuitable. However, this condition will not require removal of the unsuitable subgrade. Instead, the Engineer may opt to require the Contractor to place Permeable Material for pipe bedding in the section of trench that the groundwater is flowing into. If the length of the Permeable Material placement exceeds 20 feet measured along the trench, the Contractor shall construct slurry cement waterstops that extend from



12 inches above the top of the pipe to the bottom of the trench every 20 feet. Slurry cement waterstops placed under these conditions shall be considered as trench backfill, and no additional payment shall be made to the Contractor for their inclusion in the trench backfill.

E. Incompatible Areas

1. When pipelines cross through areas where compaction cannot occur (underneath large conduits or other obstacles), the Contractor shall bed and backfill the pipe (up to 12 inches above the top of the pipe or to the bottom of the obstacle, whichever is less) with Permeable Material. If the length of the Permeable Material placement exceeds 20 feet measured along the trench, the Contractor shall construct slurry cement waterstops that extend from 12 inches above the top of the pipe to the bottom of the bedding material every 20 feet. Slurry cement waterstops placed under these conditions shall be considered as trench backfill, and no additional payment shall be made to the Contractor for their inclusion in the trench backfill.

F. Bedding and Backfill

1. In general, 6 inches of pipe bedding shall be laid on firm, undisturbed native material true to line and grade. Bedding material shall be placed into the trench prior to pipe placement, shall be compacted to a minimum of 90% relative compaction, and an additional 1 foot of bedding material shall be placed above the utility conduit or pipe. Bedding material under the coupling bells shall be hand-excavated so that there is a minimum clearance under the bell of 1 inch.
2. Backfill material in the pipe haunching zone between the bottom of the pipe and the springline of the pipe shall be "shovel-sliced" underneath the pipe overhang, then hand-tamped with "J" bars or pneumatic "pogo stick" to a relative compaction of 90% along the entire length of the pipe. Tamping with a shovel is not sufficient and does not meet this requirement.
3. Slurry cement backfill shall be consolidated using motor-driven vibrators to remove all voids and shall be placed in the work within one hour after mixing. The vibrator used shall be large enough to vibrate the slurry cement to the satisfaction of the Engineer. In addition, the slurry cement mixture shall contain enough water that it "flows" into the hole left when the vibrator is removed. Slurry material that does not "flow" into the hole left by the vibrator shall have water added to it in the truck in an amount sufficient to attain a "flowing" behavior. Slurry cement shall not be covered with other material for at least 4 hours after placement.
4. Class 2 aggregate base backfill shall be placed in loose, 8-inch lifts as indicated in the project geotechnical report, and compacted to a maximum thickness of 6 inches.
5. In non-paved areas where native material backfill is specified, the backfill shall be placed in lifts as directed by the Engineer. The maximum lift thickness will be determined by the Engineer based upon the compaction method being employed; however, the maximum lift thickness when hand-operated compaction devices are used shall not exceed one (1) foot. All loose soil within the excavation shall be removed prior to fill placement.

G. Trench Bedding and Backfill Compaction



1. Trench bedding and backfill shall be compacted to the densities shown on the trench detail on the Plans, and as specified in this Section.
2. Compaction testing shall be performed by the Engineer to determine whether or not the Contractor's compaction efforts are meeting the minimum compaction requirements. Trench bedding and backfill that fails compaction tests shall be re-compacted as necessary to meet the minimum compaction requirements at the sole expense of the Contractor.

H. Workmanship Guarantee

1. The Contractor shall guarantee his trench work against settlement for a period of 1 year after the Notice of Completion has been filed. During this time, the Contractor shall repair, at his own expense and to the satisfaction of the Engineer, all failed trench backfill and resurfacing. For the purpose of this contract, failure shall be deemed to have occurred if any of the following conditions exists:
 - a. On paved streets, a depression in a pavement patch of 1/8 inch (0.01 feet) below the sides of the uncut portion of pavement (includes trench lines and pavement widening).
 - b. Along shoulder areas, behind sidewalks, and in other unpaved portions of the right-of-way, a depression of 3/4 inches (0.06 feet) below the average of the sides of the uncut portion.
 - c. Across all fields, pastures, or areas untraveled by automotive equipment, a depression causing the ponding of water between the sides of the uncut portion.
 - d. Any other settlement that causes drainage problems or concentrations of water to run along the excavation line.

3.4 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. See "Section 01 40 00 Quality Requirements," for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("Standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.6 CLEANING

- A. Leave unused materials in a neat, compact stockpile.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK.



This Page Left Intentionally Blank.

Section 32

Exterior Improvements

SECTION 32 01 90

LANDSCAPE MAINTENANCE

1.1 PART 1 – GENERAL

1.1 SUMMARY

- A. Work Included: Provide continuous Landscape Maintenance, complete as specified during progress of the work, after installation, and for a minimum period of 90 days after Preliminary Acceptance, and as required by warranty and Article 3.8, Termination of the Maintenance Period.
- B. Related Sections include:
 - 1. Section 32 91 19 - Landscape Finish Grading
 - 2. Section 32 84 00 - Irrigation
 - 3. Section 32 91 13 - Soil Preparation and Soil Mixes
 - 4. Section 32 93 00 - Planting

1.2 SUBMITTALS

- A. Submittals to include all materials described in this section and all other materials identified as required by maintenance issues that develop during the course of the maintenance period.
- B. Quality Control Submittals:
 - 1. An irrigation system audit report @ the 30 day benchmark, submitted to building property manager.
 - 2. Schedule of maintenance operations and monthly status report including list of equipment, materials proposed for the job.
 - 3. Licenses, permits and insurances required by City, County, State or Federal government pertaining to maintenance work.
 - 4. Monthly record of all herbicides, insecticides and disease control chemicals used for the project.
 - 5. Written application recommendation by a licensed agricultural pest control advisor for all weed, pest and disease controls restricted by the Director of Agriculture proposed for this work.
 - 6. Schedule of recommended annual fertilizer and soil conditioning program provided by Soils Testing Lab based on plant schedule.



- B. Project Close-out Submittal: Include in a single, 3-ring binder a landscape maintenance manual containing an indexed collection of all schedules, records and permits listed above, as well as a documentation of accepted condition of planting and irrigation at Final Acceptance.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Experience: The landscape contractor or maintenance subcontractor shall have a full-time employee assigned to the job as foreman for the duration of the contract. He/she shall have a minimum of four (4) years of experience in landscape maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.
2. Labor Force: The landscape maintenance labor force shall be thoroughly familiar with, and trained in, the work to be accomplished and shall perform the task in a competent, efficient manner acceptable to the University.

B. Requirements by Applicable Standards: Apply standards as described in the following:

1. Fertilizing Woody Plants, University of California, Cooperative Extension Leaflet #2958, 9/79.

Pruning Landscape Trees, University of California, Cooperative Extension Leaflet #2574, 1/79.

3. American National Standard for Tree Care Operations - ANSI A300, Parts 1 and 2
4. International Society of Arboriculture BMP for Tree and Shrub Fertilization, and for Tree Pruning
5. Irrigation Association BMP's.

C. Requirements:

1. Supervision: The foreman shall directly supervise the work force at all times. Notify University of all changes in supervision.



2. Identification: Provide proper identification at all times for landscape maintenance firm's vehicles and labor force. Be uniformly dressed in a manner satisfactory to the University.

1.4 PROJECT/SITE CONDITIONS

- A. Site Visit: At beginning of maintenance period, visit and walk the site with the Landscape Architect to clarify scope of work and understand existing project/site conditions.
- B. Documentation of Conditions: Document general condition of existing trees, shrubs, vines, groundcovers and lawn recording all plant materials which are healthy, thriving, damaged, dead or dying.
- C. Irrigation System: Document general condition of existing irrigation system, making sure that faulty electrical controllers, broken or inoperable sprinkler heads or emitters are reported.

1.5 SEQUENCING AND SCHEDULING

- A. Perform all maintenance during hours mutually agreed upon between University and Contractor.
- B. Work force shall be present at the project site at least once a week and as often as necessary to perform specified maintenance in accordance with the approved maintenance schedule.

1.2 PART 2 PRODUCTS

2.1 MATERIALS

- A. General: All materials and equipment shall be provided by the Contractor, except as specified below.
- B. Water: Clean, potable and fresh, as available from
University. Fertilizers:
 1. Tightly-compressed, slow-release and long-lasting complete fertilizer tablets bearing manufacturer's label of guaranteed analysis of chemicals present.
 2. Balanced, once-a-season application, controlled-release fertilizers with a blend of coated pills which supply controlled-release nitrogen, phosphorus and potassium, and uncoated, rapidly soluble pills containing nitrogen and phosphorus.
- D. Herbicides, Insecticides, and Fungicides:



3. Best quality materials with original manufacturers' containers, properly labeled with guaranteed analysis.



- 4. Use non-staining materials.
- E. Perennials/groundcovers: Nursery-grown in 4 in. pots, full, healthy plants just ready to bloom.
- F. Replacement Tree Stakes and Ties: Match originally accepted existing materials on the site.

2.2 EQUIPMENT

- A. General: Use only the proper tool for each job. Maintain all tools in sharp, properly-functioning condition. Clean and sterilize pruning tools prior to usage.
- B. Insect/Disease Prevention: Take all acceptable measures to prevent introduction of insect or disease-laden materials onto the site.

1.3 PART 3 GENERAL

3.1 GENERAL

- A. Duration: Continuously maintain each plant and each portion of groundcover area after installation, during progress of work, and for a period of one year (365 calendar days) after completion of all planting work until Final Acceptance.
- B. Perform sufficient litter pick-up of pathways, flower beds, driveways, and recreational areas on a daily basis.
- C. The Contractor shall be responsible for once yearly inspection of the surface drains located within the landscaped areas. These drains shall be checked to assure proper functioning. Remove any debris or vegetation that might accumulate at the inlet to prevent proper flow of water. Contractor shall notify Client, in writing, of any problems within one week of inspection.
- D. Contractor shall exercise due care to avoid hitting trees and shrubs and will be responsible for the replacement of trees and shrubs damaged by its personnel.
- E. Contractor shall submit to Client copy of any and all tests. The Contractor shall be responsible for having any tests made to affirm the soil chemistry, plant disease, insect pests, to properly maintain the landscape.

3.2 ESTABLISHING THE MAINTENANCE PERIOD

- A. Preliminary Review: As soon as planting is substantially completed per documents, hold a preliminary review to determine the condition of the work.
- B. Date of Review: Notify Landscape Architect at least five (5) working days prior to anticipated date of review.



- C. Beginning of the Maintenance Period: The date on which the Landscape Architect issues a letter of Preliminary Acceptance to the Contractor.
- D. Ending of the Maintenance Period: The date on which the Landscape Architect issues a letter of Final Acceptance to the Contractor.

3.2 PREPARATION

A. Protection:

- 1. Protect all new planting areas from damage of all kinds from beginning of work until sufficiently established or until Final Acceptance.
- 2. Provide temporary protection fences, barriers and signs as required for protection.

B. Replacements:

- 1. Immediately treat or replace all plants, which become damaged or injured as a result of Contractor's operations or negligence, as, directed by Landscape Architect, at no cost to the University.
- 2. Replacement plants shall match size, condition and variety of plants replaced.

3.3 PLANTING

A. Watering Basins:

- 1. For supplemental hand watering of watering basins, use a water wand to break the water force. Do not permit use of "jet" type watering equipment. Do not permit crown roots to become exposed to air through dislodging of soil and mulch.
- 2. Maintain originally called for depth of mulch to reduce evaporation and frequency of watering.
- 3. In rainy season, open basins to allow surface drainage away from the root crown where excess water may accumulate. Restore watering basins at end of rainy season.

B. Resetting: Reset plants to proper grades and upright position.

C. Weed Control:

- 1. All areas between plants, including watering basins, shall be weed free at all times.
- 2. Use only recommended and legally approved herbicides to control weed growth.
- 3. Avoid frequent soil cultivation that destroys shallow roots and breaks the seal of pre-emergent herbicides.

D. Pruning:



1. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, and which have vertical spacing of 18 in. to 48 in. and radial orientation so as not to overlay one another.
 2. Prune trees to eliminate diseased or damaged growth, and narrow V-shaped branch forks that lack strength. Reduce toppling and wind damage by thinning out crowns.
 3. Prune trees to maintain growth within space limitations, maintaining a natural appearance and balancing crown with roots.
 4. No stripping of lower branches ("raising up") of young trees will be permitted.
 5. Retain lower branches in a "tipped back" or pinched condition to promote caliper trunk growth (tapered trunk). Do not cut back to fewer than six buds or leaves on such branches. Only cut lower branches flush with the trunk after the tree is able to stand erect without staking or other support.
 6. Thin out and shape evergreen trees when necessary to prevent wind and storm damage. Do primary pruning of deciduous trees during the dormant season. Do not permit any pruning of trees prone to excessive "bleeding" during growth season.
 7. Prune damaged trees or those that constitute health or safety hazards at any time of year as required.
 8. Make all cuts clean and close to the trunk, without cutting into the branch collar. "Stubbing" will not be permitted. Cut smaller branches flush with trunk or lateral branch. Make larger cuts (1 in. in diameter or larger) parallel to shoulder rings, with the top edge of the cut at the trunk or lateral branch.
 9. Branches too heavy to handle shall be precut in three stages to prevent splitting or peeling of bark. Make the first two cuts 18 in. or more from the trunk to remove the branch. Make the third cut at the trunk to remove the resulting stub.
 10. Do not prune or clip shrubs into balled or boxed forms unless specifically called for by design.
 11. Take extreme care to avoid transmitting disease from one infected plant to another. Properly sterilize pruning tools before going from one infected plant to all other plants.
 12. Pruning Season: Prune tree's during dormant season consistent with arboricultural standards for species to be pruned.
- E. Staking and Guying of Trees: Inspect stakes at least once a month to check for rubbing that causes bark wounds.



3.4 GROUNDCOVERS

A. Watering:

1. Check for moisture penetration throughout the root zone at least twice a month.
2. Water as frequently as necessary to maintain healthy growth of groundcovers.

B. Weed Control:

1. Control weeds, preferably with pre-emergent herbicides and with selective systemic herbicides.
2. Minimize hoeing of weeds in order to avoid plant damage.

C. Fertilization:

1. Verify specific plant requirements, if any.
2. Recently installed plant materials: Verify with University actual completion date of planting installation and rate of prior application of fertilizers.
3. New plant materials: Place one (1) 5-gram tablets (20-10-5; N-P-K) beside the root ball about an inch from root tips.
4. Established Plant Materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.

D. Mowing and Edging:

1. Edge groundcovers to keep in bounds. Trim top growth as necessary to achieve an overall even appearance.
2. Groundcovers, which lend themselves to mowing, shall be mowed to specified height above finished grade in order to renew growth, improve density and attractiveness.

E. Replace dead and missing plants after obtaining University's agreement to pay for replacement. Damages due to Contractor's negligence shall be paid for without charge to the University.

3.5 ANNUALS, PERENNIALS AND SUCCULENTS

A. Watering:

1. Species, sizes of plants, container sizes and orientation shall dictate frequency of watering. Submit to University a watering schedule for different seasonal requirements.

B. Weed Control: All planters with annuals and perennials shall be weed-free at all times.

C. Pruning:

1. Limit pruning to removal of damaged or dead twigs and foliage.



2. Remove spent flowers on a weekly basis.

D. Fertilization: Incorporate slow-release fertilizers per manufacturer's current specifications, and rake smooth.

3.6 INSECTS, PESTS, AND DISEASE CONTROL

A. Inspection: Inspect all plant materials for signs of stress, damage and potential trouble from the following:

1. Presence of insects, moles, gophers, ground squirrels, snails and slugs in planting areas.
2. Discolored or blotching leaves or needles.
3. Unusually light green or yellowish green color inconsistent with normal green color of leaves.

B. Personnel: Only licensed, qualified, trained personnel shall perform spraying for insect, pest and disease control

C. Application: Spray with extreme care to avoid all hazards to any person or pet in the area or adjacent areas.

3.7 IRRIGATION SYSTEM

A. General:

1. Repair without additional charge to the University all damages to system caused by Contractor's operations. Perform all repairs within one (1) watering period.
2. Report promptly to University Representative all accidental damage not resulting from Contractor's negligence or operations.
3. Set and program automatic controllers for seasonal water requirements.
4. Twice a month, use a probe or other acceptable tool to check the rootball moisture of representative plants as well as the surrounding soil.

B. Cleaning and Monitoring the System:

1. Continually monitor the irrigation systems to verify that they are functioning properly as designed. Make program adjustments required by changing field conditions.
2. Clear irrigation systems once a year and as often as necessary to keep the irrigation systems free of sand and other debris.
3. Prevent spraying on windows, building walls, (game courts) by balancing the throttle control on the remote-control valves and the adjustment screws on the sprinkler heads. Do not allow water to atomize and drift.



3.9 **TERMINATION OF THE MAINTENANCE PERIOD**

A. Final Acceptance Procedure:

1. Work will be accepted by the Landscape Architect upon satisfactory completion of all work, including maintenance period, but exclusive of replacement of materials under the Warranty Period.
2. Submit a written request to Landscape Architect for review for Final Acceptance at least five (5) working days prior to anticipated Final Review date, which is at the end of the Maintenance Period.
3. Submit maintenance operations manual to the University's Representative.

B. Corrective Work:

1. Work requiring corrective action or replacement shall be performed within ten (10) calendar days after the Final Review.
2. Perform corrective work and materials replacement in accordance with the Drawings and Specifications and shall be made by the Contractor at no cost to the University.
3. After corrective work is completed, the Contractor shall again request a Final Review for Final Acceptance as outlined above.
4. Continue maintenance of all landscaped areas until such time as all corrective measures have been completed and accepted.

C. Conditions for Acceptance of Work at End of Maintenance Period:

1. Each plant shall be alive and thriving, showing signs of growth and no signs of stress, disease, or any other weaknesses.
2. Replace all plants not meeting these conditions. An additional Warranty Period equal in length to the original shall be commenced for all such plants and planted areas.

D. Final Acceptance Date: The date on which the Landscape Architect issues a Letter of Final Acceptance. Upon Final Acceptance, the University will assume responsibility for maintenance of the work.

3.10 **CLEANING**

- A. Dispose of all pruned materials, vacuum all lawn clippings and leaves, sweep all walkways and rake smooth all mulched areas.
- B. Remove from the site all containers and evidence of maintenance activities.



3.11 **CLOSE OUT**

- A. Landscape Maintenance and Operations Manual: Submit binder to the University with all documentation and records required and utilized during the maintenance period with recommended operations and maintenance procedures and schedules.
- B. Keys and Identification: Return all keys and identification materials supplied by the University for the purpose of site access.

END OF SECTION



SECTION 32 91 13

SOIL PREPARATION AND SOIL MIXES

1.4 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes planting soils specified by composition of the mixes.
- B. B. Related Requirements:
 - 1. Section 32 84 00 - Irrigation
 - 2. Section 32 91 19 - Landscape Finish Grading
 - 3. Section 32 93 00 - Planting - for placing planting soil for plantings
 - 4. Section 32 94 00 - Planting Accessories

1.3 DEFINITIONS

- A. Retain terms that remain after this Section has been edited for a project.
- B. AAPFCO: Association of American Plant Food Control Officials.
- C. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or un-amended soil as indicated.
- D. CEC: Cation exchange capacity.
- E. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- F. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- G. Imported Soil: Soil that is transported to Project site for use.
- H. Layered Soil Assembly: A designed series of planting soils, layered on each other, that to-gather produce an environment for plant growth.



- I. **Manufactured Soil:** Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- J. **NAPT:** North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through inter-laboratory sample exchanges and statistical evaluation of analytical data.
- K. **Organic Matter:** The total of organic materials in soil exclusive of un-decayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- L. **Planting Soil:** Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- M. **RCRA Metals:** Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- N. **SSSA:** Soil Science Society of America.
- O. **Subgrade:** Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- P. **Subsoil:** Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- Q. **Surface Soil:** Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- R. **USCC:** U.S. Composting Council.

1.4 **PREINSTALLATION MEETINGS**

Pre-installation Conference: Conduct conference at Project site.

1.5 **ACTION SUBMITTALS**

- A. **Product Data:** For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. **Material Certificates:** For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:



- a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
 - c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.
- B. Samples: For each bulk-supplied material, 1 -quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.6 INFORMATIONAL SUBMITTALS

Qualification Data: For each testing agency.

Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Retain "Testing Agency Qualifications" Paragraph below if Contractor or manufacturer selects testing agency or if Contractor is required to provide services of a qualified testing agency in "Field Quality Control" Article. Qualification requirements are in addition to those specified in Section 014000 "Quality Requirements."
- B. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

Laboratory: Subject to compliance with requirements, provide testing by the following, or an approved equivalent laboratory:

- a. Waypoint Analytical, Inc., 4741 E Hunter Avenue, Suite A, Anaheim, CA 92807, www.waypointanalytical.com, (714) 282-8777.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil, imported soil and manufactured lightweight soil mixes for on-structure installations.
 - 1. Notify Landscape Architect seven days in advance of the dates and times when laboratory samples will be taken.



Preconstruction Soil Analyses: For each un-amended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.9 SOIL-SAMPLING REQUIREMENTS

General: Extract soil samples according to requirements in this article.

Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Landscape Architect or soil scientist (CPSS) certified by SSSA under the direction of the testing agency.

1. Number and Location of Samples: Minimum of eight representative soil samples from where indicated on Drawings for each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to the University for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.10 TESTING REQUIREMENTS

General: Perform tests on soil samples according to requirements in this article.

Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
 - a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
 - b. Hydrometer Method: Report percentages of sand, silt, and clay.
2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

C. Chemical Testing:



1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Generally retain "Metals Hazardous to Human Health" Subparagraph below for brown-field redevelopment sites.
4. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
5. Generally retain "Phytotoxicity" Subparagraph below. Some plants are more sensitive to the presence and concentrations of trace minerals.
6. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT WERA-103, including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm and sodium absorption ratio.



14. Soluble-salts ppm.

15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.

16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil.

2. Generally, adjust soil reaction (pH) only in soils where the pH is near the extreme ends of the acceptable range for the plants indicated.

3. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil.

1.11 DELIVERY, STORAGE, AND HANDLING

Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

3. Do not move or handle materials when they are wet or frozen.

4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.



1.5 PART 2 - PRODUCTS

2.1 MATERIALS

- A. Regional Materials: Imported soil, manufactured planting soil and soil amendments and fertilizers shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

2.2 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Existing, on-site surface soil shall not be used for this project. Refer to requirements of Division 31, Earthwork, for disposition of on-site lime treated soils.
- C. Planting-Soil Type I: Imported, naturally formed soil from off-site sources and consisting of sandy loam soil according to USDA textures; and modified to produce viable planting soil.
 - 1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 6 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass.
 - 2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7.9 and minimum of 4 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
 - 3. Unacceptable Properties: Clean soil of the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches in any dimension.



4. Amended Soil Composition: Blend imported, un-amended soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:



- a. Volume of Compost: 3 to 4 cubic yards per 1000 square feet per 6 inches of soil depth.
- b. Weight of Agricultural Gypsum: 30 pounds per 1000 sq. ft. per 6 inches of soil depth.
- c. Weight of Blood Meal: 8 pounds per 1000 sq. ft. per 6 inches of soil depth.

2.3 INORGANIC SOIL AMENDMENTS

- A. If using ground-up, recycled gypsum board debris as a soil amendment, replace or revise "Agricultural Gypsum" Paragraph below or insert another paragraph for this additional material. Coordinate with planting-soil mixes retained in "Planting Soils Specified by Composition" Article.
- B. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

2.4 ORGANIC SOIL AMENDMENTS

Organic Compost:

- 1. The organic amendments, and fertilizer rates and quantities listed in Part Three are to be used for bid basis only. The contractor shall provide a copy of a recent lab analysis (not older than 30 days) and recommendations performed by Methods of Soil Analysis, Part 1, Physical and Mineralogical Methods of Soil Analysis, Part 3 Chemical Methods, Soil Science Society of America, Inc., for compost properties. Adjustments to project costs resulting from the soil report recommendation shall be submitted as a modification of the base bid.
- 2. Compost Properties:
 - a. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%. The organic matter content shall be at least 50% on a dry weight basis.
 - b. The pH of the material shall be between 6 and 7.5.
 - c. The salt content shall be less than 10 millimho/cm @ 25° C. (ECe less than 10) in a saturated paste extract.
 - d. Boron content of the saturated extract shall be less than 1.0 part per million.
 - e. Silicon content (acid-insoluble ash) shall be less than 50%.
 - f. Calcium carbonate shall not be present if to be applied on alkaline soils.
 - g. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.



- h. Composted wood products are conditionally acceptable [stable humus must be pre-sent]. Wood based products are not acceptable which are based on red wood or cedar.
- i. Sludge-based materials are not acceptable.
- j. Carbon:nitrogen ratio is less than 20:1.
- k. The compost shall be aerobic without malodorous presence of decomposition products.
- l. Solvita maturity index 6 or higher.
- m. SAR (sodium adsorption ratio) less than 5.
- n. Seed germination - over 80% germination in saturation extract diluted 1 to 3 in water compared to seeds germinated in deionized water.
- o. Germination vigor - equal to or better than seed length for seeds germinated in de-ionized water.
- p. Molar ratio of ammoniacal nitrogen to nitrate nitrogen less than 2.
- q. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen.
- r. Maximum total permissible pollutant concentrations in amendment in parts per mil-lion on a dry weight basis:

arsenic	20	copper	150	selenium	30
cadmium	15	lead	100	silver	10
chromium	100	mercury	10	vanadium	200
cobalt	50	molybdenum	20	zinc	200
nickel	100				

2.5 FERTILIZERS

Blood Meal: Minimum 13 percent nitrogen.

1.6 PART 3 - EXECUTION

3.1 GENERAL

- A. Contractor is to provide soil amendments and fertilizers as specified in the soil analysis re-port prepared by soil testing laboratory. Materials used shall meet all environmental requirements that meet nursery standard and state regulations.
- B. Soil amendments and fertilizers used on project shall be used for both initial soil preparation and planting operations. A formulation for each planting condition and type shall be formulated withing nursery industry standards and will be fully documented



- C. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- D. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 **PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING**

- A. Retain "Excavation" Paragraph below if Contractor is required to perform soil excavation and stockpiling.
- B. Excavation: Excavate soil from designated area(s) to a depth of 18 inches and stockpile until amended, unless otherwise indicated on Drawings.
- C. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- D. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

3.3 **PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE**

- A. Generally retain this article if existing, on-site soil or imported soil will be amended and applied to areas that have been stripped of existing soils or that have poor existing soils regarded as subgrade.
- B. General: Apply and mix un-amended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- C. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off University's property.
 - 1. Apply, add soil amendments, except compost, and mix approximately half the thickness of un-amended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
- D. Mixing: Spread unamended soil to total depth of 6 inches unless otherwise indicated on Drawings, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix fertilizer with planting soil no more than seven days before planting.



- 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 6 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- E. Retain last option in "Compaction" Paragraph below if more than one compaction value is required for different locations.
- F. Compaction: Compact each blended lift of planting soil to 75 to 85 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.
- G. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 **BLENDING PLANTING SOIL IN PLACE**

- A. Generally retain this article if existing, unamended, on-site surface soil is amended without excavating to produce planting soil.
- B. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- C. Preparation: Till unamended, existing soil in planting areas to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off University's property.
- D. Retain option in "Mixing" Paragraph below if applying compost component of planting-soil mix to surface and lightly tilling in lieu of blending compost throughout planting-soil mix.
- E. Mixing: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.
 - 1. Mix fertilizer with planting soil no more than seven days before planting.
- F. Retain last option in "Compaction" Paragraph below if more than one compaction value is required for different locations.
- G. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 **APPLYING COMPOST TO SURFACE OF PLANTING SOIL**

- A. Generally retain this article if applying a separate compost layer or applying the compost component of a planting-soil mix to surface of in-place planting soil in lieu of blending compost throughout the planting-soil mix.



- B. Application: Apply compost component of planting-soil mix 6 inches of compost to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- C. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.6 **PLACEMENT OF MANUFACTURED LIGHTWEIGHT SOIL MIX ON STRUCTURE**

- A. Verify placement of perforated drain pipe, drain rock and drainage mat, filter fabric, poly-styrene fill, protection board and filter fabric prior to soil mix placement.
- B. Coordinate placement of soil mix with the irrigation system installation and planter drain and clean out locations. Protect irrigation equipment and drainage structures during placement.
- C. Install soil mix in 9-inch maximum lifts. Install soil mix layers to depths as indicated on Drawings.
- D. Compact each lift by thoroughly watering or jetting in the entire planting area. Maximum compaction to 85 percent relative compaction.

3.7 **FIELD QUALITY CONTROL**

- A. Retain "Testing Agency" and "Perform the following tests(and inspections)" paragraphs below to identify who shall perform tests and inspections. If retaining second option in "Testing Agency" Paragraph, or if retaining "Perform the following tests(and inspections)" Paragraph, retain "Field quality-control reports" Paragraph in "Informational Submittals" Article.
- B. Testing Agency: University will engage a qualified testing agency to perform tests and inspections.
- C. Retain "Perform the following tests(and inspections)" Paragraph below to require Contractor to perform tests and inspections.
- D. Perform the following tests:
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.
 - 2. Soil Testing Lab report to include soil fertility, agricultural suitability, particle size appraisal, pH, salinity, nitrate. ammonium, phosphate, potassium, calcium, magnesium, boron, sodium absorption rate (SAR), organic content, and infiltration rate. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.



- E. See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.
- F. Soil will be considered defective if it does not pass tests.
- G. Prepare test reports.
- H. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.8 PROTECTION

- A. Revise "Protection Zone" Paragraph below to suit Project. Delete if referenced Section is not used.
- B. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- C. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
- D. If planting soil or subgrade is over-compacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Landscape Architect and replace contaminated planting soil with new planting soil.

3.9 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off University's property unless otherwise indicated.



1. Retain subparagraph below if required; revise to suit Project.
2. Dispose of excess subsoil and unsuitable materials on-site where directed by the University.

END OF SECTION



SECTION 32 91 19

LANDSCAPE FINISH GRADING

1.7 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following: Landscape Finish Grading.
- B. Related requirements:
 - 1. Section 32 01 90 - Landscape Maintenance
 - 2. Section 32 91 13 - Soil Preparation and Soil Mixes
 - 3. Section 32 84 00 - Irrigation
 - 4. Section 32 93 00 - Planting

1.3 PROJECT/SITE CONDITIONS

- A. Existing Conditions: For protection of existing trees to remain, see Division 01, Section "Temporary Tree and Plant Protection".
- B. Prior to fine grading, Contractor shall verify that the rough grading, under drainage system, planting soil mixes and irrigation system have been accepted.
- C. Dust Nuisance: Assume full responsibility for alleviation or prevention of dust as a result of grading work.

1.4 SEQUENCING AND SCHEDULING:

- A. Complete all finish grading prior to installation of irrigation systems in each area graded.
- B. Regrade as required to finish grades established by Landscape Architect once the irrigation system is installed.

1.8 PART 2 - PRODUCTS

- A. Not Used.



1.9 PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Verify that the following items have been completed prior to commencement of finish grading:
 - 1. Installation of topsoil and soil preparation including debris removal.
 - 2. Incorporation of soil amendments.
 - 3. Prior to fine grading, Contractor shall verify that the rough grading, under drainage system, planting soil mixes and irrigation system have been accepted.

3.2 INSTALLATION

- A. Provide all grades for natural runoff of water without low spots or pockets. Accurately set flow line grades at 2 percent minimum gradient unless otherwise noted in Drawings.
- B. Finish grades shall be smooth, even and on a uniform plane with no abrupt changes of surface. Slope uniformly between given spot elevations.
- C. Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given, or between points established by walks, paving, curbs or catch basins.
- D. Tops and toes of all slopes shall be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.
- E. Trenching for drainage shall not extend into the bearing angle off of the foundation.
- F. Drainage designed so as not to have landscape area drain over sidewalks.
- G. Surface drainage shall drain to drains/catch basins in planting areas and in paved areas.
- H. The subgrade shall be inspected prior to the start of subsoil placement for conformance with the Drawings for elevations of subgrade relative to finish grade. Subgrade shall be graded smooth and parallel to the finish grades.
- I. Where settling occurs, before final acceptance or during the warranty period, remove finish surfacing, backfill with additional approved material, compact to specified rates, and restore any disturbed areas to a condition acceptable to the City.
- J. Protect newly graded areas from traffic, freezing and erosion. Keep free of trash, debris or construction materials from other work.
- K. Set sufficient grade stakes for checking the finished grades. Stakes must be set at the bottom and top of slopes and the centers of plant beds. Grades shall be established which are accurate to 1/10th of a foot either way. Connect contours and spot elevations with an even slope. All grading will insure drainage away from structures.
- L. After topsoil or planting soil mix has been spread, it shall be carefully prepared by scarifying and hand raking. All large stiff clods, lumps, brush, roots, stumps, litter and



other foreign matter, and stones over one inch in diameter shall be removed from the topsoil. Topsoil shall also be free of smaller stones in excessive quantities as determined by the Landscape Architect.

- M. Fine grade planted areas to smooth, free draining, even surfaces with fine texture. Roll, rake and drag areas to flatten ridges and fill depressions, except as select areas shown on drawings. Control moisture content to maintain optimum conditions, but do not create a muddy condition.
- N. Rolling - Typical: Roll the entire area with a hand roller weighing not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional topsoil and the surface shall be regraded and rolled until presenting a smooth and even finish to the required grade or to the shapes and configurations as shown on the details.
- O. Maintenance and Restoration: Restore prepared areas to specified condition if eroded, settled, or otherwise disturbed after fine grading and prior to lawn planting. Restore area disturbed by planting to achieve full healthy growth as approved by Landscape Architect. Vehicular traffic routes must conform to pre-approved routing of construction operations.
- P. Driving over new lawns: The Contractor is strictly prohibited from tracking or driving over new lawns or planted areas.
- Q. Grades not otherwise indicated to be uniform slopes between points where elevations are given, or between points established by paving, curbs or catch basins.
- R. Round tops and toes of all slopes to produce a gradual, natural-appearing transition between relatively level areas and slopes.

3.3 TOLERANCES

- A. All planting areas, including lawn areas, shall be true to grade within 1 in. when tested with a 10 ft. straightedge.
- B. Hold finished grades below top of adjacent pavement, headers, curbs, or walls as follows:
- C. Shrub and Groundcover Areas: 1-1/2 inches.
- D. Sodded Lawn Areas: 1 inch.
- E. Planters: 2 inches.

END OF SECTION



THIS PAGE INTENTIONALLY LEFT BLANK.



SECTION 32 93 00

PLANTING

1.10 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Plants.
- B. Related Requirements:
 - 1. Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.
 - 2. Section 32 01 90 - Landscape Maintenance
 - 3. Section 32 91 13 - Soil Preparation and Soil Mixes
 - 4. Section 32 91 19 - Landscape Finish Grading
 - 5. Section 32 84 00 - Irrigation
 - 6. Section 32 94 00 - Planting Accessories

1.3 REFERENCES

- A. "An Annotated Checklist of Woody Ornamental Plants of California, Oregon and Washington, (Number 4091)", McClintock and Leiser, Division of Agricultural Sciences, University of California, 1979.
- B. "American Standard for Nursery Stock", ANZI z.60.1-2004 Edition, American Association of Nurserymen, Inc.

2.1 1.4 DEFINITIONS

- A. Retain terms that remain after this Section has been edited for a project.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- C. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than sizes indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.



- D. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.
- E. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the mini-mum root spread according to ANSI Z60.1 for type and size of plant required.
- F. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- G. Finish Grade: Elevation of finished surface of planting soil.
- H. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- I. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- J. Planting Area: Areas to be planted.
- K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation and Soil Mixes" for drawing designations for planting soils.
- L. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- M. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- N. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- O. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

2.2 1.5 COORDINATION

- A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.



1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

2.3 1.6 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.

1.7 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 50 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

1.8 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of university's contact persons.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 1. Manufacturer's certified analysis of standard products.
 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

1.9 CLOSEOUT SUBMITTALS

Maintenance Data: Recommended procedures to be established by University for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.



1.10 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
 - 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 2. Experience: Five years' experience in landscape installation in addition to requirements in Division 1.
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 4. Personnel Certifications: Installer's field supervisor shall have certification in all of the following categories from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Interior.
 - c. Landscape Industry Certified Horticultural Technician.
 - 5. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
 - 1. Selection of plants purchased under allowances is made by Landscape Architect, who tags plants at their place of growth before they are prepared for transplanting.
- C. Revise "Measurements" Paragraph below to suit Project.
- D. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 - 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- E. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
 - 1. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.



1.11 DELIVERY, STORAGE, AND HANDLING

Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

- A. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk materials with appropriate certificates.
- B. Deliver bare-root stock plants within 36 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.
- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- D. Handle planting stock by root ball.
- E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.
- F. Apply anti-desiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
 - 1. If deciduous trees or shrubs are moved in full leaf, spray with anti-desiccant at nursery before moving and again two weeks after planting.
- K. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- L. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
 - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3. Do not remove container-grown stock from containers before time of planting.



4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.12 **FIELD CONDITIONS**

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Planting Restrictions: Delay shipment and planting during freeze periods. Replace plants killed or disfigured by freeze or frost conditions.
- C. Coordinate planting periods with maintenance periods to provide continuous required maintenance from date of Substantial Completion.
- D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.13 **WARRANTY**

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by the University.
 - b. Structural failures including plantings falling or blowing over.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 2. Warranty Periods: From date of Substantial Completion.
 - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 3 months.
 3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.



- c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
- d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.11 PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 - 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); cross-ing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
 - 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- E. Annuals and Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

2.2 FERTILIZERS

- A. Green Cross, available from Bioscape Inc., Petaluma, CA (877) 246-7227.



B. Organic Biolink Fertilizer available from Westbridge Agricultural Products, www.west-bridge.com (800) 876-2767.

C. Or approved equivalent.

2.3 2.3 PESTICIDES AND HERBICIDES

- A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer. Use one of the following products or acceptable equivalent:
 - 1. 100% organic, corn gluten meal weed suppressant "Bio-Weed" available from Bioscape Inc., Petaluma, CA (877.246.7227).
 - 2. Weedban corn gluten meal by Fertrell Company, www.fertrell.com (717.367.1566).
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated. Use one of the following products or acceptable equivalent:
 - 1. "Scythe" natural herbicide by Mycogen Corp., San Diego, CA (800.745.7476).
 - 2. "Weed Zap" available from JH Biotech, www.jhbiotech.com (800.650.8933).
- D. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per pound of vesicular-arbuscular mycorrhizal fungi and 95 million spores per pound of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

1.12 PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
 - 3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.



4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Slow-release Fertilizer Tablets: Place evenly distributed in plant pits when backfilled 2/3 according to the following schedule or per Manufacturer's latest specifications.
(Container stock)

1 gallon can - 2 tablets	24 in. box - 8 tablets
5 gallon can - 4 tablets	36 in. box - 10 tablets
15 gallon can - 6 tablets	48 in. box - 12 tablets

(B & B stock)
1 tablet per 1/2 in. caliper or 1 ft. of height, whichever is less
- E. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement, mix planting soil and place soil and soil mixes according to Section 32 91 13 "Soil Preparation and Soil Mixes."
- B. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- C. Application of Mycorrhizal Fungi: At time directed by Landscape Architect, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.



1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 2. Retain first two subparagraphs below if applicable. Retain one of four options in first subparagraph to suit Project.
 3. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
 4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate sub-grades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 7. Maintain supervision of excavations during working hours.
 8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
 9. Retain subparagraph below if applicable.
 10. If sub-drain pipe is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.



- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
 - 1. Backfill: Planting soil as indicated on Drawings.
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting fertilizer equally distributed around each planting pit when pit is approximately one-half filled in accordance with manufacturer's recommendations. Do not place fertilizer in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
 - 1. Backfill: Planting soil as indicated on Drawings.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place fertilizer equally distributed around each planting pit when pit is approximately one-half filled. Place fertilizer beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.



- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.7 PLACING SOIL IN PLANTERS

- A. Place a layer of drainage gravel with filter fabric and fill planters as specified in Section 32 94 00 - Landscape Accessories.
- B. Fill planter with planting soil per Section 32 91 13 "Soil Preparation and Soil Mixes".

3.8 GROUND COVER AND PLANT PLANTING

- A. Revise spacing in first paragraph below to suit Project. Insert spacing for each plant if pre-ferred, or indicate spacing on Drawings.
- B. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.
- C. Retain first paragraph below if planting-soil type is not indicated on Drawing; revise if other types of backfill are required.
- D. Use planting soil per Section 32 91 13 - Soil Preparation and Soil Mixes and as indicated for backfill.
- E. Dig holes large enough to allow spreading of roots.
- F. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
- G. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- H. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- I. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- J. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.9 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.



- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.10 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with University's operations and others in proximity to the Work. Notify University before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.11 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Landscape Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.
- B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.
 - 1. Provide new trees of same size as those being replaced for each tree of 4 inches or smaller in caliper size.
- C. Species of Replacement Trees: Species selected by Landscape Architect.

3.12 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off University's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, re-pair, or replace damaged plantings.



- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.
- E. Retain paragraph below if tree-watering devices are required.
- F. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.13 MAINTENANCE SERVICE

- A. Maintenance Service for Plants, per Section 32 01 90 - Landscape Maintenance: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION



SECTION 32 84 00

IRRIGATION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A. Review the General and Supplementary Contract Conditions and Division One, General Requirements, which contain information and requirements that apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Provide all products and execute all labor to achieve installation of the irrigation system complete as indicated by the Drawings and Specifications.

1.3 RELATED WORK IN OTHER SECTIONS

- A. Related Landscape Work:
 - 1. Planting Area Finish Grading
 - 2. Soil Preparation and Soil Mixes
 - 3. Plant Material
- B. Other Related Work: Consult all other relevant Specification Sections to determine the extent and character of work specified elsewhere, but related to that included herein.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- A. Laws, Codes and Regulations: Perform work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work.
- B. Inspections and Permits: Provide for all inspections and permits required by federal, state and local authorities in furnishing, transporting and installing materials.

1.5 TRAFFIC CONTROL

- A. It is the responsibility of the contractor to ensure adequate protection and controls for pedestrian and vehicular traffic in the vicinity of the project areas. The contractor shall provide all signs, barricades, flagmen, etc., necessary to meet all traffic requirements for this project at his own expense.



1.6 APPLICABLE STANDARDS

- A. Comply with the current applicable specifications and guidelines of the following:
 - 1. DIV — Division of Industrial Safety.
 - 2. UPC — Uniform Plumbing Code published by the Association of Western Plumbing Officials.
 - 3. ASTM — American Society for Testing and Materials.
 - 4. NSF — National Sanitation Foundation.

1.7 SUBMITTALS

- A. Product data: Prior to delivery to site, submit 5 copies of current manufacturer's specifications and catalog cuts for the complete list of materials and assemblies to be installed.
- B. Final Record Documents: Submit Final Record Documents to the Landscape Architect at Preliminary Review.

1.8 RECORD DOCUMENTS

- A. Progress Record Documents:
 - 1. Maintain on the construction site at all times a record of all materials and equipment installed each day.
 - 2. Daily record information neatly to scale, on full-size prints of the irrigation construction documents.
 - 3. Record information neatly to scale, on full-size prints of the irrigation construction documents.
 - 4. Information shall include all changes, substitutions, and manufacturer's names and catalogue members for materials and equipment. Show actual locations of all valves and irrigation piping. Show dimensions from easily-identifiable permanent structures such as walls, curbs, fences, buildings or walks.
- B. Final Record Documents:
 - 1. Transfer all information noted on Progress Record Documents.
 - 2. After Work completion, transfer information noted on prints. Submit Progress Record Documents to the landscape architect for review of general information content (landscape architect will not be responsible for errors or omissions).
 - 3. Contractor shall be responsible for accuracy of information and errors or omissions.
 - 4. If first submittal is not accepted by landscape architect, resubmit until accepted.
 - 5. Once accepted, submit accepted final Record Documents to Owner



1.9 SERVICE MANUALS

- A. Submittal Procedure: At Preliminary Review, submit five individually bound Service Manuals to the Landscape Architect.
- B. Content:
 - 1. Complete drawings, diagrams and spare parts lists of all equipment installed showing components and catalog numbers together with the manufacturer's name and address.
 - 2. Index sheet indicating the Contractor's name, address and telephone number.
 - 3. Copies of equipment, warranties and certificates.
 - 4. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate, and maintain all equipment.

1.10 DEFINITION OF ACCEPTANCE

- A. Wherever the terms "acceptance" or "accepted" are used herein, they mean acceptance of Landscape Architect in writing.

1.11 INTENT OF DRAWING AND SPECIFICATIONS

- A. It is the intent of the Drawings and Specifications to provide a complete operable irrigation system. Any items not specifically shown in the Drawings or called for in the Specifications, but which are normally required to conform with such intent, are to be considered as part of the work.

1.12 SUBSTITUTIONS

- A. Written Acceptance: Specific reference to manufacturer's names and products specified in these sections are used as standards; this implies no right to substitute other materials or methods without written acceptance of the Landscape Architect.
- B. Contractor's Responsibility: Installations of accepted substitution(s) must be made to the satisfaction of Landscape Architect and without additional cost to Owner.

1.13 REVIEW OF SITE

- A. Visit project site and review conditions as they exist prior to submitting bid.

1.14 WORK SCHEDULE



- A. Submit a proposed work schedule to the Landscape Architect for acceptance at least fourteen days prior to start of irrigation work. Submit revised schedule(s) to the Landscape Architect immediately.

1.15 COORDINATION

- A. Coordinate and cooperate with other contractors to enable the work to proceed as rapidly and efficiently as possible in a workmanlike manner.

1.16 PROTECTION OF EXISTING CONDITIONS

- A. General: The Contractor shall use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the work.
- B. Barriers: Provide barricades, fences or other barriers as necessary to protect existing conditions to remain from damage during construction.
- C. Operations: Do not store materials or equipment, permit burning, or operate or park equipment under the drip line of existing plants to remain.
- D. Notification of Damages: Submit written notification of all conditions damaged during construction to the Owner and Landscape Architect immediately.
- E. Determination of Damage: Landscape Architect will determine the extent of damage and value of damaged plant material.
- F. Replacement of existing plant material: Replace existing plants to remain which are damaged during construction with plants of the same species and size as those damaged at no cost to the Owner.

1.17 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Labeling: Furnish standard products in unopened manufacturer's standard containers bearing original labels showing quantity, analysis and name of manufacturer.
- B. Storage: Store products with protection from weather or other conditions which would damage or impair the effectiveness of the product. Protect PVC pipes and fittings from direct sunlight. Beds on which pipe is stored must be full length of pipe.



1.18 ANALYSIS OF SAMPLES AND TESTS

- A. Analyses: Samples of materials may be taken and analyzed for conformity to specification at any time. The Contractor shall furnish samples as requested.
- B. Rejected Materials: Contractor shall remove rejected materials immediately from the site.
- C. Cost of Testing: The Contractor shall pay cost of testing of materials not meeting specifications.

1.19 HYDROSTATIC TESTING REVIEW

- A. Time of Review: The Owner's Representative will review the completed irrigation work during the hydrostatic testing prior to the backfilling of the trenches.
- B. Notification of Review: Notify the Owner's Representative at least 72 hours prior to the anticipated review.

1.20 WARRANTY

- A. In addition to manufacturer's guarantees or warranties, work shall be warranted for 1 year from the date of Final Acceptance against defects in material, equipment and workmanship. Warranty shall also cover repair of damage to any part of the premises resulting from leaks or other defects in materials, equipment, and workmanship to the satisfaction of the Owner.

1.21 WARRANTY FOR SPRINKLER IRRIGATION SYSTEM

- A. Include the following warranty on contractor's letterhead with service manuals:
 - 1. WE HEREBY WARRANT THAT THE IRRIGATION SYSTEM WE HAVE FURNISHED AND INSTALLED IS FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP, AND THE WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WE AGREE TO REPAIR OR REPLACE ANY DEFECTS IN MATERIAL OR WORKMANSHIP, ANY SETTling OF BACKFILLED TRENCHES, WHICH MAY DEVELOP DURING THE PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE AND ALSO TO REPAIR OR REPLACE ANY DAMAGE CAUSED BY ANY DEFECTS IN THE IRRIGATION SYSTEM OR RESULTING FROM THE REPAIRING OR REPLACING OF SUCH DEFECTS AT NO ADDITIONAL COST TO THE OWNER. ORDINARY WEAR AND TEAR, UNUSUAL ABUSE OR NEGLIGENCE ARE EXCEPTED. WE SHALL MAKE SUCH REPAIRS OR REPLACE-MENTS, INCLUDING COMPLETE RESTORATION OF ALL DAMAGED PLANTING, PAVING, OR OTHER IMPROVEMENTS OF ANY KIND, WITHIN A REASONABLE TIME, AS DETERMINED BY THE OWNER, AFTER RECEIPT OF



WRITTEN NOTICE. IN THE EVENT OF OUR FAILURE TO MAKE SUCH REPAIRS OR REPLACEMENTS WITHIN A REASONABLE TIME AFTER RECEIPT OF WRITTEN NOTICE FROM THE OWNER, WE AUTHORIZE THE OWNER TO PROCEED TO HAVE SAID REPAIRS OR REPLACEMENTS MADE AT OUR EXPENSE AND WE WILL PAY THE COSTS AND CHARGES THEREFORE UPON DEMAND.

PROJECT: _____

LOCATION: _____

CONTRACTOR: _____

LICENSE No.: _____

TELEPHONE: _____

GUARANTEE TO: _____

*DATE OF
ACCEPTANCE:* _____

*AUTHORIZED
REPRESENTATIVE:* _____

PART 2 – PRODUCTS

2.1 PIPE

- A. General: All pipe shall be NSF approved.
- B. Piping on Pressure Side of Control Valves:
 - 1. ASTM D 1785 polyvinyl chloride (PVC) 1120-1220, Schedule 40.
- C. Piping on Non-pressure Side of Control Valves:
 - 1. ASTM D 1784 polyvinyl chloride (PVC) 1120-1220, Class 200.
 - 2. Drip: As listed on Drawings.

2.2 FITTINGS



- A. Fittings for Pressurized Solvent-Welded Pipe:
 - 1. ASTM D 2466 Schedule 40 PVC as provided by the same manufacturer as the pipe.
 - 2. Connections of Mains to Remote Control and Quick-coupling Valves: ASTM D 2467 Schedule 80 PVC solvent-weld socket fittings.
- B. Fittings for Non-Pressurized Solvent-Welded Pipe:
 - 1. ASTM D 2466 and ASTM D 2467 Schedule 40 and Schedule 80, polyvinyl chloride, standard weight, as manufactured by "Sloane," "Lasco," or accepted substitute. Refer to installation details.
 - 2. Threaded PVC Nipples: Schedule 80 PVC.

2.3 NIPPLES

- A. Non-Ferrous: Schedule 40 red brass (85% copper, 15% zinc) with MIPT at both ends; ASTM B43.
- B. Plastic: Schedule 80, Type I, Grade 1 polyvinyl chloride (PVC); threaded both ends; ASTM D1784 and D1785; uniformly grey in color.
- C. Flexible: Factory made and assembled consisting of flexible polyvinyl chloride (PVC) hose fitted at each end with Schedule 40 PVC male adaptors; test rated at 200 psi static.

2.4 SLEEVE FOR CONTROL WIRE AND WATER LINE

- A. PVC 1120-1220, Schedule 40 pipe.

2.5 IRRIGATION CONTROLLER

- A. As shown on the Drawings.

2.6 REMOTE CONTROL VALVES

- A. As shown on the Drawings.

2.7 CONTROL WIRE

- A. As shown on the Drawings.
- B. Splicing Materials: DBR/Y-6 as manufactured by 3M.

2.8 VALVE BOXES FOR REMOTE CONTROL VALVES IN PLANTING AREAS

- A. Model No.: 1419B-12B.



B. Color of Box and Lid: As shown on Drawings.

C. Manufacturer: Oldcastle Precast, Inc., 1002 15th Street SW, Auburn, WA 98001, (800) 735-5566.

2.9 VALVE BOXES FOR QUICK COUPLING VALVES IN PLANTING AREAS

A. Model No.: 910-12B.

B. Color of Box and Lid: As shown on Drawings.

C. Manufacturer: Oldcastle Precast, Inc., 1002 15th Street SW, Auburn, WA 98001, (800) 735-5566.

2.10 VALVE BOXES

A. For Remote Control Valves:

1. Planted Areas: Injection molded of Polyesters and fibrous inorganic temperature resistant components. Box shall provide adequate clearance to operate and service valve. Box and lid to be black, as manufactured by "Oldcastle Precast" or accepted equal.

2.11 QUICK-COUPLING VALVES

A. Valve and Key: As specified on Drawings.

B. Valve shall be as shown on the Drawings, 3/4" two-piece brass with locking cover.

C. Furnish two Rainbird No. 33-DK valve keys fitted with 3/4" swivel hose cells.

2.12 STEEL STAKES AND PIPE CLAMPS

A. As shown on Drawings.

PART 3 – EXECUTION

3.1 LAYOUT

- A. General: During installation, conform as closely as possible to Drawings. Drawings are diagrammatic to the extent that swing joints, offsets and all fittings are not shown.
- B. Coverage: Make any necessary minor adjustments to layout required to achieve full coverage of irrigated areas at no additional cost to Owner.



- C. Stubouts: Where connections to existing stubouts are required, make necessary adjustments should stubouts be located differently than shown on the Drawings.
- D. Piping: Where piping is shown to be under paved areas but running parallel and adjacent to planted area, install piping in planted areas, unless specifically noted to be installed under paved areas. Do not install directly over another line in same trench.

3.2 TRENCHING

- A. Trench Depths:
 - 1. 18-inch deep over pipe on pressure side of irrigation control valve, control wires and quick-coupling valves.
 - 2. 12-inch deep on non-pressure side of irrigation control valve.
- B. Trench Slopes:
 - 1. Mains: Slope to drain to control valves.
 - 2. Laterals: Slope to or from control valves.

3.3 CONDUITS AND SLEEVES

- A. Conduit: Furnish and install conduit where control wires pass under or through structures or paving. Conduits to be of adequate size to accommodate retrieval for repair of wiring and shall extend 12 inches beyond edges of walls.
- B. Sleeving: Install sleeves for all pipes passing through or under structures or paving as shown on Drawings. Sleeving to be of adequate size to accommodate retrieval of wiring



or piping for repair and shall extend 12 inches beyond edges of paving or other structures.

3.4 PIPE LINE ASSEMBLY

A. General:

1. Install pipes and fittings in accordance with manufacturer's latest printed instructions.
2. Clean all pipes and fitting of dirt, scales and moisture before assembly.
3. Install pipe fittings with at least 2 inches clearance from other pipes or fittings.

B. Solvent-Welded Joints for PVC Pipes:

1. Use solvents and methods specified by pipe manufacturer.
2. Let solvents cure a minimum of 1 hour before applying any external stress on the piping and at least 24 hours before placing the joint under water pressure.

C. Threaded Joints for Swing Joints:

1. Use Teflon tape on threaded PVC fittings for swing joints only.
2. Use strap-type friction wrench only. Do not use metal-jawed wrench.

D. Laying of Pipe:

1. Remove from trench all rocks or clods 1 inch diameter or larger. Bed pipes in at least 2 inches of soil excavated from trench. Backfill on all sides of piping to provide a uniform bearing.
2. Snake pipe from side to side of trench bottom to allow for expansion and contraction. One additional foot per 100 ft. of pipe is the minimum allowance for snaking.
3. Install pipeline warning tape for all supplyline pipes supplied with well water. Install longitudinally on supplyline and secure with duct tape every 5 feet.
4. Do not lay PVC pipe when there is water in the trench.

3.5 IRRIGATION CONTROL VALVES

A. Valve Locations: Install control valves where shown on Drawings and group together where practical.

B. Valve Box Locations: Where two or more valves are installed adjacent to each other, provide at least 6 inches separation between valve boxes and align boxes parallel to each other in a row.

C. Valve Boxes: Install valve boxes over valves to be flush with accepted finish grade.

3.6 QUICK COUPLING VALVES



- A. Install on a swing joint assembly as detailed on the drawings.

3.7 AUTOMATIC CONTROLLER

- A. General: Install per local code and manufacturer's latest printed instructions.
- B. Connection to Valves: Connect remote valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc.
- C. Labeling: Affix controller name (i.e., "CONTROLLER A") on inside of controller cabinet door with minimum of 1 inch high permanent letters.
- D. Irrigation Diagram: Affix a non-fading copy of irrigation diagram to cabinet door below controller name. Irrigation diagram to be sealed between two plastic sheets 20 mil. minimum thickness. Irrigation diagram shall be a reduced copy of the Record Drawing, clearly showing all valves operated by the controller, station number, valve size, and type of planting irrigated.
- E. Grounding and Certification: Per Manufacturers specifications and requirements.

3.8 CONTROL WIRING

- A. Placement: Install control wires in common trenches with sprinkler mains and laterals wherever possible. Lay to the bottom side of pipe line. Provide a minimum of 3 feet of looped slack at valves.
- B. Splicing: Crimp control wire splices at remote control valves. Seal with specified splicing materials. Line splices will be allowed only on runs of more than 2,500 feet.

3.9 CLOSING OF PIPE AND FLUSHING OF LINES

- A. Capping: Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
- B. Flushing: Thoroughly flush out all water lines before installing heads, valves and other hydrants.
- C. Testing: Test as specified below. Upon completion of testing, complete assembly and adjust sprinkler heads for proper water distribution.



3.10 HYDROSTATIC TESTING

- A. Procedure: Make hydrostatic tests with risers capped when welded PVC joints have cured at least 24 hours. Center load piping with backfill to prevent pipe from moving under pressure. All couplings and fitting shall be exposed. Apply continuous static water pressure of 125 psi as follows:
 - 1. All Piping on the Pressure Side of Control Valves: Four hour test.
 - 2. All Piping on the Non-pressure Side of Control Valves: Two hour test.
- B. Leaks and Retest: Repair leaks observed from tests and repeat testing until system passes tests.

3.11 BACKFILLING AND COMPACTING

- A. Backfill Material at Planting Areas:
 - 1. After system is operating and required tests and reviews have been made, backfill excavations and trenches with clean sand and soil, free of debris.
 - 2. Backfill in 6-inch lifts with compaction performed between each lift.
- B. Backfill Material at Unsleeved Pipe Under Paving: Provide all PVC pipe under paving with minimum of 4 inches of sand backfill on all sides and 24 inches cover to bottom of paving.
- C. Backfill Material at Existing Underground Pipes: Use only backfill material which has been screened to eliminate all material larger than 3/8 inches when backfilling adjacent to existing underground pipe lines.
- D. Backfill Compaction:
 - 1. Regardless of the type of pipe covered, compact to minimum 95% density under pavements, and 85% in planted areas.
 - 2. Compact trenches in areas to be planted by thoroughly flooding or jetting.
 - 3. Compact trenches in paved areas in 6-inch lifts.
- E. Finish Grading: Dress off all areas to accepted finish grades.

3.12 CLEAN-UP

- A. Daily: Keep all areas of work clean, neat and orderly at all times.
- B. Final: Clean up and remove all deleterious materials and debris from the entire work area prior to Final Review.

END OF SECTION



SECTION 32 94 00

PLANTING ACCESSORIES

1.13 PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Root Ball Fixing System
2. Metal Landscape Edging
3. Mulch Materials
4. Asphalt Edge Restraint
5. Gravel Band

B. Related Requirements:

1. Section 32 01 90 - Landscape Maintenance
2. Section 32 91 13 - Soil Preparation and Soil Mixes
3. Section 32 91 19 - Landscape Finish Grading
4. Section 32 93 00 - Planting

1.3 SUBMITTALS

- A. Furnish four (4) copies of manufacturer's literature for products specified under this Section.

B. Samples:

1. Metal Landscape Edging: Six-inch section of specified type, size, and finish.
2. Mulch Materials: 5-lb bag of samples of each specified.
3. Asphalt Edge Restraint: Six-inch section of specified type, size, and finish.
4. Gravel Band Aggregate: 5-lb bag of samples of each specified aggregate.



1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of planting accessory from single source from single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping
 - 1. Provide materials in original, unopened containers with manufacturer's labels intact and legible.
- B. Acceptance at Site
 - 1. Damaged materials will not be accepted, as determined by visual inspection.
 - 2. Rejected materials shall be removed from project site immediately.
- C. Storage and Protection
 - 1. Store materials in flat, dry area in manufacturer's protective packaging, in original containers with labels and instructions intact.

1.6 CLEAN-UP

- A. Keep all areas of work clean, neat and orderly at all times. Keep all paved areas clean during planting and maintenance operations. Clean up and remove all deleterious materials and debris from the entire work area prior to beginning of landscape maintenance period to the satisfaction of the University's Representative.

1.14 PART 2 PRODUCTS

1.7 ROOTBALL FIXING SYSTEM

- A. Contractor shall use staking materials, necessary to meet requirements of specifications, subject to approval of Landscape Architect:
 - 1. Tree Stakes:
 - a. Platypus Rootball Fixing System, with Plati-Mat.
 - b. Or equal, as approved by Landscape Architect

1.8 METAL LANDSCAPE EDGING

- A. Manufacturer:
 - 1. Sure-loc Corporation, Holland, MI, (800) 787- 3562.



2. Or equal, as approved by Landscape Architect.



- B. Model: Steel, 1/4" thickness by 5 inches deep, in 16' sections.
- C. Color and Finish: black, powder coated.
- D. Stakes: Tapered steel, a minimum of 12 inches long.
- E. Accessories: Standard tapered ends, corners, and splicers, to match edging.

1.9 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of the following:
 - 1. Type-1: Lyngso – Premium Arbor Mulch or equal
 - 2. Color: Natural

1.10 ASPHALT EDGE RESTRAINT

- A. Manufacturer:
 - 1. Permaloc Edging, (616) 399-9600.
 - 2. Or equal, as approved by Landscape Architect.
- B. Model: Aluminum, 4" x 3", .21" thickness in 8' sections.
- C. Color and Finish: black.
- D. Stakes: Tapered steel, a minimum of 12 inches long.
- E. Accessories: Standard tapered ends, corners, and splicers, to match edging.

1.11 GRAVEL BAND

- A. Install gravel band as indicated on Drawings.

1.15 PART 3 EXECUTION

1.12 EXAMINATION

- A. Check to ensure that all underground lines, irrigation hoses, and other cables are installed below the maximum depth of edging, root barrier, and stakes to be installed.
- B. Any damage to site work or structures due to installation of planting accessories shall be repaired at the expense of the Contractor.

1.13 ROOTBALL FIXING SYSTEM



A. Rootball fixing shall be completed immediately after planting. Trees shall stand plumb after rootball fixing.

1. Install rootball fixing system per manufacturer's specifications.

1.14 METAL LANDSCAPE EDGING

A. Install edging as indicated on Drawings. Install edging according to manufacturer's written instructions, unless otherwise noted. Anchor edging with stakes approximately 30 inches apart, driven below top elevation of edging.

B. Top of edging shall not exceed 1/2" above adjacent finish grade.

1.15 MULCHING

A. Mulch planting area surfaces and other areas as indicated on Drawings.

END OF SECTION



SECTION 32 12 16

ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish all material, equipment and labor required to construct hot mix asphalt pavement, including, but not limited to, placement of hot mix asphalt paving, tack coat, and adjustment to grade of all traffic boxes and manhole frames and grates.
- B. Related Sections:
 - 1. Section 01 33 00: Submittals.
 - 2. Section 31 00 00: Earthwork.
- C. Reference Standards:
 - 1. California Department of Transportation (Caltrans) Standard Specifications, Current Edition.
 - 2. Caltrans California Test 216: Method of Test for Relative Compaction of Untreated and Treated Soils and Aggregates.
 - 3. Caltrans California Test 231: Method of Test for Relative Compaction of Untreated and Treated Soils and Aggregates Using Nuclear Gage.
 - 4. Caltrans California Test 309: Method of Test for Determining Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt.
 - 5. Caltrans California Test 375: Determining the In-Place Density and Relative Compaction of Hot Mix Asphalt Using Nuclear Gages.
 - 6. California Division of Occupational Safety and Health (Cal-OSHA), Title 8, Section 1590 (e).
 - 7. Any work within the street, highway or right-of-way shall be performed in accordance with the requirement of the governmental agencies having jurisdiction and shall not begin until all of those governing authorities have been notified.

1.2 SUBMITTALS

- A. Refer to "Section 01 33 00 Submittal Procedures."
- B. Job Mix Formula Proposal, Hot Mix Asphalt Design Data, and Job Mix Formula Verification per Caltrans Standard Specifications for all hot mix asphalt material being used on the project.
 - 1. Job Mix Formula Proposal: CEM-3511
 - 2. Hot Mix Asphalt Design Data: CEM-3512
 - 3. JMF Verification: CEM-3513



- C. Load slips for all material delivery trucks shall be delivered to the job site with the truck. The Contractor shall retain all load slips and shall make them available to the Engineer upon request.

1.3 QUALITY ASSURANCE

- A. All materials shall conform to the applicable sections of the Caltrans Standard Specifications unless otherwise specified in these Specifications or on the Plans.
- B. Use only new materials and products, unless existing materials or products are specifically shown otherwise on the Drawings to be salvaged and re-used.
- C. All materials, components, assemblies, workmanship and installation are to be observed by the Owner's Inspector of Record. Work not so inspected is subject to uncovering and replacement.
- D. The representatives of the Owner's testing lab will not act as supervisor of construction, nor will they direct construction operations. Neither the presence of the Owner's testing lab representatives nor the testing by the Owner's testing lab shall excuse the Contractors or Subcontractors for defects discovered in their work during or following completion of the project. Correcting inadequate compaction is the sole responsibility of the Contractor.
- E. Contractor shall provide verification that asphalt mix temperature meets the requirements of this specification at time of application.
- F. Contractor shall be solely responsible for all subgrades built. Any repairs resulting from inadequate compaction are the responsibility of the Contractor.
- G. Sieve analysis from testing laboratories identifying rock/sand percentages within the asphalt mix shall have a testing date within 90 days of contract signing.
- H. Sieve analysis from a testing laboratory identifying rock/sand percentages within the Class 2 aggregate base rock shall have a testing date within 90 days of contract signing.

1.4 WARRANTY

- A. Refer to General Conditions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Transport, store and handle in strict accord with the local jurisdiction.
- B. Make delivery to job when notified by Contractor verifying that the job is ready to receive the work of this Section and that arrangements have been made to properly store, handle and protect such materials and work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aggregate Base: See Specifications "Section 31 00 00 Earthwork."



- B. Hot Mix Asphalt: Shall be Type "A" Hot Mix Asphalt, and shall conform to the requirements for Type "A" hot mix asphalt with 1/2 inch HMA Type A grading as specified in Section 39-2.02, of the Caltrans Standard Specifications.
- C. Asphalt Binder: Asphalt Binder for Type "A" hot mix asphalt shall be PG 64-16, as specified in Section 92 of the Caltrans Standard Specifications.
- D. Prime Coat: Prime coat on aggregate base will not be required.
- E. Tack Coat: Tack coat shall conform with, and be applied in conformance with Section 94, "Asphaltic Emulsions" of the Caltrans Standard Specifications. Tack Coat shall be type SS1 or RS1, and shall be applied to all vertical surfaces of existing pavement, curbs, gutters and construction joints.
- F. Seal Coat: No seal coat will be required.
- G. Pavement Reinforcing Fabric: If pavement reinforcing fabric is required, it shall conform to Section 96-1.02J, "Paving Fabric" of the Caltrans Standard Specifications.
- H. Crack Treatment:
 - 1. Crack Seal, if required, shall conform to Section 37-6, "Crack Treatment," and Section 41-5, "Joint Seals" of the Caltrans Standard Specifications.
 - 2. Crack seal treatment shall be "hot-applied" type.
 - 3. The Contractor shall provide the Engineer with a Certificate of Compliance for each shipment of crack sealant. The certificate shall certify that the sealant conforms to the specifications and shall be accompanied with storage and heating instructions and calculations for the material.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

A. Environmental Requirements:

- 1. Base Course: Do not lay base course on muddy subgrade, during wet weather, or when atmospheric temperature is below 40 degrees Fahrenheit (°F).
- 2. Asphalt Surfacing: Do not apply asphaltic surfacing on wet base, during wet weather, or when atmospheric temperature is below 50°F.

3.2 PROTECTION OF WORK

- A. Curbs and other work shall be covered with suitable material and protected from staining or damage by equipment or contact with oil, emulsion, and asphalt. All manholes, catch basins, and gratings shall be covered with suitable material so that no asphalt or emulsion will come in contact with the inside walls or floors of the structures.



3.3 PAVEMENT GRINDING

- A. Pavement grinding, when required, shall be performed in accordance with the requirements of Section 39-3.04 and Section 42-3, of the Caltrans Standard Specifications, as specified in these specifications, and as directed by the Engineer.
- B. The Contractor shall exercise care to avoid damaging existing concrete curbs and drainage facilities during all grinding operations. Damage to existing improvements shall be repaired at the Engineer's direction, and at the sole expense of the Contractor.
- C. Prior to conducting grinding operations, the Contractor shall remove all weeds and dirt in the gutters and in cracks in the existing pavement surface to the satisfaction of the Engineer. The Contractor will not be permitted to use herbicides, and the method of weed removal shall be subject to the approval of the Engineer.
- D. The Contractor shall completely remove all existing raised reflective markers from the areas being ground.
- E. The grinded areas shall be swept throughout the course of the grinding operations and shall be left thoroughly clean and clear of all grindings at the end of each working day. The Contractor shall exercise care to avoid spilling grindings into drainage inlets and culverts, and shall promptly clean out any grindings that do spill into inlets or culverts.
- F. Prior to initiation of grinding operations, the Contractor shall lower all traffic boxes and manhole lids and frames within the limits of the work.
- G. Abrupt edges shall not be left in place when traffic is allowed back into the grinding area. Where abrupt edges exist (mid-block or on cross streets or alleys), or where directed by the Engineer, the Contractor shall build a transition ramp no shorter than 25 feet long that spans the entire length or width of the abrupt edge, lifting traffic out of the ground area and onto the surrounding pavement.

3.4 PAVEMENT SAWCUTTING

- A. Pavement sawcutting shall be performed with a wheel roller, pneumatic pavement cutter, or other sawcutting equipment approved by the Engineer.
- B. All pavement sawcutting shall be to the full depth of the pavement, regardless of depth. All pavement material inside the sawcut limits shall be completely removed. Sawcuts shall be straight and shall provide clean, solid, vertical faces free from loose or cracked material. All damaged or disturbed adjoining pavement shall be sawcut and removed.
- C. When sawcutting is necessary for utility, storm drain, or culvert installation, sawcutting shall be made 12 inches wider on all sides than the width of the excavation.
- D. When possible, sawcuts shall be either parallel or perpendicular to the roadway centerline.
- E. The number of jogs in the sawcut lines shall be held to minimum and shall be subject to approval by the Engineer. The Contractor may be required to remove additional undisturbed pavement if, in the opinion of the Engineer, the lines are too erratic or contain too many jogs.



3.5 INSTALLATION

- A. Subgrade shall be prepared in accordance with "Section 31 00 00 Earthwork" of these project specifications. Compaction and moisture content shall be verified immediately prior to placement of aggregate base.
- B. Cleaning: Existing surfaces and new surfaces shall be clean of all dirt, sand, oil or grease. All cracks shall be cleaned and free of all debris and vegetation.
- C. Base Placement
 - 1. Install in accord with Caltrans Standard Specifications, Section 26. Compact to relative compaction of not less than 95%, Caltrans 216/231. The material shall be deposited on the subgrade in such a manner as to provide a uniform section of material within five percent tolerance of the predetermined required depth. Deposition will be by spreader box or bottom dump truck to prevent segregation of the material. The material so deposited on the subgrade shall have sufficient moisture which, in the opinion of the Engineer, is adequate to prevent excessive segregation. It shall then be immediately spread to its planned grade and cross section. Undue segregation of material, excessive drifting or spotting of material will not be permitted. If in the opinion of the site geotechnical engineer, the material is unsuitably segregated, it shall be removed or completely reworked to provide the desired uniformity of the material.
 - 2. Moisture content and compaction of base material shall be tested immediately prior to placement of asphalt paving.
- D. Liquid Asphalt Tack Coat: Apply as "tack coat" to all vertical surfaces of existing paving, curbs, walks, and construction joints in surfacing against which paving is to be placed. When being applied for paving fabric installation, tack coat shall extend 3 inches beyond the width of the paving fabric on all sides. Tack coat shall be applied in one application at a rate of from 0.02-gallon to 0.10-gallon per square yard of surface covered.
- E. Pavement reinforcing fabric, when specified, shall be installed immediately after the tack coat is applied, in accordance with Section 39-2.01C(3)(g), "Geosynthetic Pavement Interlayer" of the Caltrans Standard Specifications, and in accordance with the manufacturer's instructions.
- F. Hot Mix Asphalt Construction
 - 1. All hot mix asphalt shall be installed in accordance with Section 39-2.01C, "Construction" of the Caltrans Standard Specifications. Type "A" hot mix asphalt shall be placed only when the atmospheric temperature is above 50°F. Failure to meet temperature restrictions is grounds for rejection of the work by the Engineer.
 - 2. Theoretical maximum specific gravity and density of hot mix asphalt shall be determined in accordance with Caltrans California Test 309.
 - 3. In-place density and relative compaction shall be determined using a nuclear gage in accordance with Caltrans California Test 375.
 - 4. The completed surface shall be thoroughly compacted, smooth, and free from ruts, humps, depressions, or irregularities. Any ridges, indentations or other objectionable marks left in

the surface of the hot mix asphalt by rollers, rakes, or other equipment shall be eliminated immediately.

5. Contractor shall schedule and attend a pre-paving meeting at least 2 hours in advance of the paving operation.
6. Placement and adjustment of Frames, Covers, Boxes and Grates: The Contractor shall set and adjust to finish grade all proposed and existing frames, covers, boxes, and grates of all manholes, drop inlets, drain boxes, valves, cleanouts, electrical boxes and other appurtenant structures prior to placement of asphaltic concrete.

G. Hot Mix Asphalt Acceptance

1. Acceptance of Hot Mix Asphalt shall be as specified in Section 39-2.02A94)(b), 39-2.02A(4)(e) ASPHALT CONCRETE, under subsection "Quality Assurance" except as modified below:
 - a. Final gradation shall be smooth, uniform and free of ruts, humps, depressions or irregularities.
 - b. Maximum variation in slopes shall be 0.5%.
 - c. Pavement Surface Drainage Test: The Contractor shall perform a Pavement Surface Drainage Test on all paved areas to confirm positive drainage. Testing shall be conducted in the presence of the Project Inspector. The Contractor shall uniformly apply water to the pavement surface by flooding or controlled spraying evaluate surface runoff. Areas exhibiting ponding or standing water shall be corrected and retested until acceptable drainage is achieved.
 - d. The surface elevations of asphalt paving shall not vary more than 1/8 inch above or below the elevations established on the plans.
 - e. In no case shall grades in accessible areas, including accessible parking stalls and accessible path of travel, exceed the maximum allowable grades for accessibility.
 - f. Pavement thickness shall be within 1/4 inch of the specified thickness.
 - g. Suitable corrective actions must be agreed upon by the Owner and the Engineer and may consist of full-depth removal and replacement, or overlaying.

3.6 DEFECTIVE ASPHALT

- A. Contractor is responsible for replacing or modifying defective asphalt, using method approved by the Engineer. Contractor is responsible for costs associated with replacing or modifying defective asphalt
- B. Defective asphalt is as described below:
 1. Exposed rock pockets on the finished surface.
 2. Asphalt not placed to the design grades or elevations.
 3. Asphalt that ponds water.



4. Asphalt that was compacted below the minimum required temperatures.
5. Asphalt that fails to meet the minimum compaction requirements.
6. Asphalt that lacks the minimum thickness required per plan.
7. New asphalt contaminated by a petroleum product, or spilled paint.
8. Asphalt that has depressions, cracks, raveling, segregation, slippage, bleeding, or potholes.
9. Asphalt placed on pumping, unstable sub-grades.

3.7 CLEANING

- A. Upon completion of work of this Section promptly remove from the working area all scraps, debris and surplus material of this Section.
- B. Clean excess material from surface of all concrete walks and utility structures.

END OF SECTION



THIS PAGE INTENTIONALLY LEFT BLANK.



SECTION 32 13 13

SITE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections include the following:

1. Section 31 00 00: Earthwork.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.3 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM-International (ASTM) C94/C94M requirements for production facilities and equipment:

1. Manufacturer certified according to National Ready Mixed Concrete Association's (NRMCA's) "Certification of Ready Mixed Concrete Production Facilities."

B. American Concrete Institute (ACI) Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

PART 2 PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces:

1. Use flexible or curved forms for curves with a radius of 100 feet (30.5 meters [m]) or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.



2.2 STEEL REINFORCEMENT

- A. Reinforcement to meet requirements and products specified in California Department of Transportation (Caltrans) Standard Specifications Section 52.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Shall be as defined in Caltrans Standard Specifications Section 40.
- B. Normal-Weight Aggregates: Shall be $\frac{3}{4}$ -inch maximum size aggregate in mixes.
- C. Water: ASTM C94/C94M.
- D. Air-Entraining Admixture: ASTM C260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1% water-soluble chloride ions by mass of cementitious material.

2.4 CURING MATERIALS

- A. Curing materials to meet requirements and products specified in Caltrans Standard Specifications.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
- B. Bonding Agent: ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Detectable Warning Panels: See Specification "Section 32 17 26 Tactile Warning Surface."

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience:
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days):
 - a. Sidewalks, walkways, curbs and other areas not exposed to vehicle traffic: 3,000 pounds per square inch (psi)
 - b. Driveways, crosswalks, parking stalls, and other areas exposed to vehicle traffic: 4,000 psi
 - c. Site retaining walls: 4,000 psi
 - d. Structural and building elements: Not included in this specification section
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.5



3. Slump Limit: 3 inches, plus or minus 1 inch
 - C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 1. Air Content: 5½ percent plus or minus 1.5 percent for curb and gutter
 2. Air Content: 5½ percent plus or minus 1.5 percent for sidewalks and driveways
 - D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
 - E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - F. Cementitious Materials - Limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements as follows:
 1. Fly Ash or Pozzolan: 20 percent.
- 2.7 CONCRETE MIXING
- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Furnish batch certificates for each batch discharged and used in the Work:
 1. When air temperature is between 85 degrees Fahrenheit (°F) and 90°F, reduce mixing and delivery time from 1½ hours to 75 minutes; when air temperature is above 90°F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities and general public access.

3.2 EXAMINATION

- A. Examine exposed sub-grades and sub-base surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subgrade surface below Class 2 Aggregate Base supporting concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 1. Completely proof-roll base in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 miles per hour (mph).
 2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
 3. Base with soft spots and areas of pumping or rutting exceeding depth of 1 inch or as determined by the Engineer require correction according to requirements in Division 31.



4. In areas that rut less than 1 inch, the ruts shall be filled with base material, compacted, and brought to grade.
- C. Class 2 Aggregate base placed above the subgrade shall be compacted to 90% relative compaction for vehicular and non-vehicular concrete pavements as indicated on the Plans.
- D. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.3 PREPARATION

- A. Remove loose material from compacted sub-base surface immediately before placing concrete.

3.4 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.5 STEEL REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's (CRSI's) "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

3.6 JOINTS

- A. General: Form construction, expansion, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated:
 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints:
 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
- C. Expansion Joints: Form expansion joints of pre-formed joint-filler strips where indicated:
 1. Locate expansion joints at intervals of 50 feet (15.25 meters), unless otherwise indicated.
 2. Locate reinforcing bar mid-depth within the concrete slab.



3. Extend joint fillers full width and depth of joint.
 4. Terminate joint filler not less than 1/2 inch (13 millimeters [mm]) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
 5. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 6. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 7. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary pre-formed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated:
1. Locate isolation joints at the perimeter of rigid structures (stormwater treatment basins, columns, and so on), unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- E. Contraction Joints—Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match jointing of existing adjacent concrete pavement:
1. Locate expansion joints at maximum intervals of 10 feet (3.05 meters), unless otherwise indicated.
 2. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch (6-mm)-radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 3. Sawed Joints: Form contraction joints with saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch (3-mm)-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks. After concrete is poured, saw cuts shall be completed within:
 - a. 1 to 4 hours with early-entry dry cut saws (1 hour for hot weather to 4 hours for cold weather); or,



- b. 4 to 12 hours with conventional wet or dry saws (4 hours for hot weather to 12 hours for cold weather).
 - c. Vacuum and remove debris from joint after saw cutting is complete.
- F. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the radii indicated on the plans. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.7 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, ponded water, or frost from sub-base surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten sub-base to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping:
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed:
 - 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
- J. Screed pavement surfaces with a straightedge and strike off.
- K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.



- L. Finishing of Unformed Surfaces: Unless otherwise shown on the plans, unformed surfaces shall be finished as follows:
1. Finishes that are exposed and subject to foot traffic shall receive a broom finish with a texture of plus or minus one-sixteenth ($\pm 1/16$) inch or as designated on the plans.
 2. Stairways and Sidewalks: Strike smooth tops of stairs and sidewalks and finish with a light broom providing a texture of plus or minus one-sixteenth ($\pm 1/16$) inch.
- M. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- N. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures:
1. When air temperature has fallen to or is expected to fall below 40°F (4.4 degrees Celsius [$^{\circ}\text{C}$]), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C) and not more than 80°F (27°C) at point of placement.
 2. Do not use frozen materials or materials containing ice or snow.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- O. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90°F (32°C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.8 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture:



1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.9 CONCRETE PROTECTION AND CURING

- A. Refer to Caltrans Standard Specifications for Concrete Protection and Curing.

3.10 ACCESSIBLE. CURB RAMP CONSTRUCTION

- A. Sidewalk curb approach ramps shall be constructed to current Americans with Disability Act (ADA) standards as detailed in the plans, and in the California Building Code Section 11B-406.
- B. Surface Texture: Accessible surface texture requirements shall be met with the installation of the accessible compliant detectable warning panels inserted in the sidewalk approach ramps as indicated in the details.
- C. Slope:
 1. New construction:
 - a. Running Slope: Maximum slope in the direction of travel shall be 1 foot vertical to 12 feet horizontal (1:12). Maximum rise for any run shall be thirty (30) inches or less.
 - b. Cross Slope: Maximum slope perpendicular to the direction of travel shall be 1 foot vertical to 48 feet horizontal (1:48).
 - c. Flared Side Slope: When curb ramps are located where pedestrians must walk across the ramp, the ramp shall have flared sides with a maximum slope of 1 foot vertical to 10 feet horizontal (1:10).

3.11 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 1. Elevation: 1/4 inch (6 mm).
 2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
 3. Surface: Gap below 10-foot (3-m)-long, unleveled straightedge not to exceed 1/4 inch (6 mm).
 4. Joint Spacing: 3 inches (75 mm).
 5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
 6. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.12 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C172 shall be performed according to the following requirements for vehicular concrete, retaining walls, and equipment pads, testing is not required for pedestrian concrete:
1. Test Locations: Driveways, Valley Gutters, Accessible Parking Stalls, Crosswalks, and Retaining Walls.
 2. Testing Frequency: Obtain at least 1 composite sample for each 100 cubic yards (76 cubic meters) or fraction thereof of each concrete mix placed each day:
 - a. When frequency of testing will provide fewer than five (5) compressive-strength tests for each concrete mixture, testing shall be conducted from at least five (5) randomly selected batches or from each batch if fewer than five are used.
 3. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 4. Air Content: ASTM C231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 5. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40°F (4.4 °C) and below and when 80°F (27°C) and above, and one test for each composite sample.
 6. Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one (1) set of three (3) standard cylinder specimens for each composite sample.
 7. Compressive-Strength Tests: ASTM C39/C39M; test 1 specimen at 7 days and 2 specimens at 28 days:
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 megapascals [MPa]).
- D. Test results shall be reported in writing to Architect, Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as a sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.



- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.13 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION



SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Parking lot markings, including parking bays, arrows, loading zones, access aisles, international symbols of accessibility (ISA), and curb markings.

B. Related Section:

1. Section 32 12 16: Asphalt Paving.

C. Reference Standards:

1. California Building Code (CBC) Chapter 11B: Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing.
2. Master Painters Institute Approved Products List (MPI APL); Master Painters and Decorators Association; current edition, www.paintinfo.com.

1.2 DEFINITIONS

- A. Pavement Stripe: Includes traffic control, materials, and all appurtenances not otherwise specified.
- B. Pavement Markings: Includes traffic control, setup, materials, and all appurtenances not otherwise specified in the bid schedule.

1.3 SUBMITTALS

- A. All paint products to be used for pavement markings.

1.4 QUALITY ASSURANCE

- A. All pavement striping, pavement marking shall be installed in accordance with manufacturer's instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.



PART 2 PRODUCTS

2.1 MATERIALS

A. Traffic Paint:

1. Type: Water base, roadway traffic lane marking type; colors as selected.
2. Acceptable Manufacturers:
 - a. Dunn-Edwards, Vin-L-Stripe No. W-801, vinyl-epoxy as a standard of quality.
 - b. J. E. Bauer latex base Formula No. 1030A9 White, No. 1056A9 Yellow, No. 1865A9 Blue, No. 1118A9 Green, and No. 1854A9
 - c. Red Sinclair No. 160 Vinyl Traffic Line Paint, water base.
 - d. Ennis Traffic Safety Solutions, product 6000 white & 6006 blue.

B. Line and Zone Marking Paint: MPI (APL) No. 97 Latex Traffic Marking Paint:

1. Roadway Markings: White.
2. Symbols of Accessibility: Blue and white, as indicated on the Plans.

C. Striping: Thermoplastic Stripe, In accordance with State of California, Department of Transportation (Caltrans), Standard Specifications, Section 84.

D. Pavement Markings: Thermoplastic Markings, In accordance with Caltrans, Standard Specifications, Section 84.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

3.2 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.3 JOB CONDITIONS

- A. Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 degrees Fahrenheit (°F) for oil-based materials, 50°F for water-based materials, and not exceeding 95°F.
- B. Sequencing, Scheduling: Coordinate with paving work. Verify that paint type is compatible with asphalt paving surfaces.
1. Do not apply pavement markings for 14 days after installation of hot mix asphalt.



2. Do not apply pavement markings until concrete has cured for 30 days.

C. Protection: After application, protect from traffic until thoroughly dry.

3.4 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean surfaces thoroughly prior to installation:

1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

C. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

D. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

3.5 INSTALLATION

A. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

B. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

C. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends:

1. Apply paint in one coat only.

2. Wet Film Thickness: 0.015 inch, minimum.

3. Width Tolerance: Plus or minus 1/8 inch.

D. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings:

1. Mark the International Symbol of Accessibility at indicated parking spaces.

2. Hand application by pneumatic spray is acceptable.

3.6 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.



- C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.
- D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
- E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.
- F. Replace removed markings at no additional cost to Owner.

END OF SECTION

SECTION 32 17 26

TACTILE WARNING SURFACING

PART 1 GENERAL

1.1 SUMMARY

A. Scope:

1. Truncated dome pre-cast pavers meeting California Building Code Section 11B requirements.
2. Paving base
3. Portland cement mortars
4. Grout

B. Related Sections:

1. Section 32 13 13: Concrete Paving
2. Section 32 17 23: Pavement Markings

C. Reference Standards:

1. 49 Code of Federal Regulations (CFR) 37: Transportation Services for Individuals with Disabilities (ADA); current edition.
2. ADA Standards: ADA Standards for Accessible Design; 2010.
3. ASTM-International (ASTM) A666: Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
4. ASTM D2047: Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
5. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
6. ATBCB PROWAG: Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way.
7. FED-STD-595C: Colors Used in Government Procurement (Fan Deck).
8. Accessibility Requirements:
 - a. Americans with Disabilities Act of 1990, as amended:
 - i. ADA Title II Regulations & the 2010 ADA Standards for Accessible Design.

- b. California Building Code (CBC) 2025 (California Code of Regulations [CCR] Title 24, Part 2, as adopted and amended by Division of the State Architect [DSA]):
 - i. CBC Chapter 11B, Access to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing.

1.2 SUBMITTALS

- A. See "Section 01 33 00 Submittal Procedures."
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.
- C. Samples: Submit two (2) samples of tactile warning surface pavers, in pattern and color specified.
- D. Color contrast data per CBC Section 11B-705.1.1.3.2
- E. Shop Drawings.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 5 years' documented experience.
- B. Accessibility Requirements:
 - 1. Detectable warning surfaces shall comply with CBC Section 11B-705.1.
 - 2. Detectable warning surfaces shall provide a minimum of 70-percent visual contrast with adjacent walking surfaces. See CBC Section 11B-705.1.1.3.2.
 - 3. Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact. Such constraint shall not be required for detectable warning surfaces at curb ramps, islands, or cut-through medians. See CBC Section 11B-705.1.1.4.

1.4 WARRANTY

- A. See "Section 01 77 00 Closeout Procedures."
- B. Pavers: Provide manufacturer's standard five (5) year warranty against manufacturing defects, breakage or deformation. Warranty shall also indicate compliance with architectural standards as published in the current edition of the California Building Standards Code, and also include durability criteria which indicate that the shape, color fastness, confirmation, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for specified years after initial installation:
 - 1. As used in this specification, "not degrade significantly" means that the product maintains at least 90 percent of its approved design characteristics, as determined by the enforcing agency.
- C. Installer's Warranty: 1 year.



1.5 DELIVERY, STORAGE, AND HANDLING

- A. Tactile Warning Surfacing shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy plastic wrappings to protect tile from concrete residue during installation.
- B. Tactile Warning Surfacing shall be delivered to location at the site for storage prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Truncated Dome Pavers:
 - 1. Endicott Clay Products Co.
 - a. www.endicott.com
 - 2. Or approved equal.
 - 3. Substitutions: See "Section 01 25 00 Substitution Procedures and Form."
- B. Surface Applied tiles are not permitted.

2.2 TACTILE AND DETECTABLE WARNING DEVICES

- A. Installation Method: Mortar set and grouted.
- B. Shape: Rectangular.
- C. Dimensions 3-5/8" x 7-5/8"
- D. Color: Yellow and approximate 33538 SAE AMS-STD-595A
 - 1. Provide a minimum of 70-percent visual contrast with adjacent walking surfaces, meeting CBC 11B-705.1.1.3.2
- E. Finish: Wirecut
- F. Pattern: Alternating
- G. Truncated Dome Dimensions:
 - 1. Height: 0.2 inch (5.1 millimeters [mm]).
 - 2. Base Diameter: 0.9 inches (22.9 mm) minimum to 0.92 inches (23.4 mm) maximum.
 - 3. Top Diameter: 0.45 inches (11.4 mm) minimum to 0.47 inches (11.9 mm) maximum.
 - 4. Pattern:
 - a. Wide Inline (Square) Pattern: Center-to-Center spacing of 2.3 inches minimum to 2.4 inches maximum each way.



- b. Radial Pattern: Center-to-Center spacing of 1.6 inches minimum to 2.4 inches maximum each way.

5. Tile Dimensions: As specified on Drawings.

2.3 ACCESSORIES

- A. Mortar: One part Portland cement, six parts damp sand by volume.
- B. Grout: Colored grout as recommended by manufacturer of truncated dome pavers. Color to match color of truncated dome pavers.
- C. Portland Cement: ASTM C150, Type I.
- D. Sand: ASTM C144, washed, sharp durable, particles free from silt, loam, clay, salts or organic impurities.
 - 1. For settling beds:
 - a. 100% Passing No. 4 sieve
 - b. Not more than 5% passing 100-mesh sieve
 - 2. For Grout
 - a. 100% Passing 30-mesh sieve
 - b. Not more than 5% passing 100-mesh sieve
- E. Expansion Joint Sealant
 - 1. Polyurethane two-part sealant

PART 3 EXECUTION

3.1 EXAMINATION

- A. When installation location is near site boundary or property line, verify required location using property survey.
- B. Verify that work area is ready to receive work:
 - 1. If existing conditions are not as required to properly complete the work of this section, notify Architect.
 - 2. Do not proceed with installation until deficiencies in existing conditions have been corrected.
 - 3. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.2 INSTALLATION, GENERAL

A. Install in accordance with manufacturer's written instructions:

1. Dampen concrete slab prior to placement of mortar setting bed.
2. Place mortar setting bed and screed and tamp firmly to required lines, grades, and planes.
3. Set pavers in full beds of Portland cement mortar.
4. Apply a dust coat of dry Portland cement over the plastic setting bed, or apply a skim coat of Portland cement to the backs of pavers.
5. Lay pavers in position and tamp into place to achieve full bearing.
6. Rack joints 3/8 inch to 1/2 inch wide, full depth of pavers.
7. Rod joints and maintain natural color joint appearance.
8. Place grout in joints until completely filled.
9. Apply a second grout application and tool joints flush with the face of pavers.
10. Remove excess grout and prevent grout accumulation on exposed faces of pavers.

B. Do not install damaged, cracked, chipped, bowed, dented, abraded, or otherwise defective units.

C. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. The tile shall be placed true and square to the curb edge in accordance with the drawings. Tiles shall be tamped into the setting bed to ensure the field level of the tile is flush to adjacent concrete surface.

D. The elevation and slope of the tile shall be set consistent with the contract drawings to permit water drainage and eliminate ponding.

E. Field Adjustment:

1. Locate relative to curb line in compliance with CBC Chapter 11B, Section 705.
2. Orient so the dome pattern is aligned with the direction of the ramp.
3. Align truncated dome pattern between adjacent units.

F. Install units fully seated to substrate, square to straight edges and flat to required slope.

3.3 CLEANING

1. Pavers shall be cleaned after grouting. Acid or acid cleaners shall not be used. Remove all mortar stains and other deleterious substances from the surface. Use care not to damage the surface finish.

3.4 PROTECTION

- A. Protect installed units from traffic, subsequent construction operations or other imposed loads until mortar and grout are fully cured and the project is open to the public.
- B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

END OF SECTION



SECTION 32 84 00

IRRIGATION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A. Review the General and Supplementary Contract Conditions and Division One, General Requirements, which contain information and requirements that apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Provide all products and execute all labor to achieve installation of the irrigation system complete as indicated by the Drawings and Specifications.

1.3 RELATED WORK IN OTHER SECTIONS

- A. Related Landscape Work:
 - 1. Planting Area Finish Grading
 - 2. Soil Preparation and Soil Mixes
 - 3. Plant Material
- B. Other Related Work: Consult all other relevant Specification Sections to determine the extent and character of work specified elsewhere, but related to that included herein.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- A. Laws, Codes and Regulations: Perform work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work.
- B. Inspections and Permits: Provide for all inspections and permits required by federal, state and local authorities in furnishing, transporting and installing materials.

1.5 TRAFFIC CONTROL

- A. It is the responsibility of the contractor to ensure adequate protection and controls for pedestrian and vehicular traffic in the vicinity of the project areas. The contractor shall provide all signs, barricades, flagmen, etc., necessary to meet all traffic requirements for this project at his own expense.

1.6 APPLICABLE STANDARDS

- A. Comply with the current applicable specifications and guidelines of the following:
 - 1. DIV — Division of Industrial Safety.
 - 2. UPC — Uniform Plumbing Code published by the Association of Western Plumbing Officials.
 - 3. ASTM — American Society for Testing and Materials.
 - 4. NSF — National Sanitation Foundation.

1.7 SUBMITTALS

- A. Product data: Prior to delivery to site, submit 5 copies of current manufacturer's specifications and catalog cuts for the complete list of materials and assemblies to be installed.
- B. Final Record Documents: Submit Final Record Documents to the Landscape Architect at Preliminary Review.

1.8 RECORD DOCUMENTS

- A. Progress Record Documents:
 - 1. Maintain on the construction site at all times a record of all materials and equipment installed each day.
 - 2. Daily record information neatly to scale, on full-size prints of the irrigation construction documents.
 - 3. Record information neatly to scale, on full-size prints of the irrigation construction documents.
 - 4. Information shall include all changes, substitutions, and manufacturer's names and catalogue members for materials and equipment. Show actual locations of all valves and irrigation piping. Show dimensions from easily-identifiable permanent structures such as walls, curbs, fences, buildings or walks.
- B. Final Record Documents:
 - 1. Transfer all information noted on Progress Record Documents.
 - 2. After Work completion, transfer information noted on prints. Submit Progress Record Documents to the landscape architect for review of general information content (landscape architect will not be responsible for errors or omissions).
 - 3. Contractor shall be responsible for accuracy of information and errors or omissions.
 - 4. If first submittal is not accepted by landscape architect, resubmit until accepted.
 - 5. Once accepted, submit accepted final Record Documents to Owner

1.9 SERVICE MANUALS

- A. Submittal Procedure: At Preliminary Review, submit five individually bound Service Manuals to the Landscape Architect.
- B. Content:
 - 1. Complete drawings, diagrams and spare parts lists of all equipment installed showing components and catalog numbers together with the manufacturer's name and address.
 - 2. Index sheet indicating the Contractor's name, address and telephone number.
 - 3. Copies of equipment, warranties and certificates.
 - 4. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate, and maintain all equipment.

1.10 DEFINITION OF ACCEPTANCE

- A. Wherever the terms "acceptance" or "accepted" are used herein, they mean acceptance of Landscape Architect in writing.

1.11 INTENT OF DRAWING AND SPECIFICATIONS

- A. It is the intent of the Drawings and Specifications to provide a complete operable irrigation system. Any items not specifically shown in the Drawings or called for in the Specifications, but which are normally required to conform with such intent, are to be considered as part of the work.

1.12 SUBSTITUTIONS

- A. Written Acceptance: Specific reference to manufacturer's names and products specified in these sections are used as standards; this implies no right to substitute other materials or methods without written acceptance of the Landscape Architect.
- B. Contractor's Responsibility: Installations of accepted substitution(s) must be made to the satisfaction of Landscape Architect and without additional cost to Owner.

1.13 REVIEW OF SITE

- A. Visit project site and review conditions as they exist prior to submitting bid.

1.14 WORK SCHEDULE

- A. Submit a proposed work schedule to the Landscape Architect for acceptance at least fourteen days prior to start of irrigation work. Submit revised schedule(s) to the Landscape Architect immediately.

1.15 COORDINATION

- A. Coordinate and cooperate with other contractors to enable the work to proceed as rapidly and efficiently as possible in a workmanlike manner.

1.16 PROTECTION OF EXISTING CONDITIONS

- A. General: The Contractor shall use every possible precaution to prevent damage to existing conditions to remain such as structures, utilities, irrigation systems, plant materials and paving on or adjacent to the site of the work.
- B. Barriers: Provide barricades, fences or other barriers as necessary to protect existing conditions to remain from damage during construction.
- C. Operations: Do not store materials or equipment, permit burning, or operate or park equipment under the drip line of existing plants to remain.
- D. Notification of Damages: Submit written notification of all conditions damaged during construction to the Owner and Landscape Architect immediately.
- E. Determination of Damage: Landscape Architect will determine the extent of damage and value of damaged plant material.
- F. Replacement of existing plant material: Replace existing plants to remain which are damaged during construction with plants of the same species and size as those damaged at no cost to the Owner.

1.17 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Labeling: Furnish standard products in unopened manufacturer's standard containers bearing original labels showing quantity, analysis and name of manufacturer.
- B. Storage: Store products with protection from weather or other conditions which would damage or impair the effectiveness of the product. Protect PVC pipes and fittings from direct sunlight. Beds on which pipe is stored must be full length of pipe.

1.18 ANALYSIS OF SAMPLES AND TESTS

- A. Analyses: Samples of materials may be taken and analyzed for conformity to specification at any time. The Contractor shall furnish samples as requested.

- B. Rejected Materials: Contractor shall remove rejected materials immediately from the site.
- C. Cost of Testing: The Contractor shall pay cost of testing of materials not meeting specifications.

1.19 HYDROSTATIC TESTING REVIEW

- A. Time of Review: The Owner's Representative will review the completed irrigation work during the hydrostatic testing prior to the backfilling of the trenches.
- B. Notification of Review: Notify the Owner's Representative at least 72 hours prior to the anticipated review.

1.20 WARRANTY

- A. In addition to manufacturer's guarantees or warranties, work shall be warranted for 1 year from the date of Final Acceptance against defects in material, equipment and workmanship. Warranty shall also cover repair of damage to any part of the premises resulting from leaks or other defects in materials, equipment, and workmanship to the satisfaction of the Owner.

1.21 WARRANTY FOR SPRINKLER IRRIGATION SYSTEM

- A. Include the following warranty on contractor's letterhead with service manuals:
 - 1. WE HEREBY WARRANT THAT THE IRRIGATION SYSTEM WE HAVE FURNISHED AND INSTALLED IS FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP, AND THE WORK HAS BEEN COMPLETED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WE AGREE TO REPAIR OR REPLACE ANY DEFECTS IN MATERIAL OR WORKMANSHIP, ANY SETTling OF BACKFILLED TRENCHES, WHICH MAY DEVELOP DURING THE PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE AND ALSO TO REPAIR OR REPLACE ANY DAMAGE CAUSED BY ANY DEFECTS IN THE IRRIGATION SYSTEM OR RESULTING FROM THE REPAIRING OR REPLACING OF SUCH DEFECTS AT NO ADDITIONAL COST TO THE OWNER. ORDINARY WEAR AND TEAR, UNUSUAL ABUSE OR NEGLIGENCE ARE EXCEPTED. WE SHALL MAKE SUCH REPAIRS OR REPLACEMENTS, INCLUDING COMPLETE RESTORATION OF ALL DAMAGED PLANTING, PAVING, OR OTHER IMPROVEMENTS OF ANY KIND, WITHIN A REASONABLE TIME, AS DETERMINED BY THE OWNER, AFTER RECEIPT OF WRITTEN NOTICE. IN THE EVENT OF OUR FAILURE TO MAKE SUCH REPAIRS OR REPLACEMENTS WITHIN A REASONABLE TIME AFTER RECEIPT OF WRITTEN NOTICE FROM THE OWNER, WE AUTHORIZE THE OWNER TO PROCEED TO HAVE SAID REPAIRS OR REPLACEMENTS

MADE AT OUR EXPENSE AND WE WILL PAY THE COSTS AND CHARGES THEREFORE
UPON DEMAND.

PROJECT:

LOCATION:

CONTRACTOR:

LICENSE No.:

TELEPHONE:

GUARANTEE TO:

*DATE OF
ACCEPTANCE:*

*AUTHORIZED
REPRESENTATIVE:*

PART 2 – PRODUCTS

2.1 PIPE

- A. General: All pipe shall be NSF approved.
- B. Piping on Pressure Side of Control Valves:
 - 1. ASTM D 1785 polyvinyl chloride (PVC) 1120-1220, Schedule 40.

- C. Piping on Non-pressure Side of Control Valves:
 - 1. ASTM D 1784 polyvinyl chloride (PVC) 1120-1220, Class 200.
 - 2. Drip: As listed on Drawings.

2.2 FITTINGS

- A. Fittings for Pressurized Solvent-Welded Pipe:
 - 1. ASTM D 2466 Schedule 40 PVC as provided by the same manufacturer as the pipe.
 - 2. Connections of Mains to Remote Control and Quick-coupling Valves: ASTM D 2467 Schedule 80 PVC solvent-weld socket fittings.
- B. Fittings for Non-Pressurized Solvent-Welded Pipe:
 - 1. ASTM D 2466 and ASTM D 2467 Schedule 40 and Schedule 80, polyvinyl chloride, standard weight, as manufactured by "Sloane," "Lasco," or accepted substitute. Refer to installation details.
 - 2. Threaded PVC Nipples: Schedule 80 PVC.

2.3 NIPPLES

- A. Non-Ferrous: Schedule 40 red brass (85% copper, 15% zinc) with MIPT at both ends; ASTM B43.
- B. Plastic: Schedule 80, Type I, Grade 1 polyvinyl chloride (PVC); threaded both ends; ASTM D1784 and D1785; uniformly grey in color.
- C. Flexible: Factory made and assembled consisting of flexible polyvinyl chloride (PVC) hose fitted at each end with Schedule 40 PVC male adaptors; test rated at 200 psi static.

2.4 SLEEVE FOR CONTROL WIRE AND WATER LINE

- A. PVC 1120-1220, Schedule 40 pipe.

2.5 IRRIGATION CONTROLLER

- A. As shown on the Drawings.

2.6 REMOTE CONTROL VALVES

- A. As shown on the Drawings.

2.7 CONTROL WIRE

- A. As shown on the Drawings.
- B. Splicing Materials: DBR/Y-6 as manufactured by 3M.

2.8 VALVE BOXES FOR REMOTE CONTROL VALVES IN PLANTING AREAS

- A. Model No.: 1419B-12B.
- B. Color of Box and Lid: As shown on Drawings.
- C. Manufacturer: Oldcastle Precast, Inc., 1002 15th Street SW, Auburn, WA 98001, (800) 735-5566.

2.9 VALVE BOXES FOR QUICK COUPLING VALVES IN PLANTING AREAS

- A. Model No.: 910-12B.
- B. Color of Box and Lid: As shown on Drawings.
- C. Manufacturer: Oldcastle Precast, Inc., 1002 15th Street SW, Auburn, WA 98001, (800) 735-5566.

2.10 VALVE BOXES

- A. For Remote Control Valves:
 - 1. Planted Areas: Injection molded of Polyesters and fibrous inorganic temperature resistant components. Box shall provide adequate clearance to operate and service valve. Box and lid to be black, as manufactured by "Oldcastle Precast" or accepted equal.

2.11 QUICK-COUPLING VALVES

- A. Valve and Key: As specified on Drawings.
- B. Valve shall be as shown on the Drawings, 3/4" two-piece brass with locking cover.
- C. Furnish two Rainbird No. 33-DK valve keys fitted with 3/4" swivel hose cells.

2.12 STEEL STAKES AND PIPE CLAMPS

- A. As shown on Drawings.

PART 3 – EXECUTION

3.1 LAYOUT

- A. General: During installation, conform as closely as possible to Drawings. Drawings are diagrammatic to the extent that swing joints, offsets and all fittings are not shown.
- B. Coverage: Make any necessary minor adjustments to layout required to achieve full coverage of irrigated areas at no additional cost to Owner.
- C. Stubouts: Where connections to existing stubouts are required, make necessary adjustments should stubouts be located differently than shown on the Drawings.
- D. Piping: Where piping is shown to be under paved areas but running parallel and adjacent to planted area, install piping in planted areas, unless specifically noted to be installed under paved areas. Do not install directly over another line in same trench.

3.2 TRENCHING

- A. Trench Depths:
 - 1. 18-inch deep over pipe on pressure side of irrigation control valve, control wires and quick-coupling valves.
 - 2. 12-inch deep on non-pressure side of irrigation control valve.
- B. Trench Slopes:
 - 1. Mains: Slope to drain to control valves.
 - 2. Laterals: Slope to or from control valves.

3.3 CONDUITS AND SLEEVES

- A. Conduit: Furnish and install conduit where control wires pass under or through structures or paving. Conduits to be of adequate size to accommodate retrieval for repair of wiring and shall extend 12 inches beyond edges of walls.
- B. Sleeving: Install sleeves for all pipes passing through or under structures or paving as shown on Drawings. Sleeving to be of adequate size to accommodate retrieval of wiring

or piping for repair and shall extend 12 inches beyond edges of paving or other structures.

3.4 PIPE LINE ASSEMBLY

- A. General:
 - 1. Install pipes and fittings in accordance with manufacturer's latest printed instructions.
 - 2. Clean all pipes and fitting of dirt, scales and moisture before assembly.
 - 3. Install pipe fittings with at least 2 inches clearance from other pipes or fittings.
- B. Solvent-Welded Joints for PVC Pipes:
 - 1. Use solvents and methods specified by pipe manufacturer.
 - 2. Let solvents cure a minimum of 1 hour before applying any external stress on the piping and at least 24 hours before placing the joint under water pressure.
- C. Threaded Joints for Swing Joints:
 - 1. Use Teflon tape on threaded PVC fittings for swing joints only.
 - 2. Use strap-type friction wrench only. Do not use metal-jawed wrench.
- D. Laying of Pipe:
 - 1. Remove from trench all rocks or clods 1 inch diameter or larger. Bed pipes in at least 2 inches of soil excavated from trench. Backfill on all sides of piping to provide a uniform bearing.
 - 2. Snake pipe from side to side of trench bottom to allow for expansion and contraction. One additional foot per 100 ft. of pipe is the minimum allowance for snaking.
 - 3. Install pipeline warning tape for all supplyline pipes supplied with well water. Install longitudinally on supplyline and secure with duct tape every 5 feet.
 - 4. Do not lay PVC pipe when there is water in the trench.

3.5 IRRIGATION CONTROL VALVES

- A. Valve Locations: Install control valves where shown on Drawings and group together where practical.
- B. Valve Box Locations: Where two or more valves are installed adjacent to each other, provide at least 6 inches separation between valve boxes and align boxes parallel to each other in a row.
- C. Valve Boxes: Install valve boxes over valves to be flush with accepted finish grade.

3.6 QUICK COUPLING VALVES

- A. Install on a swing joint assembly as detailed on the drawings.

3.7 AUTOMATIC CONTROLLER

- A. General: Install per local code and manufacturer's latest printed instructions.
- B. Connection to Valves: Connect remote valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc.
- C. Labeling: Affix controller name (i.e., "CONTROLLER A") on inside of controller cabinet door with minimum of 1 inch high permanent letters.
- D. Irrigation Diagram: Affix a non-fading copy of irrigation diagram to cabinet door below controller name. Irrigation diagram to be sealed between two plastic sheets 20 mil. minimum thickness. Irrigation diagram shall be a reduced copy of the Record Drawing, clearly showing all valves operated by the controller, station number, valve size, and type of planting irrigated.
- E. Grounding and Certification: Per Manufacturers specifications and requirements.

3.8 CONTROL WIRING

- A. Placement: Install control wires in common trenches with sprinkler mains and laterals wherever possible. Lay to the bottom side of pipe line. Provide a minimum of 3 feet of looped slack at valves.
- B. Splicing: Crimp control wire splices at remote control valves. Seal with specified splicing materials. Line splices will be allowed only on runs of more than 2,500 feet.

3.9 CLOSING OF PIPE AND FLUSHING OF LINES

- A. Capping: Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
- B. Flushing: Thoroughly flush out all water lines before installing heads, valves and other hydrants.
- C. Testing: Test as specified below. Upon completion of testing, complete assembly and adjust sprinkler heads for proper water distribution.

3.10 HYDROSTATIC TESTING

- A. Procedure: Make hydrostatic tests with risers capped when welded PVC joints have cured at least 24 hours. Center load piping with backfill to prevent pipe from moving under pressure. All couplings and fitting shall be exposed. Apply continuous static water pressure of 125 psi as follows:
 - 1. All Piping on the Pressure Side of Control Valves: Four hour test.
 - 2. All Piping on the Non-pressure Side of Control Valves: Two hour test.
- B. Leaks and Retest: Repair leaks observed from tests and repeat testing until system passes tests.

3.11 BACKFILLING AND COMPACTING

- A. Backfill Material at Planting Areas:
 - 1. After system is operating and required tests and reviews have been made, backfill excavations and trenches with clean sand and soil, free of debris.
 - 2. Backfill in 6-inch lifts with compaction performed between each lift.
- B. Backfill Material at Unsleeved Pipe Under Paving: Provide all PVC pipe under paving with minimum of 4 inches of sand backfill on all sides and 24 inches cover to bottom of paving.
- C. Backfill Material at Existing Underground Pipes: Use only backfill material which has been screened to eliminate all material larger than 3/8 inches when backfilling adjacent to existing underground pipe lines.
- D. Backfill Compaction:
 - 1. Regardless of the type of pipe covered, compact to minimum 95% density under pavements, and 85% in planted areas.
 - 2. Compact trenches in areas to be planted by thoroughly flooding or jetting.
 - 3. Compact trenches in paved areas in 6-inch lifts.
- E. Finish Grading: Dress off all areas to accepted finish grades.

3.12 CLEAN-UP

- A. Daily: Keep all areas of work clean, neat and orderly at all times.

- B. Final: Clean up and remove all deleterious materials and debris from the entire work area prior to Final Review.

END OF SECTION

SECTION 32 91 13

SOIL PREPARATION AND SOIL MIXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes planting soils specified by composition of the mixes.
- B. Related Requirements:
 - 1. Section 32 84 00 - Irrigation
 - 2. Section 32 91 19 - Landscape Finish Grading
 - 3. Section 32 93 00 - Planting - for placing planting soil for plantings
 - 4. Section 32 94 00 - Planting Accessories

1.3 DEFINITIONS

- A. Retain terms that remain after this Section has been edited for a project.
- B. AAPFCO: Association of American Plant Food Control Officials.
- C. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or un-amended soil as indicated.
- D. CEC: Cation exchange capacity.
- E. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- F. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- G. Imported Soil: Soil that is transported to Project site for use.
- H. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.

- I. **Manufactured Soil:** Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- J. **NAPT:** North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through inter-laboratory sample exchanges and statistical evaluation of analytical data.
- K. **Organic Matter:** The total of organic materials in soil exclusive of un-decayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- L. **Planting Soil:** Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- M. **RCRA Metals:** Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- N. **SSSA:** Soil Science Society of America.
- O. **Subgrade:** Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- P. **Subsoil:** Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- Q. **Surface Soil:** Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- R. **USCC:** U.S. Composting Council.

1.4 PREINSTALLATION MEETINGS

Pre-installation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. **Product Data:** For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. **Material Certificates:** For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:

- a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
 - c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.
- B. Samples: For each bulk-supplied material, 1 -quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.6 INFORMATIONAL SUBMITTALS

Qualification Data: For each testing agency.

Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Retain "Testing Agency Qualifications" Paragraph below if Contractor or manufacturer selects testing agency or if Contractor is required to provide services of a qualified testing agency in "Field Quality Control" Article. Qualification requirements are in addition to those specified in Section 014000 "Quality Requirements."
- B. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

Laboratory: Subject to compliance with requirements, provide testing by the following, or an approved equivalent laboratory:

- a. Waypoint Analytical, Inc., 4741 E Hunter Avenue, Suite A, Anaheim, CA 92807, www.waypointanalytical.com, (714) 282-8777.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil, imported soil and manufactured lightweight soil mixes for on-structure installations.
- 1. Notify Landscape Architect seven days in advance of the dates and times when laboratory samples will be taken.

Preconstruction Soil Analyses: For each un-amended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.9 SOIL-SAMPLING REQUIREMENTS

General: Extract soil samples according to requirements in this article.

Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Landscape Architect or soil scientist (CPSS) certified by SSSA under the direction of the testing agency.

1. Number and Location of Samples: Minimum of eight representative soil samples from where indicated on Drawings for each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to the University for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.10 TESTING REQUIREMENTS

General: Perform tests on soil samples according to requirements in this article.

Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
 - a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
 - b. Hydrometer Method: Report percentages of sand, silt, and clay.
2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Generally retain "Metals Hazardous to Human Health" Subparagraph below for brown-field redevelopment sites.
4. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
5. Generally retain "Phytotoxicity" Subparagraph below. Some plants are more sensitive to the presence and concentrations of trace minerals.
6. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT WERA-103, including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm and sodium absorption ratio.

14.Soluble-salts ppm.

15.Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.

16.Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil.
2. Generally, adjust soil reaction (pH) only in soils where the pH is near the extreme ends of the acceptable range for the plants indicated.
3. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil.

1.11 DELIVERY, STORAGE, AND HANDLING

Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Regional Materials: Imported soil, manufactured planting soil and soil amendments and fertilizers shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site.

2.2 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Existing, on-site surface soil shall not be used for this project. Refer to requirements of Division 31, Earthwork, for disposition of on-site lime treated soils.
- C. Planting-Soil Type I: Imported, naturally formed soil from off-site sources and consisting of sandy loam soil according to USDA textures; and modified to produce viable planting soil.
 - 1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 6 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass.
 - 2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7.9 and minimum of 4 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
 - 3. Unacceptable Properties: Clean soil of the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches in any dimension.
 - 4. Amended Soil Composition: Blend imported, un-amended soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

- a. Volume of Compost: 3 to 4 cubic yards per 1000 square feet per 6 inches of soil depth.
- b. Weight of Agricultural Gypsum: 30 pounds per 1000 sq. ft. per 6 inches of soil depth.
- c. Weight of Blood Meal: 8 pounds per 1000 sq. ft. per 6 inches of soil depth.

2.3 INORGANIC SOIL AMENDMENTS

- A. If using ground-up, recycled gypsum board debris as a soil amendment, replace or revise "Agricultural Gypsum" Paragraph below or insert another paragraph for this additional material. Coordinate with planting-soil mixes retained in "Planting Soils Specified by Composition" Article.
- B. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

2.4 ORGANIC SOIL AMENDMENTS

Organic Compost:

- 1. The organic amendments, and fertilizer rates and quantities listed in Part Three are to be used for bid basis only. The contractor shall provide a copy of a recent lab analysis (not older than 30 days) and recommendations performed by Methods of Soil Analysis, Part 1, Physical and Mineralogical Methods of Soil Analysis, Part 3 Chemical Methods, Soil Science Society of America, Inc., for compost properties. Adjustments to project costs resulting from the soil report recommendation shall be submitted as a modification of the base bid.
- 2. Compost Properties:
 - a. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%. The organic matter content shall be at least 50% on a dry weight basis.
 - b. The pH of the material shall be between 6 and 7.5.
 - c. The salt content shall be less than 10 millimho/cm @ 25° C. (ECe less than 10) in a saturated paste extract.
 - d. Boron content of the saturated extract shall be less than 1.0 part per million.
 - e. Silicon content (acid-insoluble ash) shall be less than 50%.
 - f. Calcium carbonate shall not be present if to be applied on alkaline soils.
 - g. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.

- h. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
- i. Sludge-based materials are not acceptable.
- j. Carbon:nitrogen ratio is less than 20:1.
- k. The compost shall be aerobic without malodorous presence of decomposition products.
- l. Solvita maturity index 6 or higher.
- m. SAR (sodium adsorption ratio) less than 5.
- n. Seed germination - over 80% germination in saturation extract diluted 1 to 3 in water compared to seeds germinated in deionized water.
- o. Germination vigor - equal to or better than seed length for seeds germinated in deionized water.
- p. Molar ratio of ammoniacal nitrogen to nitrate nitrogen less than 2.
- q. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen.
- r. Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	20	copper	150	selenium	30
cadmium	15	lead	100	silver	10
chromium	100	mercury	10	vanadium	200
cobalt	50	molybdenum	20	zinc	200
nickel	100				

2.5 FERTILIZERS

Blood Meal: Minimum 13 percent nitrogen.

PART 3 - EXECUTION

3.1 GENERAL

- A. Contractor is to provide soil amendments and fertilizers as specified in the soil analysis report prepared by soil testing laboratory. Materials used shall meet all environmental requirements that meet nursery standard and state regulations.
- B. Soil amendments and fertilizers used on project shall be used for both initial soil preparation and planting operations. A formulation for each planting condition and type shall be formulated withing nursery industry standards and will be fully documented

- C. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- D. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Retain "Excavation" Paragraph below if Contractor is required to perform soil excavation and stockpiling.
- B. Excavation: Excavate soil from designated area(s) to a depth of 18 inches and stockpile until amended, unless otherwise indicated on Drawings.
- C. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- D. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. Generally retain this article if existing, on-site soil or imported soil will be amended and applied to areas that have been stripped of existing soils or that have poor existing soils regarded as subgrade.
- B. General: Apply and mix un-amended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- C. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off University's property.
 - 1. Apply, add soil amendments, except compost, and mix approximately half the thickness of un-amended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
- D. Mixing: Spread unamended soil to total depth of 6 inches unless otherwise indicated on Drawings, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix fertilizer with planting soil no more than seven days before planting.

2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 6 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- E. Retain last option in "Compaction" Paragraph below if more than one compaction value is required for different locations.
- F. Compaction: Compact each blended lift of planting soil to 75 to 85 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.
- G. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 BLENDING PLANTING SOIL IN PLACE

- A. Generally retain this article if existing, unamended, on-site surface soil is amended without excavating to produce planting soil.
- B. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- C. Preparation: Till unamended, existing soil in planting areas to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off University's property.
- D. Retain option in "Mixing" Paragraph below if applying compost component of planting-soil mix to surface and lightly tilling in lieu of blending compost throughout planting-soil mix.
- E. Mixing: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.
 1. Mix fertilizer with planting soil no more than seven days before planting.
- F. Retain last option in "Compaction" Paragraph below if more than one compaction value is required for different locations.
- G. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

- A. Generally retain this article if applying a separate compost layer or applying the compost component of a planting-soil mix to surface of in-place planting soil in lieu of blending compost throughout the planting-soil mix.

- B. Application: Apply compost component of planting-soil mix 6 inches of compost to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- C. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.6 PLACEMENT OF MANUFACTURED LIGHTWEIGHT SOIL MIX ON STRUCTURE

- A. Verify placement of perforated drain pipe, drain rock and drainage mat, filter fabric, polystyrene fill, protection board and filter fabric prior to soil mix placement.
- B. Coordinate placement of soil mix with the irrigation system installation and planter drain and clean out locations. Protect irrigation equipment and drainage structures during placement.
- C. Install soil mix in 9-inch maximum lifts. Install soil mix layers to depths as indicated on Drawings.
- D. Compact each lift by thoroughly watering or jetting in the entire planting area. Maximum compaction to 85 percent relative compaction.

3.7 FIELD QUALITY CONTROL

- A. Retain "Testing Agency" and "Perform the following tests(and inspections)" paragraphs below to identify who shall perform tests and inspections. If retaining second option in "Testing Agency" Paragraph, or if retaining "Perform the following tests(and inspections)" Paragraph, retain "Field quality-control reports" Paragraph in "Informational Submittals" Article.
- B. Testing Agency: University will engage a qualified testing agency to perform tests and inspections.
- C. Retain "Perform the following tests(and inspections)" Paragraph below to require Contractor to perform tests and inspections.
- D. Perform the following tests:
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.
 - 2. Soil Testing Lab report to include soil fertility, agricultural suitability, particle size appraisal, pH, salinity, nitrate. ammonium, phosphate, potassium, calcium, magnesium, boron, sodium absorption rate (SAR), organic content, and infiltration rate. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.

- E. See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.
- F. Soil will be considered defective if it does not pass tests.
- G. Prepare test reports.
- H. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.8 PROTECTION

- A. Revise "Protection Zone" Paragraph below to suit Project. Delete if referenced Section is not used.
- B. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- C. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
- D. If planting soil or subgrade is over-compacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Landscape Architect and replace contaminated planting soil with new planting soil.

3.9 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off University's property unless otherwise indicated.
 - 1. Retain subparagraph below if required; revise to suit Project.

2. Dispose of excess subsoil and unsuitable materials on-site where directed by the University.

END OF SECTION

SECTION 32 91 19

LANDSCAPE FINISH GRADING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following: Landscape Finish Grading.
- B. Related requirements:
 - 1. Section 32 01 90 - Landscape Maintenance
 - 2. Section 32 91 13 - Soil Preparation and Soil Mixes
 - 3. Section 32 84 00 - Irrigation
 - 4. Section 32 93 00 - Planting

1.3 PROJECT/SITE CONDITIONS

- A. Existing Conditions: For protection of existing trees to remain, see Division 01, Section "Temporary Tree and Plant Protection".
- B. Prior to fine grading, Contractor shall verify that the rough grading, under drainage system, planting soil mixes and irrigation system have been accepted.
- C. Dust Nuisance: Assume full responsibility for alleviation or prevention of dust as a result of grading work.

1.4 SEQUENCING AND SCHEDULING:

- A. Complete all finish grading prior to installation of irrigation systems in each area graded.
- B. Regrade as required to finish grades established by Landscape Architect once the irrigation system is installed.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Verify that the following items have been completed prior to commencement of finish grading:
 - 1. Installation of topsoil and soil preparation including debris removal.
 - 2. Incorporation of soil amendments.
 - 3. Prior to fine grading, Contractor shall verify that the rough grading, under drainage system, planting soil mixes and irrigation system have been accepted.

3.2 INSTALLATION

- A. Provide all grades for natural runoff of water without low spots or pockets. Accurately set flow line grades at 2 percent minimum gradient unless otherwise noted in Drawings.
- B. Finish grades shall be smooth, even and on a uniform plane with no abrupt changes of surface. Slope uniformly between given spot elevations.
- C. Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given, or between points established by walks, paving, curbs or catch basins.
- D. Tops and toes of all slopes shall be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.
- E. Trenching for drainage shall not extend into the bearing angle off of the foundation.
- F. Drainage designed so as not to have landscape area drain over sidewalks.
- G. Surface drainage shall drain to drains/catch basins in planting areas and in paved areas.
- H. The subgrade shall be inspected prior to the start of subsoil placement for conformance with the Drawings for elevations of subgrade relative to finish grade. Subgrade shall be graded smooth and parallel to the finish grades.
- I. Where settling occurs, before final acceptance or during the warranty period, remove finish surfacing, backfill with additional approved material, compact to specified rates, and restore any disturbed areas to a condition acceptable to the City.
- J. Protect newly graded areas from traffic, freezing and erosion. Keep free of trash, debris or construction materials from other work.
- K. Set sufficient grade stakes for checking the finished grades. Stakes must be set at the bottom and top of slopes and the centers of plant beds. Grades shall be established which are

accurate to 1/10th of a foot either way. Connect contours and spot elevations with an even slope. All grading will insure drainage away from structures.

- L. After topsoil or planting soil mix has been spread, it shall be carefully prepared by scarifying and hand raking. All large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter, and stones over one inch in diameter shall be removed from the topsoil. Topsoil shall also be free of smaller stones in excessive quantities as determined by the Landscape Architect.
- M. Fine grade planted areas to smooth, free draining, even surfaces with fine texture. Roll, rake and drag areas to flatten ridges and fill depressions, except as select areas shown on drawings. Control moisture content to maintain optimum conditions, but do not create a muddy condition.
- N. Rolling - Typical: Roll the entire area with a hand roller weighing not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional topsoil and the surface shall be regraded and rolled until presenting a smooth and even finish to the required grade or to the shapes and configurations as shown on the details.
- O. Maintenance and Restoration: Restore prepared areas to specified condition if eroded, settled, or otherwise disturbed after fine grading and prior to lawn planting. Restore area disturbed by planting to achieve full healthy growth as approved by Landscape Architect. Vehicular traffic routes must conform to pre-approved routing of construction operations.
- P. Driving over new lawns: The Contractor is strictly prohibited from tracking or driving over new lawns or planted areas.
- Q. Grades not otherwise indicated to be uniform slopes between points where elevations are given, or between points established by paving, curbs or catch basins.
- R. Round tops and toes of all slopes to produce a gradual, natural-appearing transition between relatively level areas and slopes.

3.3 TOLERANCES

- A. All planting areas, including lawn areas, shall be true to grade within 1 in. when tested with a 10 ft. straightedge.
- B. Hold finished grades below top of adjacent pavement, headers, curbs, or walls as follows:
- C. Shrub and Groundcover Areas: 1-1/2 inches.
- D. Sodded Lawn Areas: 1 inch.
- E. Planters: 2 inches.

END OF SECTION

SECTION 32 93 00

PLANTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes: Plants.
- B. Related Requirements:
 - 1. Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.
 - 2. Section 32 01 90 - Landscape Maintenance
 - 3. Section 32 91 13 - Soil Preparation and Soil Mixes
 - 4. Section 32 91 19 - Landscape Finish Grading
 - 5. Section 32 84 00 - Irrigation
 - 6. Section 32 94 00 - Planting Accessories

1.3 REFERENCES

- A. "An Annotated Checklist of Woody Ornamental Plants of California, Oregon and Washington, (Number 4091)", McClintock and Leiser, Division of Agricultural Sciences, University of California, 1979.
- B. "American Standard for Nursery Stock", ANZI z.60.1-2004 Edition, American Association of Nurserymen, Inc.

DEFINITIONS

- A. Retain terms that remain after this Section has been edited for a project.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation.

- C. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than sizes indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- D. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.
- E. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.
- F. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- G. Finish Grade: Elevation of finished surface of planting soil.
- H. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- I. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- J. Planting Area: Areas to be planted.
- K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation and Soil Mixes" for drawing designations for planting soils.
- L. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- M. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- N. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- O. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

COORDINATION

Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.5 PREINSTALLATION MEETINGS

Pre-installation Conference: Conduct conference at Project site.

ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 50 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

1.7 INFORMATIONAL SUBMITTALS

Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of university's contact persons.

Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

Maintenance Data: Recommended procedures to be established by University for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.

Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.

2. Experience: Five years' experience in landscape installation in addition to requirements in Division 1.
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

Personnel Certifications: Installer's field supervisor shall have certification in all of the following categories from the Professional Landcare Network:

- a. Landscape Industry Certified Technician - Exterior.
- b. Landscape Industry Certified Interior.
- c. Landscape Industry Certified Horticultural Technician.
5. Pesticide Applicator: State licensed, commercial.

- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

Selection of plants purchased under allowances is made by Landscape Architect, who tags plants at their place of growth before they are prepared for transplanting.

- C. Revise "Measurements" Paragraph below to suit Project.

- D. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.

2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

- E. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries,

and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

1.10 DELIVERY, STORAGE, AND HANDLING

Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

- B. Bulk Materials:
 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk materials with appropriate certificates.
- C. Deliver bare-root stock plants within 36 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.
- D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- E. Handle planting stock by root ball.
- F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

Apply anti-desiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with anti-desiccant at nursery before moving and again two weeks after planting.
- H. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

- I. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.

2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.11 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Planting Restrictions: Delay shipment and planting during freeze periods. Replace plants killed or disfigured by freeze or frost conditions.
- C. Coordinate planting periods with maintenance periods to provide continuous required maintenance from date of Substantial Completion.
- D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by the University.
 - b. Structural failures including plantings falling or blowing over.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Periods: From date of Substantial Completion.

- a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 3 months.
3. Include the following remedial actions as a minimum:
- a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

Annuals and Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

FERTILIZERS

- A. Green Cross, available from Bioscape Inc., Petaluma, CA (877) 246-7227.
- B. Organic Biolink Fertilizer available from Westbridge Agricultural Products, www.westbridge.com (800) 876-2767.
- C. Or approved equivalent.

2.3 PESTICIDES AND HERBICIDES

General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

- B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer. Use one of the following products or acceptable equivalent:
 - 1. 100% organic, corn gluten meal weed suppressant "Bio-Weed" available from Bioscape Inc., Petaluma, CA (877.246.7227).
 - 2. Weedban corn gluten meal by Fertrell Company, www.fertrell.com (717.367.1566).
- C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated. Use one of the following products or acceptable equivalent:
 - 1. "Scythe" natural herbicide by Mycogen Corp., San Diego, CA (800.745.7476).
 - 2. "Weed Zap" available from JH Biotech, www.jhbiotech.com (800.650.8933).

Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per pound of vesicular-arbuscular mycorrhizal fungi and 95 million spores per pound of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
 - 3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

- D. Slow-release Fertilizer Tablets: Place evenly distributed in plant pits when backfilled 2/3 according to the following schedule or per Manufacturer's latest specifications.
 - (Container stock)
 - 1 gallon can - 2 tablets
 - 5 gallon can - 4 tablets
 - 15 gallon can - 6 tablets
 - (B & B stock)
 - 1 tablet per 1/2 in. caliper or 1 ft. of height, whichever is less

- E. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement, mix planting soil and place soil and soil mixes according to Section 32 91 13 "Soil Preparation and Soil Mixes."

Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

Application of Mycorrhizal Fungi: At time directed by Landscape Architect, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES AND SHRUBS

Planting Pits and Trenches: Excavate circular planting pits.

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
2. Retain first two subparagraphs below if applicable. Retain one of four options in first subparagraph to suit Project.
3. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
9. Retain subparagraph below if applicable.
10. If sub-drain pipe is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.

Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

- C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
 - 1. Backfill: Planting soil as indicated on Drawings.
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting fertilizer equally distributed around each planting pit when pit is approximately one-half filled in accordance with manufacturer's recommendations. Do not place fertilizer in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
 - 1. Backfill: Planting soil as indicated on Drawings.
 - 2. Carefully remove root ball from container without damaging root ball or plant.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Place fertilizer equally distributed around each planting pit when pit is approximately one-half filled. Place fertilizer beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

Remove only dead, dying, or broken branches. Do not prune for shape.

- B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.7 PLACING SOIL IN PLANTERS

- A. Place a layer of drainage gravel with filter fabric and fill planters as specified in Section 32 94 00 - Landscape Accessories.
- B. Fill planter with planting soil per Section 32 91 13 "Soil Preparation and Soil Mixes".

3.8 GROUND COVER AND PLANT PLANTING

- A. Revise spacing in first paragraph below to suit Project. Insert spacing for each plant if preferred, or indicate spacing on Drawings.
- B. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.
- C. Retain first paragraph below if planting-soil type is not indicated on Drawing; revise if other types of backfill are required.
- D. Use planting soil per Section 32 91 13 - Soil Preparation and Soil Mixes and as indicated for backfill.
- E. Dig holes large enough to allow spreading of roots.

- F. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
- G. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- H. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- I. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- J. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.9 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.10 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with University's operations and others in proximity to the Work. Notify University before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.11 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Landscape Architect.
 - 1. Submit details of proposed pruning and repairs.

2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.

Remove and replace trees that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree of 4 inches or smaller in caliper size.

Species of Replacement Trees: Species selected by Landscape Architect.

3.12 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off University's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.
- E. Retain paragraph below if tree-watering devices are required.
- F. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.13 MAINTENANCE SERVICE

Maintenance Service for Plants, per Section 32 01 90 - Landscape Maintenance: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION

SECTION 32 94 00

PLANTING ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Root Ball Fixing System
2. Metal Landscape Edging
3. Mulch Materials
4. Asphalt Edge Restraint
5. Gravel Band

B. Related Requirements:

1. Section 32 01 90 - Landscape Maintenance
2. Section 32 91 13 - Soil Preparation and Soil Mixes
3. Section 32 91 19 - Landscape Finish Grading
4. Section 32 93 00 - Planting

1.3 SUBMITTALS

- A. Furnish four (4) copies of manufacturer's literature for products specified under this Section.

B. Samples:

1. Metal Landscape Edging: Six-inch section of specified type, size, and finish.
2. Mulch Materials: 5-lb bag of samples of each specified.
3. Asphalt Edge Restraint: Six-inch section of specified type, size, and finish.
4. Gravel Band Aggregate: 5-lb bag of samples of each specified aggregate.



1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of planting accessory from single source from single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping

- 1. Provide materials in original, unopened containers with manufacturer's labels intact and legible.

B. Acceptance at Site

- 1. Damaged materials will not be accepted, as determined by visual inspection.
- 2. Rejected materials shall be removed from project site immediately.

C. Storage and Protection

- 1. Store materials in flat, dry area in manufacturer's protective packaging, in original containers with labels and instructions intact.

1.6 CLEAN-UP

- A. Keep all areas of work clean, neat and orderly at all times. Keep all paved areas clean during planting and maintenance operations. Clean up and remove all deleterious materials and debris from the entire work area prior to beginning of landscape maintenance period to the satisfaction of the University's Representative.

PART 2 PRODUCTS

1.7 ROOTBALL FIXING SYSTEM

- A. Contractor shall use staking materials, necessary to meet requirements of specifications, subject to approval of Landscape Architect:
 - 1. Tree Stakes:
 - a. Platypus Rootball Fixing System, with Plati-Mat.
 - b. Or equal, as approved by Landscape Architect

1.8 METAL LANDSCAPE EDGING

- A. Manufacturer:
 - 1. Sure-loc Corporation, Holland, MI, (800) 787- 3562.
 - 2. Or equal, as approved by Landscape Architect.



- B. Model: Steel, 1/4" thickness by 5 inches deep, in 16' sections.
- C. Color and Finish: black, powder coated.
- D. Stakes: Tapered steel, a minimum of 12 inches long.
- E. Accessories: Standard tapered ends, corners, and splicers, to match edging.

1.9 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of the following:
 - 1. Type-1: Lyngso – Premium Arbor Mulch or equal
 - 2. Color: Natural

1.10 ASPHALT EDGE RESTRAINT

- A. Manufacturer:
 - 1. Permaloc Edging, (616) 399-9600.
 - 2. Or equal, as approved by Landscape Architect.
- B. Model: Aluminum, 4" x 3", .21" thickness in 8' sections.
- C. Color and Finish: black.
- D. Stakes: Tapered steel, a minimum of 12 inches long.
- E. Accessories: Standard tapered ends, corners, and splicers, to match edging.

1.11 GRAVEL BAND

- A. Install gravel band as indicated on Drawings.

PART 3 EXECUTION

1.12 EXAMINATION

- A. Check to ensure that all underground lines, irrigation hoses, and other cables are installed below the maximum depth of edging, root barrier, and stakes to be installed.
- B. Any damage to site work or structures due to installation of planting accessories shall be repaired at the expense of the Contractor.

1.13 ROOTBALL FIXING SYSTEM

- A. Rootball fixing shall be completed immediately after planting. Trees shall stand plumb after rootball fixing.



1. Install rootball fixing system per manufacturer's specifications.

1.14 METAL LANDSCAPE EDGING

- A. Install edging as indicated on Drawings. Install edging according to manufacturer's written instructions, unless otherwise noted. Anchor edging with stakes approximately 30 inches apart, driven below top elevation of edging.
- B. Top of edging shall not exceed 1/2" above adjacent finish grade.

1.15 MULCHING

- A. Mulch planting area surfaces and other areas as indicated on Drawings.

END OF SECTION



This Page Left Intentionally Blank.

Section 33

Utilities

SECTION 33 42 11

STORMWATER GRAVITY PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Storm drainage piping, fittings, and accessories.
2. Connection of drainage system to municipal sewers.
3. Drain inlets, plant area drains, paved area drainage, site surface drainage, and swales.

B. Related Requirements:

1. Section 31 23 33: Trenching and Backfilling.

C. Reference Standards:

1. American Association of State Highway and Transportation Officials (AASHTO) M252: Standard Specification for Corrugated Polyethylene Drainage Pipe.
2. AASHTO M294: Standard Specification for Corrugated Polyethylene Pipe, 300- to 1,500-millimeter (mm; 12- to 60-inch) Diameter.
3. ASTM-International (ASTM) D2680: Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Polyvinyl Chloride (PVC) Composite Sewer Piping.
4. ASTM F667: Corrugated polyethylene tubing and fittings.
5. ASTM D1056: Specification for Flexible Cellular Materials: Sponge or Expanded Rubber.
6. ASTM D1248: Specification for Polyethylene Plastics Molding and Extrusion Material.
7. ASTM D3350: Specification for Polyethylene Plastics Pipe and Fittings Materials.
8. ASTM D2321: Standard practice for underground installation.

1.2 SUBMITTALS

A. See "Section 01 33 00 Submittal Procedures."

B. Product Data: Provide data indicating pipe, pipe accessories, and area drains.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 STORM WATER DRAINAGE PIPE MATERIALS

- A. Provide pipe and associated materials of the size indicated on the Drawings and meeting the following requirements:
1. High-density Polyethylene Pipe (HDPE):
 - a. Acceptable products:
 - i. "N-12" Dual Wall High Density Polyethylene storm drain pipe and fittings, manufactured by Advanced Drainage Systems, 4640 Trueman Boulevard, Hillard, OH 43026. Phone: (800) 821-6710, Fax: (614) 658-0204.
 - ii. Or approved equivalent.
 - b. Storm drain pipe shall be N-12 dual wall high density polyethylene corrugated exterior/smooth interior pipe. Pipe and fitting shall be "Water Tight."
 - c. Perforated subdrain pipe shall be N-12 dual wall HDPE corrugated exterior/smooth interior pipe. Pipe and fittings shall be "Soil Tight." Perforated HDPE subdrain pipe may be substituted with perforated SDR 35 PVC, if approved by the engineer.
 - i. Maximum perforation width: 0.125 inches
 - ii. Maximum Perforation length: 0.875 inches
 2. High-density Polyethylene material shall comply with:
 - a. AASHTO M252 for material from 3 to 10 inches in size.
 - b. AASHTO M294 for material 12 to 36 inches in size.
 - c. ASTM D1248 for standard specifications for Polyethylene Plastics Molding and Extrusion Materials.
 - d. ASTM D3350 for pipe and fitting.
 - e. ASTM D2321 standard practice for underground installation.
 3. Joints and Fittings:
 - a. The material supplied under this specification shall be N-12 dual wall high density polyethylene corrugated exterior/smooth interior pipe. Pipe and fittings shall match the pipe classification ("Soil Tight" or "Water Tight").
 - b. All fittings shall conform to AASHTO M294.
 4. Banded Shielded Couplings:
 - a. Banded Shielded Coupling: 300 series stainless steel shear bands, minimum thickness of 0.012 inches, and 316 stainless steel clamps with nut and bolt take up.



- b. Coupling bands shall cover at least one full corrugation on each section of pipe. When gasketed couple bands are required, the gasket shall be made of closed-cell synthetic expanded rubber meeting the requirements of ASTM D1056, Grade RE42. All coupling bands shall meet or exceed the soils-tightness requirements of the AASHTO Standard Specifications for Highway Bridges, Section 23, paragraph 23.3.2.5.4.(e).

2.2 DRAIN INLETS, TRENCH DRAIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. General:

1. Construct manholes, inlets, and junction structures of reinforced concrete or precast reinforce concrete, complete with metal frames and covers or gratings, and with fixed ladder rungs where indicated on the Drawings or required by codes. Prefabricated structures may be used when shown on the plans and approved by the engineer. Supporting documentation must be provided to indicate that the prefabricated structures are acceptable for use at the designed burial depths.
2. Rungs shall be individual wall-mounted aluminum, plastic-covered steel, or galvanized steel rungs are acceptable.

B. Materials:

1. Mortar for pipe joints and connections to other drainage structures, and manhole construction:
 - a. Comply with requirements of ASTM C270, type M, except the maximum placement time shall be 1 hour.
 - b. Hydrated lime complying with ASTM C141, type B, may be added to the mixture of sand and cement in an amount equal to 25% of the volume of cement used.
 - c. Provide a quantity of water in the mixture sufficient to produce a stiff workable mortar, which shall be clean and free from harmful acids, alkalis, and organic impurities. Use the mortar within 30 minutes after water is added to the mix.
2. Precast reinforced concrete manholes:
 - a. Comply with ASTM C478, precast rings and cone sections.
 - b. Fully bed the joints between precast concrete risers and tops in mortar, and smooth both interior and exterior surfaces uniformly.
 - c. Acceptable products:
 - i. Manufactured by Jensen Precast.
 - ii. Manufactured by Oldcastle.
 - iii. Approved equivalent.
3. Landscape area drains shall be Nyloplast drain basins, or approved equal.



4. Reinforcement: Provide intermediate grade billet steel complying with ASTM A615, grade 40.
5. Frames and covers or gratings:
 - a. Provide all gratings or covers from the same manufacturer.
 - b. Frames and grates for precast reinforced drain inlets shall be galvanized steel or ductile iron.
 - c. Grates for landscape area drains shall be bronze screw-down grates.
 - d. Grates located in pedestrian travel areas shall be Americans with Disabilities Act (ADA) compliant.
6. Precast concrete catch basins:
 - a. Provide reinforced and bottom open for field pouring to ensure slope through the structure.
 - b. Contractor may select this option in lieu of cast-in-place concrete catch basins
 - c. Acceptable products:
 - i. Manufactured by Jensen Precast.
 - ii. Manufactured by Oldcastle.
 - iii. Approved equivalent.
 - d. Manufacturer is responsible for the design of drain inlets and ensuring that the design is adequate for the proposed burial depths, loading conditions, and pipe connections.

2.3 IN-LINE DRAINS AND CATCH BASINS

- A. In-Line Drains: In-line drains (trench drains) shall be ACO KlassikDrain or approved equal. Specific model of KlassikDrain is indicated on the plans.
- B. Catch Basins: In-line drain catch basins shall be ACO K1-901 G/S or approved equal.
- C. Grates shall be ADA accessible. Traffic rated grates at locations indicated on the plans.

2.4 BEDDING AND COVER MATERIALS

- A. See "Section 31 23 33 Trenching and Backfilling," and project plans.

PART 3 EXECUTION

3.1 PRODUCT HANDLING

- A. Comply with pertinent provisions of "Section 01 60 00 Product Requirements."



3.2 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the work.
- C. Do not proceed until unsatisfactory conditions are corrected.

3.3 TRENCHING AND BACKFILLING

- A. See "Section 31 23 33 Trenching and Backfilling."

3.4 INSTALLATION - PIPE

- A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.
- B. General:
 - 1. Carefully examine each pipe prior to placing:
 - a. Promptly set aside defective pipe and damaged pipe.
 - b. Clearly identify defects.
 - c. Do not install defective pipe or damaged pipe.
 - 2. Place pipe to the grades and alignment indicated, with a tolerance of one in 1,000 vertical and one in 500 horizontal, unless otherwise directed by the Architect.
 - 3. Provide adequate facilities for lowering pipe safely into the trenches.
 - 4. Do not place pipe in water, nor place pipe when trench or weather is unsuitable for such work.
- C. PVC pipe joints: Install with the specified materials and in accordance with the manufacturer's recommendations as approved by the Engineer, applying solvent cement to pipe and fitting.
- D. HDPE: Installation shall be in accordance with ASTM D2321 and as recommended by the pipe manufacturer. Backfill shall be ASTM D2321 Class I, II, or III soils, or Unified Soil Classification System (USCS) material corresponding to these ASTM designations.
- E. Joining pipes of different materials: Provide fittings or couplings made for the pipe material jointing, or provide a concrete collar as approved by the Engineer.
- F. Joining pipe of different sizes:
 - 1. Provide reducer fittings to the larger pipe.
 - 2. Where pipes are different materials as well as different sizes, use the same material for reducer fittings as in the larger pipe.
 - 3. Use saddle connection when branch lines join a main or collector main.



4. Use eccentric coupler and maintain a continuous flowline, when the slope of the pipe is less than 1%.
 - G. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
 - H. Connect to building storm drainage system, foundation drainage system, and utility/municipal sewer system.
- 3.5 INSTALLATION - CLEANOUTS
- A. Form bottom of excavation clean and smooth to correct elevation.
 - B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.
 - C. Establish elevations and pipe inverts for inlets and outlets as indicated.
 - D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.
- 3.6 FIELD QUALITY CONTROL
- A. Perform field inspection in accordance with Division 01: General Requirements.
 - B. Visually inspect the pipe for deflection:
 1. Deflection is limited to 7.5% of the base diameter.
 2. If the visual inspection determines the pipe may have deflection problems, the engineer can direct a mandrel test be performed.
 3. Such test will be performed at the contractor's expense.
 - C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
- 3.7 PROTECTION
- A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION



This Page Left Intentionally Blank.

Eureka, CA | Redding, CA | Willits, CA | Fort Bragg, CA | Coos Bay, OR | Klamath Falls, OR | Lakeview, OR

