

Project Manual

for

University of Colorado Denver (UCD) Anschutz Medical Campus (AMC)

Anschutz Medical Campus Quentin Street & Rock Lots Lighting

AMC Project # 23-128743

Clanton & Associates Project # 22098

University of Colorado Denver
Anschutz Medical Campus
Aurora, CO

Issue for Construction
July 7, 2023

CLANTON & ASSOCIATES



LIGHTING DESIGN AND ENGINEERING

TABLE OF CONTENTS

SECTION 00 01 10 – Page 1

PROJECT: Anschutz Medical Campus Quentin Street & Rock Lots Lighting
CLIENT: University of Colorado Denver (UCD) / Anschutz Medical Campus (AMC)
LOCATION: Aurora, Colorado

TITLE	PAGE
-------	------

PROCEDURAL DOCUMENTS / CONTRACT DOCUMENTS

DIVISION 00 CONTRACT REQUIREMENTS

Advertisement for Bids	1 – 2
Information for Bidders (SBP-6.12)	1 – 2
Bid Form (SBP-6.13)	1 – 2
Bid Alternates (SBP-6.131)	1 – 1
Bid Bond (SBP-6.14)	1 – 1
Contractor's Design/Bid/Build Agreement (SC-6.21)	1 – 12
Performance Bond (SC-6.22)	1 – 2
Labor and Material Bond (SC-6.221)	1 – 2
The General Conditions of the Contractor's Design/Bid/Build Agreement (SC-6.23)	1 – 54
Certification and Affidavit Regarding Unauthorized Immigrants	1 – 1
Asbestos Contaminated Soil Management Standard Operating Procedure Document	1 – 38
Section 00 73 46 – WAGE DETERMINATION SCHEDULE	1 – 1

TECHNICAL SPECIFICATIONS

DIVISION 01 GENERAL REQUIREMENTS

Section 01 00 00 – GENERAL REQUIREMENTS	1 – 1
Section 01 10 00 – SUMMARY	1 – 7
Section 01 18 00 – PROJECT UTILITY SOURCES	1 – 3
Section 01 22 00 – UNIT PRICES	1 – 3
Section 01 25 00 – SUBSTITUTION PROCEDURES	1 – 3
Section 01 26 00 – CONTRACT MODIFICATION PROCEDURES	1 – 3
Section 01 29 00 – PAYMENT PROCEDURES	1 – 5
Section 01 31 00 – PROJECT MANAGEMENT AND COORDINATION	1 – 12
Section 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION	1 – 5
Section 01 33 00 – SUBMITTAL PROCEDURES	1 – 10
Section 01 35 44 – SPECIAL PROCEDURES FOR ENVIRONMENTAL HEALTH AND SAFETY AND FIRE AND LIFE SAFETY	1 – 4
Section 01 35 96 – SPECIAL PROCEDURES FOR PROPERTY PROTECTION	1 – 1
Section 01 40 00 – QUALITY REQUIREMENTS	1 – 9
Section 01 41 00 – REGULATORY REQUIREMENTS	1 – 4
Section 01 42 00 – REFERENCES	1 – 17
Section 01 50 00 – TEMPORARY FACILITIES AND CONTROLS	1 – 7
Section 01 60 00 – PRODUCT REQUIREMENTS	1 – 5

Section 01 73 00 – EXECUTION	1 – 10
Section 01 77 00 – CLOSEOUT PROCEDURES	1 – 6
Section 03 30 00 – CAST-IN-PLACE CONCRETE	1 – 1

SECTION 00 73 46 - WAGE DETERMINATION SCHEDULE

PART 1 - GENERAL

1.1 DAVIS-BACON WAGE DETERMINATIONS

- A. Davis-Bacon wages shall not apply to this project.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 00 73 46

SECTION 01 00 00 - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Design Requirements:

1. **Designer Responsibility:** Based on a series of meetings with the University Project Manager and applicable University staff, draft Division 01 Specification Sections consistent with State of Colorado Construction Contract provisions, General and Supplementary Conditions of the Contract, including requirements for administrative procedures consistent with the size and scope of the project.
2. **Content:** Include, as applicable, the following Sections:
 - a. SECTION 01 00 00 – SUMMARY.
 - b. SECTION 01 18 00 – PROJECT UTILITY SOURCES.
 - c. SECTION 01 22 00 – UNIT PRICES
 - d. SECTION 01 25 00 – SUBSTITUTION PROCEDURES.
 - e. SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES.
 - f. SECTION 01 29 00 – PAYMENT PROCEDURES
 - g. SECTION 01 31 00 – PROJECT MANAGERMENTS AND COORDINATION.
 - h. SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION.
 - i. SECTION 01 33 00 – SUBMITTAL PROCEDURES.
 - j. SECTION 01 35 44 – SPECIAL PROCEDURES FOR ENVIRONMENTAL HEALTH AND SAFETY AND FIRE AND LIFE SAFETY.
 - k. SECTION 01 35 96 – SPECIAL PROCEDURES FOR PROPERTY PROTECTION.
 - l. SECTION 01 40 00 – QUALITY REQUIREMENTS.
 - m. SECTION 01 41 00 – REGULATORY REQUIREMENTS.
 - n. SECTION 01 42 00 – REFERENCES.
 - o. SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS.
 - p. SECTION 01 60 00 – PRODUCT REQUIREMENTS.
 - q. SECTION 01 73 00 – EXECUTION.
 - r. SECTION 01 77 00 – CLOSEOUT PROCEDURES
 - s. SECTION 01 77 00A – CLOSEOUT PROCEDURES APPENDIX A
 - t. SECTION 01 77 00B – CLOSEOUT PROCEDURES APPENDIX B
 - u. SECTION 01 78 23 – OPERATION AND MAINTENANCE DATA.
 - v. SECTION 01 78 39 – PROJECT RECORD DOCUMENTS.
 - w. SECTION 01 78 46 – EXTRA STOCK MATERIALS.
 - x. SECTION 01 79 00 – DEMONSTRATION AND TRAINING.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 00 00

SECTION 01 10 00

SUMMARY

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. Project information.
2. Work covered by Contract Documents.
3. Work by University.
4. Work under separate contracts.
5. University-furnished and installed products.
6. University-furnished, Contractor-installed products.
7. Access to site.
8. Coordination with occupants.
9. Work restrictions.
10. Specification and drawing conventions.

- B. Related Requirements:

1. Section 01 35 46 "Indoor Air Quality Procedures" for requirements and procedures related to maintaining air quality in adjacent occupied spaces and buildings.
2. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of University's facilities and for the provision of temporary construction barriers and dust partitions.

1.3 PROJECT INFORMATION

- A. Project Identification: Quentin Street & Rock Lots Lighting. AMC Project #23-128743

1. Project Location: Anschutz Medical Campus, Aurora CO 80045

- B. Principal Representation: University of Colorado Anschutz Medical Campus

1. University's Representative: David Perkins

- C. Engineer: Dane Sanders, Clanton & Associates, Inc

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and, in summary, briefly consists of the following:
 - 1. Improvements to the exterior roadway and parking lot lighting around the University of Colorado Anschutz Medical Campus. Improvements include removal and replacement of existing luminaires in select locations, instillation of new luminaires and light standards, and electrical infrastructure.

1.5 WORK BY UNIVERSITY

- A. General: Cooperate fully with University so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by University. Coordinate the Work of this Contract with work performed by University.

1.6 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.7 UNIVERSITY-FURNISHED AND INSTALLED PRODUCTS

- A. University will furnish certain items of equipment/furnishings as shown on the Drawings. Contractor will be responsible for coordinating their work to accommodate these items including, but not limited to, physical space fit, utility connections and rough-in, power wiring and electrical characteristics.
- B. Include in Project scheduling the latest times when information for such items is required and so notify the University in writing.

1.8 UNIVERSITY-FURNISHED, CONTRACTOR-INSTALLED PRODUCTS

- A. The University will furnish certain items delivered to the jobsite as shown on the drawings. Contractor will receive, unload, move, set in position, anchor and connect such items and put them into operating condition.
- B. The Contractor will be responsible for coordinating their work to accommodate these items including, but not limited to, physical space fit, utility connections and rough-in, power wiring and electrical characteristics.
- C. Include in Project scheduling the latest times when information for such items is required and so notify the University in writing.
- D. Cooperate with University in scheduling the delivery of these items and be responsible for accommodating their storage and protection in the building and their replacement or repair due to damage as a result of Contractor's operations.

1.9 ACCESS TO SITE

- A. General: Contractor shall have limited and restricted use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Adjust means and methods of construction based on site limits and restrictions.
 - 2. Locate staging areas only where permitted by University.
 - 3. As part of this Project, replace damaged lawns, sprinkler systems, sidewalks and any other existing site improvements within staging area and access ways.
- C. Construction Access and Travel:
 - 1. Use only those entrances, exits, and travel ways on campus roads and within the building designated by University. Contractor's personnel are not permitted in non-designated areas of University's existing facilities. Use only designated travel ways for transporting demolition materials, new construction materials, tools and equipment.
 - 2. Use of other than designated travel ways on campus roads and within existing buildings requires a minimum of 20 business days prior approval by University.
 - a. Request variations to traffic flow including temporary fire lane, parking lot, sidewalk and road closures, regulatory signage, and traffic control devices in accordance with University "Procedure for Approval of Regulatory Signage, Traffic Control Devices and for Street Closures at the Anschutz Medical Campus" and "AMC Campus Street and Parking Lot Closure Request" available through University Project Manager.
 - 3. Access to the site will be as permitted by the University. Prearrange delivery and use of cranes, heavy trucks and other heavy equipment at least 72 hours prior to need through the University's Project Manager and University Police.
 - 4. Maintain access to fire lanes and campus operations at all times. Provide flag personnel during the ingress or egress of large equipment.
 - a. When fire lanes and/or access way must be temporarily disrupted notify University Police and University Parking and Transportation at least 20 business days in advance and reconfirm 72 hours in advance through the University's Project Manager.
 - 5. Arrange for and obtain all necessary permits from City of Aurora for any disruption to or temporary closures of public city streets. Coordinate procurement of permits with Anschutz Medical Campus Liaison and University Project Manager.
- D. Construction Parking:
 - 1. General: Contractor must pay for all parking and, if available, may be assigned parking spaces in designated contractor parking lots. Parking in lots designated for visitors and patients is not permitted. Make arrangements for designated spaces and payment for long term parking with University Parking Services through the University Project Manager.
 - 2. Provide temporary parking or use designated areas of University's existing parking areas as applicable to the Project and in accordance with the following:
 - a. All parking on University property, including parking on University owned streets, is under the exclusive control and authority of University Parking and Transportation Services. Direct policy question to the department at (303) 724-2555.

- b. There is no free parking on campus. Displacement or use of existing parking spaces by Contractor, either for parking or for staging, is a Contractor cost.
 - c. Use of existing parking spaces or other areas outside of Contractor's staging area must be approved in advance by University Parking and Transportation Services.
 - d. University Parking and Transportation Services may require and issue parking permits through the University Project Manager. Permits must be displayed and visible at all times while parked on the campus. Failure to display a permit will result in citations being written and possible removal of the vehicle from University property.
 - e. Keep all designated parking areas clean and free of litter and debris. University reserves the right to direct Contractor to clean areas not kept clean and orderly.
 - f. University Parking and Transportation Services may change parking assignments as deemed necessary, restrict the use of any space(s) or lot(s) at any time, and determine the hours of control and mode of operations for any parking area at any time. University Parking and Transportation Services may deny or revoke parking privileges to any person when deemed necessary and/or considered to be in the best interests of the University.
3. Parking on University property is at the Contractor's own risk. The University and any entity affiliated with it are not responsible for fire, theft, and damage to or loss of contractor's or subcontractor's vehicle or any article left therein. Only a license is granted to the user and no bailment is created.

1.10 COORDINATION WITH OCCUPANTS

- A. University may occupy site and both existing and adjacent building(s) during entire construction period. Cooperate with University during construction and sequence operations to minimize conflicts and facilitate University usage. Perform the Work so as not to interfere with University's day-to-day operations.
 1. Maintain existing exits from existing and adjacent building, unless otherwise indicated.
 2. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from University and approval of authorities having jurisdiction.
 3. Limit construction operations to those methods and procedures which will not adversely and unduly affect the working environment of University's occupied spaces, including noise, dust, odors, air pollution, ambient discomfort, poor lighting, hazards and other undesirable effects and conditions.
 4. Coordinate with University Project Manager to schedule jack hammering or activities producing dusty conditions, excessive fumes or odors during off-hours.
 5. When work must be accomplished in areas containing existing furniture, upon a minimum of 3 business days notification of the University Project Manager, University will remove or relocate existing furniture.
 6. Provide not less than 72 hours' notice to University Project Manager of activities that will affect University's operations. University Project Manager will coordinate with campus tenants.
 - a. Refer to "Work Restrictions" Article of this Section for procedures and notification requirements related to utility interruptions.
 7. Provide temporary barriers and partitions, or other means as required to protect occupants of existing building and the general public from injury due to construction activities. Prevent the spread of dust and dirt to adjacent occupied areas and building.

1.11 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
 - 2. In planning and executing the Work, take into consideration the special needs of University patient care, teaching and research settings, for example, supply of critical utilities, noise and dust control, access to existing loading docks, occupied buildings, etc.
- B. Normal Working Hours: Limit work to normal working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday.
 - 1. Notify University Project Manager of all proposed work outside of normal working hours. Include dates, times, names and contact information for contractors and subcontractor performing the Work with notification. University Project Manager will notify, as appropriate, other University personnel and departments including, but not limited to, Building Maintenance and Operations (BMO) Directors, BMO assigned representative, Campus Police and Facilities Management.
- C. Noise and Vibration: Coordinate operations that may result in high levels of noise and vibration, or other disruption to University occupancy with University.
 - 1. Noise during Normal Working Hours: Identify potentially disruptive construction activities at weekly Progress Meeting and adjust active time of day to reduce significant impacts on occupants.
 - 2. Noise outside Normal Working Hours: Schedule construction work or demolition work outside of normal working hours with University Project Manager at minimum of 72 hours in advance.
 - a. The maximum permissible noise level is 75 decibels (dBA), measured at the adjacent property line.
- D. Contractor Identification:
 - 1. Supervisory staff for the primary contractor must obtain an identification badge at the University Anschutz Medical Center (AMC) Building 500. Submit the University Access Control Badge Application form through University Project Manager. Submitted forms shall be complete with all required information including a letter on company letterhead confirming employee status with company and stating whether the company completes background testing and/or drug screening. Contractor supervision must display badge on site during construction activities.
 - 2. To the greatest extent possible, Contractor's and subcontractor's employees must wear a recognizable logo shirt or hardhat identifying them as members of the contractor's work force.
- E. Use of Existing Elevators: Use "freight" elevators only and protect finishes during transport. Restrict use exclusively to time required to move construction materials.
 - 1. Do not block corridors, aisles, passageways or doors leading to elevator except as, and only to the extent approved by University Project Manager.
- F. Keys: Submit written request to University Project Manager on University Key Request Form.
 - 1. To the extent the need for keys is demonstrated and required to complete the Work, University Project Manager will issue keys to Contractor.
 - 2. Contractor is responsible for all costs related to lost or non-returned keys.
 - 3. Electrical, mechanical and sensitive research space may require University escort in lieu of issuing keys.

- G. Dock Deliveries: Restrict use exclusively to time required to unload and move construction materials.
- H. Existing Utility Interruptions: Do not interrupt water, sewer, plumbing, gas, steam, chilled water, oxygen, HVAC, electrical power, lighting, telephone and other related utilities serving facilities occupied by University without prior notice to and approval by the University. Coordinate and schedule interruptions in advance through the University Project Manager in strict conformance with University Utility Interruption/Outage Request Procedure.
 - 1. Form of Notice: University Utility Interruption and Start-up Request form.
 - 2. Time of Notice: Notice for major and minor outages as defined by the Utility Interruption/Outage Request Procedure is 8 business days for minor outages and 31 business days for major outages.
- I. Fire Alarm and Fire Sprinkler Interruptions: When construction activities require interruption of fire alarm or fire sprinkler service, or when dust from construction activities is likely to cause accidental alarm, advise University Project Manager who will submit an interruption request.
 - 1. Form of Notice: University Fire Alarm/Sprinkler Disable Request Form.
 - 2. Time of Notice: Prior to noon on the day before the anticipated interruption.
- J. Nonsmoking Campus: Smoking, chewing tobacco, and other related tobacco product use is not permitted at any location on campus or on any adjacent property.
- K. University Policies Applying to All Contractors: Comply with University policies applying to contractors including drug policy, sexual harassment policy and tobacco free policy. Obtain copies of University policies from University Project Manager.
 - 1. Controlled Substances: Use of tobacco products and other controlled substances on Project site and surrounding Campus is not permitted.
- L. Designated Eating Areas: Restrict consumption of food on project site to designated eating areas as approved by University Project Manager.

1.12 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
 - 3. Words in the singular number include the plural and those in the plural include the singular.
 - 4. Words of any gender include any other gender.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products may be identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 18 00

PROJECT UTILITY SOURCES

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 matrix of utility sources applicable to Project.

1.3 QUALITY ASSURANCE

- A. Comply with utility company and regulatory agency codes, standards, and guidelines for the provision of new or extension of exiting utilities.

1.4 UTILITY SOURCE MATRIX

- A. The following matrix summarizes utility responsible for provision of utility service:

	AMC				DC		AMC		DC	
	Trunk		In Tract		Trunk	In Tract	Trunk	In Tract	Trunk	In Tract
Steam	University	Note 1	Developer		Xcel	University	University	University	DW	University
Chilled Water	University	Note 1	Developer		NA	University	University	University	NA	University
Electricity	University	Note 2	Developer		Xcel	University	University	University	DW	University
Storm Drainage	COA		Developer		DW	University	University/ COA Note 5	University	DW	University
Sanitary Sewer	COA		Developer		DW	University	University/ COA Note 5	University	DW	University
Water	COA		Developer		DW	University	University/ COA Note 5	University	DW	University
Telecommunications	University	Note 3	Developer	Note 3	University	University	University	University	DW	University
Natural Gas	Xcel	Note 4	Developer		Xcel	University	University	University	DW	University
University: University of Colorado Denver			Note 1: University owns Trunk steam and chilled water from CUP to vault							
COA: City of Aurora			Note 2: University owns Trunk electrical from switch gear to manhole							
DW: Denver Water			Note 3: University owns Trunk telecom ductbank from main switch to manhole. Developer owns cable from switch to building							
			Note 4: Xcel has license agreement with University							
Developer:			Note 5: University and COA jointly permit							
University, TCH, UCH. In Tract lines are owned by the building they are feeding										

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 18 00

SECTION 01 22 00

UNIT PRICES

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 administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by Change Order, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Upon completion of work involving unit prices, submit documentation to establish actual quantity of work provided. A Change Order will be issued in an amount equal to the actual quantity multiplied by the unit price.
- C. 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 acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price 1: Removal of unsatisfactory soil and replacement with satisfactory soil material.
 - 1. Description: Unsatisfactory soil excavation and disposal off site and replacement with satisfactory fill material or engineered fill from off site, as required, according to Section 31 20 00 "Earth Moving."
 - 2. Unit of Measurement: Cubic yard of soil excavated, based on survey of volume removed.
- B. Unit Price No. 2: Removal and replacement of concrete sidewalk.
 - 1. Description: Removal of existing concrete sidewalk, removal and excavation as required, and subsequent backfill, compaction, and replacement of concrete according to Section 01 73 00 "Execution." not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Square yards of concrete removed.
- C. Unit Price No. 3: Removal and replacement of asphalt mat
 - 1. Description: Removal of existing asphalt mat, removal and excavation as required, and subsequent backfill, compaction, and replacement of asphalt according to Section 01 73 00 "Execution" not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Square yards of asphalt removed.
- D. Unit Price No 4: Removal and replacement of concrete pavement
 - 1. Description: Removal of existing concrete pavement, removal and excavation as required, and subsequent backfill, compaction, and replacement of concrete pavement according to Section 01 73 00 "Execution" not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Square yards of asphalt removed.
- E. Unit Price No 5: Landscape restoration
 - 1. Description: Removal of existing landscape, and subsequent landscape restoration according to Section 01 73 00 "Execution" not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Acre of landscape restoration
- F. Unit Price No. 6: Curb and Gutter Type 2
 - 1. Description: Removal of existing curb and gutter, and subsequent backfill, compaction, and replacement of curb and gutter according to Section 01 73 00 "Execution" not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Linear foot of curb and gutter type 2
- G. Unit Price No. 7: Electrical equipment
 - 1. Description: Removal and replacement of existing luminaires and electrical equipment; installation of new equipment, light standard, foundation, wiring, and conduit according to Section 26 56 00 "Exterior Lighting" not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Each

- H. Unit Price No. 8: Conduit and wiring
 - 1. Description: Installation of new wiring conduit, including boring, according to Sections 26 05 not otherwise indicated in the Contract Documents.
 - 2. Unit of Measurement: Linear foot

END OF SECTION 01 22 00

SECTION 01 25 00

SUBSTITUTION PROCEDURES

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 administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or University that are not required in order to meet other Project requirements but may offer advantage to Contractor or University.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit each request for consideration in format and quantities specified in Section 01 33 00 "Submittal Procedures". Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A or Contractor-generated form with substantially the same information.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by University and separate contractors that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - i. Cost information, including a proposal of change, if any, in the Contract Sum.
 - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Engineer's Action: If necessary, Engineer in consultation with the University will request additional information or documentation for evaluation within seven calendar days of receipt of a request for substitution. Engineer in consultation with the University will notify Contractor of acceptance or rejection of proposed substitution within 14 calendar days of receipt of request, or seven calendar days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order.
 - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 14 calendar days prior to time required for preparation and review of related submittals.

1. Conditions: Engineer in consultation with the University will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that specified product provided.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

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 administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Contractor's Agreement Design/Bid/Build, State Form SC-6.21 and The General Conditions of the Construction Contract Design/Bid/Build, State Form SC-6.23 for definitions and contractual requirements related to contract modification procedures.

1.3 DEFINITIONS

- A. Change Order: A written order in compliance with the requirements of the Contract authorizing changes in the Work. For the purposes of this Section a Change Order and a Contract Amendment shall have the same meaning.

1.4 INFORMATIONAL SUBMITTALS

- A. Contractor's Authorized Signatory: Submit name of individual authorized to accept changes and responsible for informing others employed by Contractor of changes in the Work.

1.5 MINOR CHANGES IN THE WORK

- A. University Project Manager will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.6 CHANGE ORDER BULLETIN

- A. University-Initiated Change Order Bulletin: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. It will also state the time period for which the request will remain valid.

1. Change Order Bulletin Form: State Form SC-6.311 available on the website of the Office of the State Architect.
 2. Work Change Order Bulletins issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
- B. Contractor-Initiated Change Order Bulletin: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the University Project Manager.
1. Change Order Bulletin Form: State Form SC-6.311 available from the website of the Office of the State Architect.
 2. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

1.7 CHANGE ORDER PROPOSAL

- A. Change Order Proposal: In response to a University-Initiated Change Order Bulletin or accompanying a Contractor-Initiated Change Order Bulletin, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change described.
1. Change Order Proposal Form: State Form SC-6.312 available from the website of the Office of the State Architect.
 2. Labor Rates: Prior to submitting first Change Order Proposal, submit bare, unburdened hourly labor rates for all contractor and subcontractor labor categories; submit itemized breakdown of all applicable additional labor benefit costs to be added to the bare labor cost to arrive at the total burdened hourly labor cost.
 3. Equipment Costs: Provide cost backup for all equipment clearly indicating equipment billing rates and sufficient to demonstrate, as determined by the University Project Manager, that proposed rates are competitive and reasonable in all cases. Submit completed Change Order Proposal Form within the requested timeframe. Include backup documentation to support calculations consistent with Contract provisions, including but not limited to, the following:
 - a. Contractor and Subcontractor labor, material and equipment costs including:
 - 1) A list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 2) Applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 3) Costs of labor and supervision directly attributable to the change and as permitted by the terms and conditions of the General Contract for Construction.
 - b. Contractor and Subcontractor overhead and profit.
 - c. Contractor's bond cost.
 - d. Justification for Change in Contract Time: An updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 4. Maintain detailed records of work completed. Provide complete information for evaluation of proposed changes and to substantiate proposed changes in Contract Sum or Contract Time.

1.8 ADMINISTRATIVE CHANGE ORDERS

- A. Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.9 CHANGE ORDER PROCEDURES

- A. Submit one signed copy of Change Order Proposal to Engineer for review.
1. University-Initiated Change Order Bulletins: University and Engineer will evaluate Contractor's Change Order Proposal and either request additional information or suggest modifications. Based on this review and evaluation University will either accept or reject the proposal.
 2. Contractor-Initiated Change Order Bulletins: Engineer will evaluate Contractor's claim based on the terms and conditions of the Contractor Agreement and General Conditions of the Construction Contract, as applicable.
 3. Engineer's Action: When satisfied as to the accuracy and completeness of the Change Order Proposal, the Engineer will sign the copy and forward to the University for consideration.
- B. On University's approval of a Change Order Proposal, Engineer will prepare, sign and forward the copy of the Change Order, State Form SC-6.31 available from the website of the Office of the State Architect, for signature by the Contractor. Contractor then forwards all three copies of signed Change Order to the University for signature and distribution of fully executed copies to Engineer and Contractor for record.
- C. Upon receipt of a fully executed Change Order, promptly perform the following:
1. Revise Schedule of Values on the Application for Payment Form by indicating each authorized Change Order as a separate line item and adjusting the Contract Sum as shown on the Change Order.
 - a. University will not pay for changes to the Work until authorized by a Change Order signed by all parties.
 2. Revise the Progress Schedule to reflect any change in the Contract Time.
 3. Enter changes in the Project Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00

PAYMENT PROCEDURES

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 administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 01 22 00 "Unit Prices" for administrative requirements governing the use of unit prices.
 - 2. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Schedule of values report from cost-loaded Critical Path Method Schedule prepared in accordance with Section 01 32 00 "Construction Progress Documentation" may serve to satisfy requirements for the schedule of values.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 1) Construction Manager's Fee.
 - 2) Estimated Project General Conditions Costs.
 - 2. Submit schedule of values and hold a conference with the Engineer and University Project Manager to finalize the schedule of values at earliest possible date, but no later than 10 business days before the date scheduled for submittal of initial Certificates and Applications for Payment.

- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 6. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 7. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by University Project Manager and paid for by University.
1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Pay Application and Schedule Review Meetings: Conduct in accordance with Section 01 31 00 "Project Management and Coordination." Provide draft application for payment and draft schedule update reflecting work accomplished during previous pay period. Review progress achieved; discuss and resolve issues affecting the progress; and review critical activities to be accomplished during the following 90 calendar days.
1. Jobsite Walk: When required, conduct a walk of the jobsite to confirm progress related to any activity in question.

- C. Monthly Schedule Reporting: Upon conclusion of the Pay Application and Schedule Review Meeting, but not later than the 28th of the month, update the Construction Schedule and submit the Pay Application.
- D. Payment Application Times: Submit Application for Payment to University Project Manager by the first day of the month and no more than five (5) business days prior thereto. The period covered by each Application for Payment is per the date indicated in the Application.
- E. Payment Application Review: The University Project Manager shall, within five (5) business days after the receipt of each Certificate and Application for Payment, review the Project Application for Payment and either execute a Project Certificate for Payment to the University or notify the Contractor in writing of the reasons for withholding a Certificate.
 - 1. All applications for payment, except the final application, and the payments there under, shall be subject to correction in the next application rendered following the discovery of any error
- F. Application for Payment Forms: Use State Form SBP-7.2 "Certification for Contractor Payment."
- G. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. University Project Manager will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders issued before last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under University-requested project acceleration.
- H. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site as approved in advance by the University Project Manager and items stored at an off-site location previously agreed upon in writing.
 - 1. Provide certificate of insurance, evidence of transfer of title to University, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- I. Transmittal: Submit three signed and notarized original copies of each Application for Payment to University Project Manager by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of electrical permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
- K. Application for Payment at Substantial Completion: After University Project Manager issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for University occupancy of designated portions of the Work.
- L. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. All items on Pre-acceptance Checklist (State Form SBP-05) have been completed.
 2. Notice of Acceptance (State Form SBP-6.27) has been issued.
 3. Statements to support local sales tax refunds, if any submitted.
 4. Notice of Contractor's settlement has been published.
 5. Evidence of completion of Project closeout requirements, including but not limited to:
 - a. Submittal of Record Documents.
 - b. Submittal of all Operation and Maintenance Manuals.
 - c. Completion of all required demonstration and training.
 6. Updated final statement, accounting for final changes to the Contract Sum.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when University took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

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 administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project meetings.
- B. Related Requirements:
 - 1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Within 21 calendar days of Notice of Award submit, as complete as possible, a preliminary list to include all major subcontractors. Augment, complete and submit the final subcontractor list within 60 calendar days of Notice of Award, unless a longer duration is approved by the Architect/Engineer. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 14 calendar days after Notice to Proceed, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify

individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1.5 GENERAL COORDINATION PROCEDURES

- A. General: Each entity involved in the performance of work for the entire Project shall cooperate in the overall coordination of the Work; promptly, when requested, furnish information concerning its portion of the Work; and respond promptly and reasonably to the decisions and requests of persons designated with coordination, supervision, administrative or similar authority.

1. University Standard Project Management Forms

- a. Where applicable, obtain from the University Project Manager and use the following University Standard Forms:

- 1) Preconstruction Agenda
- 2) Change Order Log with Contingency Codes
- 3) Access Control Badge Application Form
- 4) Utility Interruption Request Form
- 5) Utility Start-Up Request Form
- 6) Hot Work Permit Form
- 7) Anschutz Medical Campus (AMC) Street and Parking Lot Closure Form

2. Site Utilization:

- a. In addition to the site utilization limitations and requirements indicated in Section 01 10 00 "Summary" and indicated by the Contract Documents; administer the allocation of available space equitably among entities needing access and space, so as to produce the best overall efficiency in the performance of the total work of the project. Schedule deliveries so as to minimize the space and time requirements for storage of materials and equipment on the site; but do not unduly risk delays in the work.
- b. Concurrent with work of the Contractor, other contractors, suppliers, and the University personnel may be working in relatively close proximity. The Contractor is solely responsible for coordinating their work with that of other contractors and will make no claims for failure to do so.

3. Layout:

- a. It is recognized that the Contract Documents are diagrammatic in showing certain physical relationships of the various elements and systems and their interfacing with other elements and systems. Establishment and coordination of these relationships is the exclusive responsibility of the Contractor. Do not scale the drawings. Lay out and arrange all elements to contribute to safety, efficiency and to carry the harmony of design throughout the Work. In case of conflict or undimensioned locations, verify required positioning with Engineer.

4. Substrate Examination:

- a. The Installer of each element of the work must examine the conditions of the substrate to receive the work, dimensions and spaces adjacent, tolerances, interfacing with other elements and services, and the conditions under which the work will be performed, and must notify the Contractor in writing of conditions detrimental to the proper or timely

completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

5. Large and Heavy Equipment:
 - a. Contractor to coordinate with University Project Manager requirements to be maintained for the subsequent entry of large equipment units. Heavy equipment shall remain on the roadway surface and not impact sidewalk or landscape, unless otherwise approved by University Project Manager.
 - b. Where equipment or products to be installed on the roof are too heavy to be hand-carried, do not transport across landscape areas.
- B. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections of the Specification that depend on each other for proper installation, connection, and operation.
 1. Contractor Communication with the University: Direct all communication with the University through the University Project Manager.
 2. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 3. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 4. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 1. Prepare similar memoranda for University and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- E. Coordination Of Submittals: Prior to transmittal to the Engineer, review shop and erection drawings, product data, and samples for compliance with Contract Documents and for coordination among work of all Sections of the Specifications. Coordination of submittals shall include, but not be limited to the following:
 1. Verification of field dimensions and clearances and relationship to available space and anchors.
 2. Verification of compatibility with equipment and work of other Sections, electrical characteristics, and operational control requirements.
 3. Verification of control characteristics.
 4. Coordination of controls, interlocks, wiring of pneumatic switches, and relays.

5. Coordination of wiring and control diagrams.
6. Review of the effect of any changes on work of other Sections.
7. For any item to be installed in or on a finished surface, certify that applicable Contract Documents have been checked and that the item submitted is compatible with the surface finish on which it is to be installed.
8. Equipment and material submittals shall show sufficient data to indicate complete compliance with Contract Documents as follows:
 - a. Proper sizes and capabilities.
 - b. Ability to fit in the available space in a manner that will allow proper service.
 - c. Construction methods, materials, and finishes.
 - d. List of accessories.

F. Special Coordination Requirements for Electrical Work:

1. General: Provide necessary work and services required to coordinate the complete installation of electrical equipment, fixtures, and systems; and other equipment or systems containing motors and controls or requiring connection to electrical systems; all so that the various systems perform as indicated and are in harmony with other project Work.
2. Contract Drawings:
 - a. Drawings are schematic in nature, and indicate in general how the various components are integrated with other parts of the building. Coordinate exact locations by job measurement, by verifying the requirements of other trades, and by review of Contract Documents.
3. Electrical Drawings indicate general routing of the various parts of the systems, but do not indicate all sizes, fittings, offsets, and runouts which are required. Coordinate correct sizes, fittings, offsets, and runouts required to fit systems into allocated spaces and locations.
4. Coordinate installation of electrical work in compliance with the following requirements:
 - a. Install electrical work in a neat, organized manner with conduit and similar services.
 - b. Arrange all work to facilitate maintenance and repair or replacement of equipment. Locate services requiring maintenance in a splice box behind the luminaire, where applicable Connect equipment for ease of disconnecting, with minimum of interference with other work.
 - c. Locate operating and control equipment and devices for easy access.
5. Access to Equipment: Provide splice boxes wherever access is required for ongoing or periodic access.
 - a. Coordinate requirements and obtain approval of locations from Engineer.

G. Compatibility of Systems:

1. Provide products and equipment which are compatible with other work requiring electrical interface including electrical connections, control devices, water, drain and other piping connections. Verify electrical characteristics and other interface requirements before ordering equipment and resolve conflicts that may arise.
2. Coordinate equipment and electrical work in accordance with the following schedule:

<u>ITEM</u>	<u>FURNISHED BY</u>	<u>MOUNTED BY</u>	<u>LOW VOLTAGE WIRED BY</u>	<u>POWER WIRED & CONNECTED BY</u>	<u>LOW VOLTAGE CONTROL CONNECTED BY</u>
Fused and unfused disconnect switches	EI**	EI**	EI**	EI	--
Control relays and transformers	MI	MI	MI	EI	MI
Electric meters	EI	EI	EI	EI	MI
<p>I = Installer of equipment requiring electrical service EI = Electrical Installer MI = Mechanical Installer</p> <p>** Disconnects for AH units are factory mounted.</p>					

H. Complete Systems:

1. It is the intent of the Contract Documents that all systems, including electrical, be complete and functional to provide the intended or specified performance. Provide all incidental items and parts necessary to achieve this requirement.
2. Provide correctly sized power, utilities, piping, drains, services and their connections to equipment and systems requiring them, whether or not specific items are listed in the schedule under "Compatibility of Systems" paragraph in this Section.

I. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as University's property.
2. Establish recycling program at job site. Refer to Section 01 74 19 "Construction Waste Management and Disposal" for additional requirements.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple subcontractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.

- c. Indicate functional and spatial relationships of components of architectural, structural, civil, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Engineer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
 1. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture locations.
 - c. Panel board, transformer, generator, and lighting control center locations.
 - d. Location of pull boxes.
 2. Review: Engineer will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Engineer determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Engineer will so inform Contractor, who shall make changes as directed and resubmit.
 3. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Engineer.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.

13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, and details of affected materials, assemblies, and attachments on attached sketches.
 14. Space for response and signature by Engineer.
- C. RFI Forms: Hard copy form or software-generated form with substantially the same content as indicated above, acceptable to Engineer.
1. Attachments shall be electronic files in PDF format.
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven calendar days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Engineer's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
 3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Contractor-Initiated Change Order Bulletin and Proposal according to Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify University Project Manager and Engineer in writing within seven calendar days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by RFI number. Submit log weekly. Use CSI Log Form 13.2B or Contractor-generated form of substantially same content. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Engineer.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect/Engineer's response was received.
- F. On receipt of Architect/Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect/Engineer within seven calendar days if Contractor disagrees with response.

1.8 PROJECT WEB SITE (Not Used)

1.9 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify University and Engineer of scheduled meeting dates and times a minimum of 4 business days prior to meeting.
 - a. Participants, including representatives of subcontractors and suppliers, shall be qualified, familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including University and Engineer, within three business days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time and site convenient to all parties, but not later than 14 calendar days after Notice to Proceed.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work and include the following:
 - a. Authorized representatives of University:
 - 1) University Project Manager.
 - 2) University Building Maintenance Operations (BMO) Representative.
 - b. Engineer and their consultants.
 - c. Contractor's project manager and superintendent.
 - d. Major subcontractors and suppliers.
 - e. Other concerned parties shall attend the conference.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Designation of key personnel and their duties.
 - b. Lines of communications.
 - c. List of major subcontractors and suppliers.
 - d. Tentative construction schedule.
 - 1) Phasing.
 - 2) Critical work sequencing and long-lead items.
 - 3) Equipment deliveries and priorities.
 - e. Procedures and processing of:
 - 1) Change Order Bulletin, Change Order Proposal and Change Orders.
 - 2) RFI's
 - 3) Testing and inspecting.
 - 4) Applications for Payment.
 - 5) Submittals.

- 6) Preparation of record documents.
 - f. Use of the premises, existing building and adjacent buildings as applicable.
 - 1) Work restrictions.
 - 2) Working hours.
 - 3) University's occupancy requirements.
 - 4) Procedures for disruptions and shutdowns.
 - 5) Construction parking and staging.
 - 6) Construction route and site access.
 - 7) Office, work, and storage areas.
 - 8) Progress cleaning procedures.
 - g. Project coordination.
 - h. Distribution of the Contract Documents.
 - i. Construction waste management and recycling.
 - j. Safety.
 - 1) Fire and Life Safety.
 - 2) Health and Safety.
 - k. First aid.
 - l. Security.
 - m. Building Department.
 - n. Building Services.
 - o. Building Operations.
 - p. University Work Related Policies.
 - q. Contractor Contacts.
 - r. University Contacts.
 - s. University Process Forms.
 - 1) Key Request Form.
 - 2) Access Control Badge Application Form.
 - 3) Utility Interruption Request Form.
 - 4) Utility Start-Up Form.
 - 5) Hot Work Permit Form.
 - 6) Anschutz Medical Campus (AMC) Street and Parking Lot Closure Form.
 - 7) Request for Variance.
 - 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Pre-installation Conferences: Conduct a preinstallation conference at Project site for installations, systems or assemblies where required by individual Specification Sections, or where deemed necessary by Contractor.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer and University Project Manager of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following, as appropriate:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.

- d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Possible conflicts.
 - i. Compatibility requirements.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written instructions.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Space and access limitations.
 - q. Regulations of authorities having jurisdiction.
 - r. Testing and inspecting requirements.
 - s. Installation procedures.
 - t. Coordination with other work.
 - u. Required performance results.
 - v. Protection of adjacent work.
 - w. Protection of construction and personnel.
 - 3. Record significant conference discussions, approved schedules, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information, including University Project Manager and Engineer.
 - 5. 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.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to University and Architect/Engineer, but no later than 30 calendar days prior to the scheduled date of Substantial Completion or Partial Substantial Completion.
- 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 - 2. Attendees: Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work and include the following:
 - a. University Project Manager.
 - b. University Building Maintenance Operations (BMO) Representative.
 - c. Engineer and their consultants.
 - d. Contractor's project manager and superintendent.
 - e. Major subcontractors and suppliers.
 - f. Other concerned parties.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Procedures related to:
 - 1) Notice of Completion, including preparation of Contractor's punch list.
 - 2) Final Inspection.
 - 3) Notice of Substantial Completion.
 - 4) Notice of Approval of Occupancy/Use.
 - 5) Supplemental Occupancy/Use Checklist.
 - 6) Supplemental Acceptance Checklist.
 - 7) Pre-acceptance Checklists.

- 8) Notice of Acceptance.
 - 9) Settlement and Final Payment.
 - b. Preparation of record documents.
 - c. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - d. Submittal of written warranties.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Installation of University's fixtures and equipment.
 - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at weekly intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work and include the following:
 - a. University Project Manager.
 - b. University Health Safety Department Representative.
 - c. University Building Maintenance Operations Representative.
 - d. University Campus Building Official.
 - e. Architect/Engineer and their consultants.
 - f. Contractor's project manager and superintendent.
 - g. Major subcontractors and suppliers.
 - h. Other entities concerned with current progress or involved in planning, coordination, or performance of future activities.
 - i. As needed, University Building Maintenance Operations (BMO), Subject Matter Experts (SME), and University Facility Support Services (FSS) Representatives.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule:
 - 1) Review progress since the last meeting.
 - 2) Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule.
 - 3) Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 4) Review schedule for next two week period.
 - 5) Review schedule of deliveries.
 - 6) Review off-site fabrication.
 - b. Site Safety.
 - c. Indoor Air Quality Management monitoring.
 - d. MS4 Storm Water and Water Quality monitoring.
 - e. Quality:
 - 1) Quality and work standards.

- 2) Status of correction of deficient items.
 - 3) Progress cleaning.
 - 4) Field observations.
 - f. Status of submittals.
 - g. Status of RFIs.
 - h. Status of Changes including:
 - 1) Change Order Bulletins.
 - 2) Change Order Proposals.
 - 3) Change Orders.
 - 4) Pending claims and disputes.
 - i. Status of LEED documentation, for projects pursuing LEED certification.
 - j. Review present and future needs of each entity present including:
 - 1) Access.
 - 2) Site utilization.
 - 3) Temporary facilities and controls.
 - 4) Coordination.
 - 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- F. Pay Application and Schedule Review Meeting: Conduct review meeting monthly on or about the 25th of each month.
- 1. Attendees:
 - a. University Project Manager.
 - b. Contractor's Project Manager, Superintendent and Scheduler.
 - 2. Agenda: Review draft pay application and progress schedule update in accordance with the requirements of Section 01 29 00 "Payment Procedures" and Section 01 32 00 "Construction Progress Documentation."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

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 administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's construction schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Monthly project status reports.
 - 6. Material location reports.
 - 7. Site condition reports.
 - 8. Special reports.
- B. Related Requirements:
 - 1. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
 - 2. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF electronic file and four paper copies.
- B. Startup construction schedule (bar chart).

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial University occupancy, as may be applicable.
 4. Review delivery dates for University-furnished products.
 5. Review schedule for work of University's separate contracts.
 6. Review submittal requirements and procedures.
 7. Review time required for review of submittals and resubmittals.
 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 9. Review time required for Project closeout and University startup procedures, including commissioning activities.
 10. Review and finalize list of construction activities to be included in schedule.
 11. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date is not permitted. Contract completion date may only be modified by Change Order.
- B. Activities: Treat separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 21 calendar days, unless specifically allowed by University Project Manager.
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in schedule.

Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include adequate time for startup, testing and commissioning.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect/Engineer's administrative procedures necessary for issuing Notice of Substantial Completion.
- C. Constraints: Include the following constraints and work restrictions as indicated in the Contract Documents and as applicable in schedule; show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work by University: Include a separate activity for each portion of the Work performed by University.
 3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. University-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Work Restrictions: Show the effect of the following items, as applicable, on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Environmental control.
 6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Submittals.
 - b. Fabrication.
 - c. Sample testing.
 - d. Deliveries.
 - e. Installation.
 - f. Tests and inspections.
 - g. Startup and placement into final use and operation.
 7. Construction Areas: As applicable, identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Completion of electrical installation.
 - b. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Commencement of Work, Substantial Completion, Notice of Occupancy and Use, and Final Acceptance. As applicable, also include milestones for Partial Substantial Completion and Partial Notice of Occupancy and Use.

- E. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

2.2 STARTUP CONSTRUCTION SCHEDULE (BAR CHART)

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven calendar days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 calendar days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (BAR CHART OR GANTT CHART) (Not Used)

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE) (Not Used)

2.5 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 7. Accidents.
 - 8. Meetings and significant decisions.
 - 9. Unusual events (see special reports).
 - 10. Stoppages, delays, shortages, and losses.
 - 11. Meter readings and similar recordings.
 - 12. Emergency procedures.
 - 13. Orders and requests of authorities having jurisdiction.
 - 14. Change Orders received and implemented.
 - 15. Services connected and disconnected.
 - 16. Equipment or system tests and startups.
 - 17. Partial completions and occupancies.
 - 18. Substantial Completions authorized.

2.6 SPECIAL REPORTS

- A. General: Submit special reports directly to University within one calendar day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events,

persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise University in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE (Not Used)

END OF SECTION 01 32 00

SECTION 01 33 00

SUBMITTAL PROCEDURES

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 requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 3. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 4. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 5. Division 02 through 33 for additional submittal requirements specific to indicated Specification Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals." Submittals not specifically indicated as informational submittals are considered to be action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that do not require University Project Manager's and Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals" and include, but are not limited to:
 - 1. Schedules.
 - 2. Permits.
 - 3. Applications for payment.
 - 4. Performance and payment bonds.
 - 5. Insurance certificates.
 - 6. List of Subcontractors.
 - 7. Schedule of Values.
 - 8. Inspection and test results.
 - 9. Closeout documents.

10. Coordination drawings.
11. Street and Storm Water Quality Management Plan.
12. Anschutz Medical Campus Street Services Request.

- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Initial Submittal: Submit concurrently with startup construction schedule and within 30 calendar days of Notice to Proceed or Commencement of Work, but not later than submittal of first application for payment. Include submittals required during the first 90 calendar days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date for University Project Manager's and Engineer's final release or approval.
 - h. Scheduled date of fabrication.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals.
1. /Engineer will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.

- a. Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD 2014 or newer.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to University and Engineer.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit for review with sufficient time to avoid construction delays.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 1. Initial Review: Allow 14 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 14 calendar days for review of each resubmittal.
 4. Large and/or Complex Submittals: For large and/or complex submittals, as determined by the Engineer and for submittals that require sequential reviews by Engineer's consultants, a review period greater than 14 calendar days may be required. Engineer and Contractor shall identify such submittals upon submission of the submittal schedule and determine a mutually agreed upon review period.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 3 by 3 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.

- 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless University Project Manager or Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.
 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. University Project Manager or Engineer will return without review submittals received from sources other than Contractor.
 - a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
 - 1) Project name.
 - 2) Date.
 - 3) Destination (To:).
 - 4) Source (From:).
 - 5) Name and address of Engineer.
 - 6) Name and address of Contractor.
 - 7) Name of firm or entity that prepared submittal.
 - 8) Names of subcontractor, manufacturer, and supplier.
 - 9) Category and type of submittal.
 - 10) Submittal purpose and description.
 - 11) Specification Section number and title.
 - 12) Specification paragraph number or drawing designation and generic name for each of multiple items.
 - 13) Drawing number and detail references, as appropriate.
 - 14) Indication of full or partial submittal.
 - 15) Transmittal number.
 - 16) Submittal and transmittal distribution record.
 - 17) Remarks.
 - 18) Contractor's certification that information complies with Contract Document requirements.
 - 19) Signature of transmitter.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.

- a. File name shall use project identifier and Specification Section number followed by a dash and then a sequential number (e.g., LNHS-061000-01). Resubmittals shall include an alphabetic suffix after another dash (e.g., LNHS-061000-01-A).
- 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.
- F. Options: Identify options requiring selection by University Project Manager or Engineer.
- G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by University Project Manager or Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- H. Contractor Certification: On transmittal include Contractor's certification that information complies with Contract Document requirements.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect/Engineer's action stamp.
- L. Record Documents: Retain complete additional copies of submittals on Project site to be submitted as record documents in accordance with requirements of Section 01 78 39 "Project Record Documents."
- M. Legibility: Provide clear and legible submittals. Submittals that are blurry or are for any reason unreadable will be returned without action.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Email electronic submittals as PDF electronic files directly to University Project Manager and/or Engineer.
 - a. University Project Manager and/or Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - 2. Action Submittals: Submit one paper copy of each submittal to Engineer and one to University unless otherwise indicated. Engineer will return one copy, including both University's and Engineer's comments.

3. Informational Submittals: Submit two paper copies of each submittal to University Project Manager. University Project Manager will not return copies.
 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's printed recommendations.
 - e. Standard color charts.
 - f. Statement of compliance with specified referenced standards.
 - g. Statement of compliance with specified trade association standards.
 - h. Testing by recognized testing agency.
 - i. Application of testing agency labels and seals.
 - j. Notation of coordination requirements.
 - k. Notation of dimensions verified by field measurement.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Rough-in diagrams and templates indicating clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Confirm compliance of Product Data with requirements of Contract Documents. Submit cover letter indicating Contractor's certification of compliance.
 7. Submit additional copies of Product Data as required complying with requirements of Section 01 78 39 "Project Record Documents."
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Highlight, encircle or otherwise indicate deviations from Contract Documents. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Engineer's digital data drawing files is otherwise permitted. Standard information prepared without specific reference to the Project is not considered a shop drawing.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.

- g. Seal and signature of professional engineer if specified.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than size of Construction Drawings.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Mount, display or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Engineer's Sample.
 - 3. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 - f. Compliance with recognized standards.
 - g. Availability and delivery time.
 - 4. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 - 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect/Engineer will return submittal with options selected.
 - 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit two sets of Samples. University Project Manager and Engineer will retain one Sample set each; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
 - 7. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

- a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as University's property, are the property of Contractor.
- 8. Distribution of Samples: Prepare and distribute additional sets to Subcontractors, manufacturers, fabricators, suppliers, Installers, and others as required for performance of the Work. Show distribution on transmittal forms.
- 9. Field Samples and Mock-Ups: Field Samples and mock-ups specified in individual Sections are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.
- E. Selection of Related Materials: Where selections of colors, patterns, textures are specified to be made by Engineer, assemble complete samples of all specified or approved products for all Specification Sections and submit to Engineer. Review specifications and assemble all such samples for a combined single submittal. Indicate on the transmittal the latest date for selections to be made for each item to permit delivery of material in accordance with Progress Schedule. Engineer's action is limited solely to the specified selections or rejection of submittal items not in accordance with Specifications.
- F. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation."
- H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."
- I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."
- J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
- K. Maintenance Data: Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to University Project Manager or Engineer. Submittals received without Contractor's substantive review and approval stamp will be rejected and returned to the Contractor.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S AND UNIVERSITY PROJECT MANAGER'S ACTION

- A. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: University Project Manager will review each submittal and will not return it, or will return it if it does not comply with requirements. University Project Manager will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the University Project Manager and/or Engineer without action.

END OF SECTION 01 33 00

SECTION 01 35 44

SPECIAL PROCEDURES FOR ENVIRONMENTAL HEALTH AND SAFETY AND FIRE AND LIFE SAFETY

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 special administrative and procedural requirements related to environmental health and safety.
- B. University is Authority Having Jurisdiction (AHJ) for Fire and Life Safety. This responsibility is administered by the University's Fire and Life Safety Officer.
- C. Related Requirements:
 - 1. Section 02 81 00 "Transportation/Disposal of Hazardous Materials."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ENVIRONMENTAL HEALTH AND SAFETY AND FIRE AND LIFE SAFETY PROCEDURES

- A. Physical, Life, and Fire Safety:
 - 1. All contractors are required to conform to the Federal Occupational Safety and Health Administration (OSHA) regulations for construction (29 CFR 1926). Certain General Industry Standards (29 CFR 1910) may also apply, depending on location of work.
 - 2. Provide an effective health and safety program to control hazards, including but not limited to compressed gases, welding, cranes, and electrical.
 - 3. Provide fire protection in all construction areas to the satisfaction of the Authority Having Jurisdiction.
 - 4. During the construction phase, the Authority Having Jurisdiction may conduct oversight inspections to observe and provide recommendations regarding applicable safety standards. The following minimum items are included:
 - a. Do not block exit corridors
 - b. Provide physical barriers with appropriate warning signage to protect public areas from construction work.
 - c. Conduct daily inspections to eliminate fire hazards and any other safety hazards.

- d. Periodic safety inspections will be performed on job sites by the Authority Having Jurisdiction. The Authority Having Jurisdiction for fire safety will present University's Project Manager with a written summary of the findings who will then take these issues to the Contractor's superintendent, foreman or other designated representative and return the summary form with documentation of the resolution of safety items to AHJ. Abate deficient items in a timely manner. Include documentation and resolution of safety items presented in weekly Progress Meeting minutes. Inspections by University AHJ are spot-checks only. They are not all encompassing. These inspections and recommendations do not relieve the Contractor from obligations related to safe work practices, as required under federal law.
- e. AHJ has the right to access the site at all times. Should a potential threat to personnel or property be observed, AHJ may require the hazard related operation immediately altered until adequate safeguards are addressed.
- f. Supply AHJ, through the University Project Manager, with a copy of Contractor's weekly safety meeting minutes and safety inspection reports.
- g. Provide signs used for proper identification of construction areas.
- h. Insure standpipes, pull stations, electrical panels, water control valves and fire hydrants are accessible at all times.
- i. Post emergency notification phone numbers provided by Contractor and University in all construction areas.
- j. Notify University Project Manager of any lost time injuries occurring on University's property within one (1) calendar day and of any fatalities immediately.
- k. Submit copies of all injury reports to AHJ, through University's Project Manager.
- l. Equip construction personnel with personal protective equipment (PPE) where required. Coordinate with University Project Manager to identify where use of PPE will be required.

B. OSHA Hazard Communication Standard:

1. Every Contractor and Subcontractor performing work shall comply with the OSHA Hazard Communication Standard. Compliance includes joint University and Contractor responsibilities for the purpose of providing timely communications and information sharing with regard to hazardous materials, chemicals and chemical sources which may be present on-site or brought in by Contractor.
2. University Project Manager will provide Contractor with the following:
 - a. Information regarding known hazardous chemicals and agents or other hazards present at the job site.
 - b. University emergency procedures and contact numbers.
3. Provide safety training and environmental surveillance of all workers.
4. Inform and provide University's Project Manager the following:
 - a. Material safety data sheets (MSDS) for all chemicals introduced into the workplace.
 - b. Information regarding potential sources of pollutants which may be entrained in University's air intakes, e.g., nuisance dusts and asbestos - if damaged or encountered during the course of the work.

C. Asbestos and Lead Paint:

1. The presence of asbestos-containing materials and/or paint containing lead on the job site does not mean a problem exists. Areas where asbestos is friable and not contained or lead paint is present or will be caused to be present in airborne or settled dust are of concern.
2. Responsibilities of University and Contractor regarding asbestos and lead paint are as follows:
 - a. University:

- 1) Notify the Contractor of the condition and location(s) where asbestos is known to be present or may reasonably be encountered, e.g., asbestos insulation, ceiling tiles, floor tiles, fire doors, wall and ceiling plasters, concrete, grouting, etc., and lead paint on metal building materials, walls, windows, etc.
- 2) Coordinate with Contractor when response action is required by a Subcontractor.
- 3) Contract with third party contractor to monitor areas where friable asbestos and/or lead-containing particles are present during construction/renovation projects for its own records and purpose. Monitoring results can be shared with Contractors but are in no way to be used for Contractor employee monitoring.
- 4) Final authority on all asbestos-related concerns and contractual arrangements.

b. Contractor:

- 1) Notify University's Project Manager of any suspected or existing problem involving asbestos or lead and cease work in that area until University has assessed the situation.
- 2) Ensure that undamaged asbestos-containing material and/or material containing lead, not included in the scope of the project, are not damaged.
- 3) Train and monitor their own employees, including Asbestos Awareness training and Lead Paint Awareness training, where applicable.
- 4) Be responsible for all environmental/industrial hygiene surveillance of its work staff and subcontractors and for required area monitoring where potential contamination of adjacent areas exists.
- 5) Prevent problems which can result in asbestos or lead exposure to building occupants.
- 6) Coordinate with the University's EHS Department and Building Maintenance and Operations through University's Project Manager and perform all activities that may potentially disturb asbestos containing materials in a manner acceptable to the EHS.
- 7) Follow State of Colorado regulation, Emission Standards for Asbestos, Part B, Control of Asbestos, "Regulation 8" and OSHA standards regulating exposure to asbestos and lead.
- 8) Where applicable, comply with Section 02 81 00 "Transportation/Disposal of Hazardous Materials."
- 9) Comply with current "Asbestos-Contaminated Soil Management Standard Operating Procedure Document, University of Colorado Anschutz Medical Campus" during excavation operations.

D. Carcinogens:

1. Contractor or any Subcontractor shall not knowingly install or cause to be installed any material or product containing carcinogens. Refer to Annual Report on Carcinogens, U.S. Department of Health and Human Services, National toxicology Program.

E. Hazardous Waste:

1. All hazardous wastes are to be handled and disposed of according to current University EHS guidelines which can be obtained through University Project Manager. Only individuals specifically authorized by University may sign hazardous waste manifests for wastes generated on University's property. Only University approved transporters and disposal facilities are to be used for transportation and disposal of hazardous wastes.

F. The Control of Hazardous Energy (Lockout/Tagout):

1. Provide and enforce a program and procedures for the control of hazardous energy (lockout/tagout) including, but not limited to, locks, tags and lockout devices. Provide proof that workers have received safety training in the control of hazardous energy through lockout/tagout.

G. Hot Work Operations:

1. Comply with University hot work policy and obtain Hot Work Permit prior to executing any hot work.
2. Notify University Project Manager prior to any hot work on University property.
3. Provide and enforce a program to control fires during hot work operations. Provide appropriately rated fire extinguishers, fire retardant protective covers (when needed), and any other hot work related equipment.

H. Confined Space Entry:

1. Work in compliance with the “Confined Spaced Entry Procedure for Non-University Personnel” whenever any project requires entry into a confined space. A copy of this procedure can be obtained from University EHS through University’s Project Manager.

END OF SECTION 01 35 44

SECTION 01 35 96

SPECIAL PROCEDURES FOR PROPERTY PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Procedures for establishing existing conditions and monitoring procedures for protection of adjacent or nearby structures and improvements including, but not limited to, sidewalks, landscaping, parking facilities, roadways, or driveways, whether on or off the University's property arising from excavation, trenching, foundation drilling, and boring.

1.2 UNIVERSITY'S SURVEY (Not Used)

1.3 SUBMITTALS (Not Used)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 MONITORING

- A. Establish accurate levels and positions of all elements relative to other fixed points to permit accurate monitoring of potential changes.
- B. At all times during construction activities which are likely to affect adjacent properties, improvements or building, monitor conditions carefully including horizontal or vertical movements, changes in existing cracks, joints or defects or development of new cracks and other evidence of changing conditions. Report immediately to University's Project Manager and Engineer any changes to existing conditions and stop work where such appear to be significant or potentially dangerous to persons or property.

3.2 REMEDIES

- A. Conduct construction operations and specifically excavation, trenching, foundation drilling, and boring in a manner that will avoid damage to adjacent buildings, structures, properties or improvements. Promptly remedy any such damage whether to University's or other property and hold the University harmless from such damage.

3.3 POST-CONSTRUCTION SURVEY

- A. Within 30 calendar days of completion of those construction activities that would potentially damage adjacent or nearby properties, re-survey all items of University's original survey and Contractor's supplemental information, including monitoring control points. Perform this work using a licensed surveyor and independent photographer. Identify specifically each changed condition, its magnitude and probable cause.

END OF SECTION 01 35 96

SECTION 01 40 00

QUALITY REQUIREMENTS

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 administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, University, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.
- C. Related Requirements:
 - 1. Section 01 42 00 "Reference" for list of references, standards and definitions.
 - 2. Division 26 for testing of electrical systems.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by University Project Manager or Engineer.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are

not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Shop Drawings: Where integrated exterior mockups are required and indicated on the Drawings, provide plans, sections, and elevations, indicating materials and size of mockup construction.
 - 1. Indicate manufacturer and model number of individual components.
 - 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect/Engineer.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect/Engineer.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include 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 tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of technical representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For University's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
1. Monitor quality control over products, services, site conditions, and workmanship to produce work of specified quality.
 2. Comply fully with manufacturers' instructions, including each step in sequence.
 3. If manufacturers' instructions conflict with Contract Document requirements, request clarification from Engineer before proceeding.
 4. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
 5. Perform work by persons qualified to produce workmanship of specified quality.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Subcontractor and Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance. In addition comply with the following:
1. For all trades: Proof of applicable licensing.
 2. Electrical contractors:

- a. Company: State of Colorado master electrician license.
 - b. On-site electricians: State of Colorado journeyman license.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329 or ASTM D 3740 as appropriate; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
 3. Independent Agency: Meeting "Recommended Requirements for Independent Laboratory Qualifications" published by American Council for Independent Laboratories.
 4. Authorized to operate in the State of Colorado.
 5. Calibrate testing equipment at reasonable intervals with devices of accuracy traceable to National Bureau of Standards or of accepted values of natural physical constants.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies and mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. When required, build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups, as applicable; do not reuse products on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect/Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect/Engineer.
 2. Notify Architect/Engineer seven calendar days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Engineer's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven calendar days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: When indicated on Drawings, construct integrated exterior mockup. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.9 QUALITY CONTROL

- A. University Responsibilities: Where quality-control services are indicated as University's responsibility, University will engage a qualified testing agency to perform these services.
1. University will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made by the University.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to University are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by University, unless agreed to in writing by University.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- D. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. **Testing Agency Responsibilities:** Cooperate with Architect/Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples including, but not limited to, safe storage and proper curing of concrete test cylinders at Project site for first 24 hours after casting as required by ASTM C 31.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. **Manufactured Items and Equipment:** Where manufactured products or equipment are required to have representative samples tested, do not use such materials or equipment until tests have been made and the

materials or equipment found to be acceptable. Do not incorporate in the work any product which becomes unfit for use after acceptance.

- J. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
 - 1. Distribution: Distribute schedule to University, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: University will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of University, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections including instructions received from University. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Engineer.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
 - 5. Disposition: Pass, fail, nature of defects, if any.
 - 6. Date and descriptions of remedial or correction action taken.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.3 SCHEDULE OF INSPECTIONS AND TESTS BY UNIVERSITY

- A. University will engage testing agency and pay for testing and inspection associated with the following materials and systems, where included in the Project:
 - 1. Compaction density of fill and backfill.
 - 2. Drilled pier end bearing conditions and depths.
 - 3. Cast-in-place concrete.
 - 4. Precast concrete.
 - 5. Post-tensioned concrete tendons.
 - 6. Masonry.
 - 7. Structural steel field welds and bolted connections.
 - 8. Spray-applied fireproofing.
 - 9. Built-up roof cutouts.
 - 10. Asphaltic concrete paving.
 - 11. Foundation drainage systems.
 - 12. Drainage structures and piping.
 - 13. Waterproofing.
 - 14. Air barriers.
 - 15. Fluid applied membranes.
 - 16. Thermal imaging.
 - 17. Curtain wall, window, and door field testing.
 - 18. Ceiling hanger wire pull-out.
 - 19. Electrical resistance of static-control resilient flooring.
 - 20. Field sound testing of operable partitions.
 - 21. Elevator safety.
 - 22. Fan vibration.

END OF SECTION 01 40 00

SECTION 01 41 00

REGULATORY REQUIREMENTS

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. Building Department Authority.
 - 2. MS 4 Storm Water and Water Quality Permits
 - 3. Applicable Codes and Standards.

1.3 BUILDING DEPARTMENT AUTHORITY

- A. The University of Colorado Denver is charged with the responsibility of ensuring that provision of applicable codes, standards and guidelines are met on its campuses.
- B. The University Denver campus has an established Building Authority responsible to review and examine buildings and plan documents, to permit and inspect construction and/or demolition to ensure conformance to codes adopted by the University and issue certificates of temporary occupancy and occupancy if satisfactory conformance is demonstrated.
- C. The authority is executed by the Campus Building Official (CBO) who has the responsibility to perform all the duties set forth in the Current Approved State Buildings Codes and other applicable codes and standards indicated in the "Applicable Codes and Standards" Article of this Section.
- D. Permits: Obtain a separate permit for each Project from the Office of the CBO prior to erecting, constructing, enlarging, repairing, moving, removing, converting or demolishing any building or portion thereof. Coordinate and obtain all permits through the University Project Manager. The Contractor is not responsible for costs associated with construction permits.
 - 1. Exempt work: A building permit is not required for the following:
 - a. Fences less than or equal to 6 feet tall.
 - b. Movable casework, counters and partitions not over 5 feet 9 inches tall with no electrical or plumbing.
 - c. Platforms, walks, and driveways not more than 30 inches above grade and not over any basement or story below.
 - d. Painting, papering and similar finish work.
 - e. Other work of limited scope at the discretion of the CBO.
- E. Permit Issuance: The CBO, or at the discretion of the CBO a third party code consultant, will review application, Drawings, Specifications, computations and other data filed for permit. Complete the permit

application with the University Project Manager. Permits require submittal of two (2) stamped, signed sets of Construction Documents, including Drawings, Specifications and all Addenda, and one (1) set of each engineering discipline's calculations, where such calculations are required. If CBO determines that submittal conforms to the requirements of the Building Code and other applicable codes, standards, laws, regulations and ordinances, an inspection record card will be issued with the building permit. Keep one stamped set of documents on site. The University will keep one stamped set in the Campus Support plan room.

- F. Suspension or Revocation of Permit: CBO may, in writing, suspend or revoke a permit issued in error or on the basis of submitted information that is incorrect or that is in violation of the Building Code and other applicable codes and standards.
- G. Posting of Permit: Post the Permit in a visible and protected location near the access to the project.
- H. Inspection Record Card: Post the Inspection Record Card next to the permit in a visible and protected location near the access to the project. CBO will make required entries based on inspection of the work.
- I. Inspection Requests:
 - 1. Notify CBO that work is ready for inspection two business days before such inspection is desired by telephoning the number posted on the permit. The CBO retains the right to require requests in writing.
 - 2. A re-inspection fee may be charged for prior rejected items.
- J. Construction Inspections:
 - 1. Contractor is not responsible for costs associated with construction inspections, except re-inspections. The CBO or his/her designee will perform all general building, electrical and plumbing inspections. All construction or work for which a permit is required must remain accessible and exposed for inspection purposes. Provide access to and means for inspection of work.
 - 2. Site Utilities: Contact and comply with all requirements of City of Aurora.
 - 3. Plumbing and Electrical Inspections: For new buildings and major additions, contact and comply with all requirements of State of Colorado Plumbing and Electrical Boards.
 - 4. Provisions for structural and other special inspections required by Contract Documents, current approved State Building Codes and University Codes will be provided by the University.
- K. Certification of Occupancy:
 - 1. When CBO inspects the project and finds no violations of any provision of the Building Code, other applicable codes, standards, laws, regulations and ordinances, CBO will issue a Certification of Occupancy (CO) which will contain the following:
 - a. Building permit number.
 - b. Address of building.
 - c. Name and address of Owner.
 - d. Description of building or portion thereof for which certification is issued.
 - e. Statement that described building or portion thereof has been inspected for compliance with the requirements of the Building Code, other applicable codes, standards, laws, regulations and ordinances, as relates to type of occupancy and use for which the building is intended.

2. Temporary Certificate of Occupancy (TCO): If CBO finds no substantial hazard will result from occupancy of any building or portion thereof before the same is completed, CBO may issue a TCO for the use of a portion or portions of a building or structure prior to the completion of the entire building or structure.
3. Posting of CO: Provide a copy to the University Project Manager and post in a conspicuous location on the premises. CO may not be removed except by CBO upon initial occupancy.
4. Revocation of CO:

1.4 MS4 STORM WATER AND WATER QUALITY PERMITS

- A. The University has a non-standard MS4 permit for entire Anschutz Medical Campus (AMC) that requires University over-sight of campus construction and its water quality impact. Contractors are required to prepare Storm Water Quality Plans and obtain State of Colorado CDPHE permits for all projects that impact site. In addition, Contractors shall comply with the University MS4 permit requirements, including keeping written record of weekly inspections of Storm Water Quality measures and attaching record to the weekly Progress Meeting minutes. Submit the plan, permits, and evidence of final closeout to University Project Manager who will copy all such storm water documents to University Engineering Department. Coordinate with University Project Manager who will arrange for University Grounds Manager to attend monthly inspections and closeout walk.

1.5 APPLICABLE CODES AND STANDARDS

- A. The following approved building codes and standards have been adopted by State Buildings Programs (SBP) as the minimum requirements to be applied to all state-owned buildings and physical facilities including capital construction and controlled maintenance construction projects. Current applicable codes can be obtained from The Office of the State Architect's website.
- B. University of Colorado Denver Codes and Standards: The following codes and standards supplement those indicated on the Office of the State Architect website.

1. The Manual of Guidelines and Standards for Construction Projects
 - a. <http://ucdenver.edu/about/departments/FacilitiesManagement/FacilitiesProjects/Pages/GuidelinesStandards.aspx>
2. Colorado Rules and Regulations pertaining to Radiation Control, 6 CCR 1007 Part 1-20.
3. Colorado Rules and Regulations pertaining Air Quality Control Commission Regulations, 5 CCR 1001-10, Part B "Asbestos Control."
4. Colorado Rules and Regulations pertaining to Solid Waste, 6 CCR 1007-2.
5. Colorado Rules and Regulations pertaining to Hazardous Waste, 6 CCR 1007-3.
6. Federal Hazardous Waste Regulations, 40 CFR, Parts 260 through 264.
7. Federal Clean Water Act (CWA) is 33 U.S.C § 1251 et seq. (1972).
8. University of Colorado Denver | Anschutz Medical Campus, Asbestos Contaminated Soil Management, Standard Operating Procedure (SOP) Document.
9. NFPA 30: Flammable and Combustible Liquids Code.
10. NFPA 45: Standard on Fire Protection for Laboratories Using Chemicals.
11. NFPA 72: National Fire Alarm and Signaling Code.
12. Life Safety Code (NFPA 101) – latest edition.
 - a. Use the most restrictive interpretation where NFPA 101 conflicts with the IBC requirements.

13. ANSI/AIHA Z9.5 Laboratory Ventilation – latest edition.
 - a. <http://www.aiha.org/insideaiha/standards/Pages/ANSIZ9.aspx>
14. ANSI/AIHA Z9.6 Exhaust Systems for Grinding, Buffing and Polishing – latest edition.
 - a. <http://www.aiha.org/insideaiha/standards/Pages/ANSIZ9.aspx>
15. ANSI/AIHA Z9.10 Fundamentals Governing the Design and Operation of Dilution Ventilation Systems in Industrial Occupancies – latest edition.
 - a. <http://www.aiha.org/insideaiha/standards/Pages/ANSIZ9.aspx>
16. ANSI/ASHRAE/ASHE Standard 170 – Ventilation of Healthcare Facilities – latest edition.
17. ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality.
18. OSHA “Safety and Health Regulation for Construction” (29 CFR 1926).
19. OSHA “Occupational Safety and Health Standards” (29 CFR 1910).
20. American Institute of Architects, Academy of Architecture for Health (AIA AAHA) and Facility Guidelines Institute (FGI), Guidelines for Design and Construction of Hospital and Healthcare Facilities – latest edition (FOR PATIENT CARE AREAS ONLY).
21. CDC-NIH Biosafety in Microbiological and Biomedical Laboratories (BMBL); latest edition.
22. NIH Design Requirements Manual (DRM) – latest edition.
 - a. <http://orf.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesandGuidelines/DesignRequirementsManualPDF.htm>
23. NIH Guidelines for Research Involving Recombinant DNA Molecules – latest edition.
24. ILAR Guide for Care and Use of Laboratory Animals - latest edition.
25. National Research Council of the National Academies, Institute for Laboratory Animal Research, Division on Earth and Life Studies: Guide for the Care and Use of Laboratory Animals - latest edition.
26. Uniform Federal Accessibility Standards (UFAS) – latest edition.
27. Metro Wastewater District’s Rules and Regulations, (Sections 6.17 [6.13, 6.14] and 6.18).
28. City of Aurora Asphalt and Paving Standards - latest edition.

C. Other Standards: As indicated in individual Specification Sections.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 41 00

SECTION 01 42 00

REFERENCES

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. Definitions.
 - 2. Industry Standards.
 - 3. Abbreviations and Acronyms.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for an explanation of specification and drawing conventions.
 - 2. Section 01 41 00 "Regulatory Requirements" for a list of applicable codes.

1.3 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
 - 1. Definitions in this Section are not intended to be complete, exhaustive or exclusive. They are general and apply to the Work to the extent that such definitions are not stated more explicitly in other provisions of the Contract Documents.
- B. "Approved": When used to convey Architect/Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect/Engineer's duties and responsibilities as stated in the Conditions of the Contract. Except where expressly indicated, such approval does not release the Contractor from responsibility to fulfill requirements of the Contract Documents.
- C. "Backup": N+1 system.
- D. "Directed": A command or instruction by Architect/Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- E. "EHS": Environmental Health and Safety.
- F. "Engineer": Architect/Engineer. Other terms including "Mechanical Engineer", "Electrical Engineer", or "Structural Engineer" have the same meaning as "Engineer."
- G. "General Conditions": Contract terms contained in Contractor's Agreement Design/Bid/Build, State Form SC-6.21 and The General Conditions of the Construction Contract Design/Bid/Build, State Form SC-6.23

- H. “General Requirements”: Provisions and requirements of all Division 01 Sections as they apply to all aspects of the Work.
- I. “Guarantee”: The narrow definition of the term “warranty” applying to both “warranty” and “guarantee” which terms are used interchangeably.
- J. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- K. “Redundant”: 2N system. The level of redundancy is determined by design.
- L. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work, whether lawfully imposed by authorities having jurisdiction or not.
- M. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- N. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- O. “Owner”: Principal Representative and/or University.
- P. "Provide": Furnish and install, complete and ready for the intended use.
- Q. “Project Manual”: Bound, printed volume or volumes including Conditions of the Contract and Specifications, which may also include bidding requirements, contract forms, details, schedules, surveys, reports or other relevant items that may or may not be Contract Documents.
- R. "Project Site": Space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- S. “Supplementary Conditions”: University Special Supplementary General Conditions. Other terms including “Supplementary General Conditions” shall have the same meaning.

1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
 - 1. Referenced standards take precedence over standards that are not referenced but generally recognized in the construction industry as applicable.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents.
 - 1. Updated Codes and Standards: Where an applicable code or standard has been revised and reissued after the date of the Contract Documents and before performance of Work affected, submit Contractor-Initiated Change Order Bulletin and Change Order Proposal in accordance with

Section 01 26 00 “Contract Modification Procedures” for consideration to modify contract requirements to comply with revised code or standard.

- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
 2. Where required by individual Specification Sections provide and maintain copies of referenced codes and standards at Project Site.
 3. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect/Engineer reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.
- D. Unreferenced Standards: Unreferenced standards are not directly applicable to the Work, except as a general requirement of whether the Work complies with recognized construction industry standards.
- E. Conflicting Requirements: Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect/Engineer for a decision before proceeding.

1.5 ABBREVIATIONS AND ACRONYMS

- 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 following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AABC	Associated Air Balance Council www.aabc.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association www.americanbearings.org	(202) 367-1155
ACI	American Concrete Institute (Formerly: ACI International) www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The)	(205) 257-2530

	www.aeic.org	
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AHRI	Air-Conditioning, Heating, and Refrigeration Institute (The) www.ahrinet.org	(703) 524-8800
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(607) 256-3313
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute (See AHRI)	
ARI	American Refrigeration Institute (See AHRI)	
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917

ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (American Society of Mechanical Engineers) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Safety Engineers (The) www.asse.org	(847) 699-2929
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500
ATIS	Alliance for Telecommunications Industry Solutions www.atis.org	(202) 628-6380
AWEA	American Wind Energy Association www.awea.org	(202) 383-2500
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWMAC	Architectural Woodwork Manufacturers Association of Canada www.awmac.com	(403) 453-7387
AWPA	American Wood Protection Association (Formerly: American Wood-Preservers' Association) www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.gobrick.com	(703) 620-0010
BICSI	BICSI, Inc. www.bicsi.org	(800) 242-7405 (813) 979-1991

BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
BOCA	BOCA (Building Officials and Code Administrators International Inc.) (See ICC)	
BWF	Badminton World Federation (Formerly: International Badminton Federation) www.bwfbadminton.org	60 3 9283 7155
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.electricity.ca	(613) 230-9263
CEA	Consumer Electronics Association www.ce.org	(866) 858-1555 (703) 907-7600
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CFSEI	Cold-Formed Steel Engineers Institute www.cfsei.org	(866) 465-4732 (202) 263-4488
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(404) 622-0073
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(703) 724-1128
CRI	Carpet and Rug Institute (The) www.carpet-rug.org	(706) 278-3176
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(800) 328-6306 (847) 517-1200

CSA	Canadian Standards Association www.csa.ca	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
CWC	Composite Wood Council (See CPA)	
DASMA	Door and Access Systems Manufacturers Association www.dasma.com	(216) 241-7333
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
ECA	Electronic Components Association www.ec-central.org	(703) 907-8024
ECAMA	Electronic Components Assemblies & Materials Association (See ECA)	
EIA	Electronic Industries Alliance (See TIA)	
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (703) 538-1616
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) www.esda.org	(315) 339-6937
ESTA	Entertainment Services and Technology Association (See PLASA)	
EVO	Efficiency Valuation Organization www.evo-world.org	(415) 367-3643 44 20 88 167 857
FIBA	Fédération Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00

FIVB	Fédération Internationale de Volleyball (The International Volleyball Federation) www.fivb.org	41 21 345 35 45
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridarooft.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council U.S. www.fscus.org	(612) 353-4511
GA	Gypsum Association www.gypsum.org	(301) 277-8686
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GS	Green Seal www.greenseal.org	(202) 872-6400
HI	Hydraulic Institute www.pumps.org	(973) 267-9700
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association (See AHRI)	
HMMA	Hollow Metal Manufacturers Association (See NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAPSC	International Association of Professional Security Consultants www.iapsc.org	(415) 536-0288
IAS	International Approval Services (See CSA)	
ICBO	International Conference of Building Officials (See ICC)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (202) 370-1800

ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICPA	International Cast Polymer Alliance www.icpa-hq.org	(703) 525-0511
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IES	Illuminating Engineering Society (Formerly: Illuminating Engineering Society of North America) www.ies.org	(212) 248-5000
IESNA	Illuminating Engineering Society of North America (See IES)	
IENT	Institute of Environmental Sciences and Technology www.ient.org	(847) 981-0100
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
IGSHPA	International Ground Source Heat Pump Association www.igshpa.okstate.edu	(405) 744-5175
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
Intertek	Intertek Group (Formerly: ETL SEMCO; Intertek Testing Service NA) www.intertek.com	(800) 967-5352
ISA	International Society of Automation (The) (Formerly: Instrumentation, Systems, and Automation Society) www.isa.org	(919) 549-8411
ISAS	Instrumentation, Systems, and Automation Society (The) (See ISA)	
ISFA	International Surface Fabricators Association (Formerly: International Solid Surface Fabricators Association) www.isfanow.org	(877) 464-7732 (801) 341-7360
ISO	International Organization for Standardization www.iso.org	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association (See ISFA)	

ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (See CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MCA	Metal Construction Association www.metalconstruction.org	(847) 375-4718
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(888) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MMPA	Moulding & Millwork Producers Association (Formerly: Wood Moulding & Millwork Producers Association) www.wmmpa.com	(800) 550-7889 (530) 661-9591
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.org	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6223 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848

NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFPA	NFPA International (See NFPA)	
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NHLA	National Hardwood Lumber Association www.nhla.com	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association (See NWFA)	
NOMMA	National Ornamental & Miscellaneous Metals Association www.nomma.org	(888) 516-8585
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010

NSPE	National Society of Professional Engineers www.nspe.org	(703) 684-2800
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736
NWFA	National Wood Flooring Association www.nwfa.org	(800) 422-4556 (636) 519-9663
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PLASA	PLASA (Formerly: ESTA - Entertainment Services and Technology Association) www.plasa.org	(212) 244-1505
RCSC	Research Council on Structural Connections www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute www.rfci.com	(706) 882-3833
RIS	Redwood Inspection Service www.redwoodinspection.com	(925) 935-1499
SAE	SAE International (Society of Automotive Engineers) www.sae.org	(877) 606-7323 (724) 776-4841
SBCCI	Southern Building Code Congress International, Inc. (See ICC)	
SCTE	Society of Cable Telecommunications Engineers www.scte.org	(800) 542-5040 (610) 363-6888
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(877) 294-5424 (516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	

SIA	Security Industry Association www.siaonline.org	(866) 817-8888 (703) 683-2075
SJI	Steel Joist Institute www.steeljoist.org	(843) 293-1995
SMA	Screen Manufacturers Association www.smainfo.org	(773) 636-0672
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SRCC	Solar Rating and Certification Corporation www.solar-rating.org	(321) 638-1537
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWPA	Submersible Wastewater Pump Association www.swpa.org	(847) 681-1868
TCA	Tilt-Up Concrete Association www.tilt-up.org	(319) 895-6911
TCNA	Tile Council of North America, Inc. (Formerly: Tile Council of America) www.tileusa.com	(864) 646-8453
TEMA	Tubular Exchanger Manufacturers Association, Inc. www.tema.org	(914) 332-0040
TIA	Telecommunications Industry Association (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance) www.tiaonline.org	(703) 907-7700

TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance (See TIA)	
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tilerroofing.org	(312) 670-4177
UBC	Uniform Building Code (See ICC)	
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association www.wcmanet.org	(212) 297-2122
WDMA	Window & Door Manufacturers Association www.wdma.com	(800) 223-2301 (312) 321-6802
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association (See MMPA)	
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 938-5441

WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930
------	---	----------------

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

DIN	Deutsches Institut für Normung e.V. www.din.de	49 30 2601-0
-----	---	--------------

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
-------	---	----------------

ICC	International Code Council www.iccsafe.org	(888) 422-7233
-----	---	----------------

ICC-ES	ICC Evaluation Service, LLC www.icc-es.org	(800) 423-6587 (562) 699-0543
--------	---	----------------------------------

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

COE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
-----	---	----------------

CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
------	--	----------------------------------

DOC	Department of Commerce National Institute of Standards and Technology www.nist.gov	(301) 975-4040
-----	--	----------------

DOD	Department of Defense http://dodssp.daps.dla.mil	(215) 697-2664
-----	---	----------------

DOE	Department of Energy www.energy.gov	(202) 586-9220
-----	--	----------------

EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
-----	--	----------------

FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
-----	--	----------------

FG	Federal Government Publications www.gpo.gov	(202) 512-1800
----	--	----------------

GSA	General Services Administration www.gsa.gov	(800) 488-3111 (202) 619-8925
-----	--	----------------------------------

HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
-----	--	----------------

LBL	Lawrence Berkeley National Laboratory Environmental Energy Technologies Division http://eetd.lbl.gov	(510) 486-4000
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742
SD	Department of State www.state.gov	(202) 647-4000
TRB	Transportation Research Board National Cooperative Highway Research Program www.trb.org	(202) 334-2934
USDA	Department of Agriculture Agriculture Research Service U.S. Salinity Laboratory www.ars.usda.gov	(202) 720-3656
USDA	Department of Agriculture Rural Utilities Service www.usda.gov	(202) 720-2791
USDJ	Department of Justice Office of Justice Programs National Institute of Justice www.ojp.usdoj.gov	(202) 307-0703
USP	U.S. Pharmacopeia www.usp.org	(800) 227-8772 (301) 881-0666
USPS	United States Postal Service www.usps.com	(202) 268-2000

- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CFR	Code of Federal Regulations Available from Government Printing Office www.gpo.gov/fdsys	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification	(215) 697-2664

Available from Department of Defense Single Stock Point
<http://dodssp.daps.dla.mil>

Available from Defense Standardization Program
www.dsp.dla.mil

Available from General Services Administration (800) 488-3111
www.gsa.gov (202) 619-8925

Available from National Institute of Building Sciences/Whole Building
Design Guide (202) 289-7800
www.wbdg.org/ccb

MILSPEC Military Specification and Standards
(See DOD)

USAB United States Access Board (800) 872-2253
www.access-board.gov (202) 272-0080

USATBCB U.S. Architectural & Transportation Barriers Compliance Board
(See USAB)

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

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 requirements for temporary utilities, support facilities, and security and protection facilities.
 - 1. Nothing in this Section is intended to limit types and amounts of temporary work required, and no omission from this Section will be recognized as an indication by Engineer that such temporary activity is not required for successful completion of the Work. The use of alternative facilities equivalent to those specified is the Contractor's option, subject to Engineer's and University acceptance.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, University's construction forces, Engineer, testing agencies, and authorities having jurisdiction.
- B. Use Charges: As follows:
 - 1. For new construction: Arrange for and pay for water, sewer, electric power, steam and chilled water use charges for utility usage by all entities for construction operations.
 - 2. For renovations of existing facilities: Arrange for and University will pay for all use charges.
- C. Temporary Metering: For all utility connection; sub-meter at point of connection to existing systems.
 - 1. Temporary utility meter must be approved by University Campus Energy Engineer.
 - 2. Meters shall be operational prior to any use of utility for temporary heating.

1.4 INFORMATIONAL SUBMITTALS

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

- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Dust Control Plan: Submit coordination drawing and narrative that indicates the dust 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. Location of proposed air-filtration system discharge.
 - 3. Waste handling procedures.
 - 4. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. General: Comply with governing regulations and utility company regulations and recommendations for the construction of temporary facilities including, but not necessarily limited to, code compliances, permits, inspections, testing, health, safety, pollution and environmental compliances.
- B. Fire-safety: Comply with NFPA 421 "Standard for Safeguarding Construction, Alteration, and Demolition Operations."
- C. Safety: Comply with ANSI/ASSE A10 "Construction Package" series of safety construction standards.
- D. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- E. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before University's acceptance, regardless of previously assigned responsibilities.
- B. 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.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide both new or used materials and equipment for temporary facilities, which are in substantially undamaged and serviceable condition. Provide types and qualities which are recognized in the construction industry as suitable for the intended use in each application. Comply with Utility Company requirements as applicable.

2.2 TEMPORARY FACILITIES

- A. Temporary Facilities will not be provided or allowed on the construction site. The University will provide conference room space for OAC meetings. University will identify and provide staging area for materials.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Digital Camera: Minimum 12 megapixel; available in field office for use.
- C. Thermometer: Outdoor, re-settable type indicating daily maximum and minimum temperatures.
 - 1. Locate in a shaded-from-the-sun, conveniently readable location that will give reasonably accurate readings of the actual air temperature and be reached easily for resetting.
 - 2. Maintain daily log of reading.
- D. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, University, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Comply with requirements in Section 01 10 00 "Summary" for existing utility disruption procedures.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction. Where available, connect to University's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to University. At Substantial Completion, restore these facilities to condition existing before initial use.
 - 1. Obtain and pay for all required water taps.

- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Toilets: Use of University's existing toilet facilities is not permitted.
 - 2. Provide temporary toilets within available site area in location approved by University which will best serve the needs of construction personnel.
 - 3. Supply and maintain toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each sanitary facility, and provide appropriate waste paper containers for used materials.
 - 4. At Contractor's option, provide drinking water for construction personnel by either water-system-connected drinking fountains or by containerized tap dispensers with paper cups (or both).
- E. Electric Power Service: Provide weatherproof, grounded, electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Include, as required, transformers, overload protected disconnects, automatic ground fault interrupters and main distribution switchgear. Maintain equipment in a condition acceptable to University.
 - 1. Install electric power service overhead unless otherwise indicated.
 - 2. Where available capacity exists in existing system, connect temporary service to University's existing power source, as directed by University.
 - 3. Provide separate connection for power and for lighting.
 - 4. Provide sufficient 220v outlets for special tools, welding equipment and similar devices requiring such service at locations where required.
 - 5. Provide sufficient circuits and duplex 120v single phase outlets so located that any part of the work can be reached with a 75 foot extension cord to accommodate normal power tools and supplemental lighting.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect/Engineer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to University.
- B. Temporary Walks: Construct and maintain temporary walks around the construction work and to offices, toilets and similar locations on the site.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: Comply with requirements in Section 01 10 00 "Summary."
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs at locations indicated or directed. Unauthorized signs are not permitted.

1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
2. Engage an experienced sign painter to apply required colors and graphics in a neat and professional manner.
3. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

1. Coordinate with University Project Manager to obtain approval from University Environmental Services Manager.

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel. The selection of type, size and number of hoisting facilities is solely the responsibility of the Contractor.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Protection of Work: Protect in-progress and completed work from damage or deterioration, other than normal weathering of exposed materials, through construction duration until completion, as appropriate and as recommended by manufacturer and Installer.

1. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawn and landscaped areas.
2. Always protect excavation and trenches, from damage from rainwater, spring water, ground water, backing up of drains or sewers.

C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 01 10 00 "Summary."

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Comply with Section 01 41 00 “Regulatory Requirements” Article “MS4 Storm Water and Water Quality Permits.”
 2. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 3. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 4. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 5. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with Section 01 41 00 “Regulatory Requirements” Article “MS4 Storm Water and Water Quality Permits.”
- F. Tree and Plant Protection: Install temporary fencing or guard located outside the drip line of trees to protect vegetation from damage arising out of construction operations, including cutting, breaking or skinning of roots and skinning or bruising of bark. Protect tree root systems from damage, flooding, and erosion.
1. Do not stockpile construction materials or excavated materials inside dripline.
 2. University will identify historically recorded trees and vegetation not to be disturbed.
 3. Water trees and other vegetation to remain as required to maintain their health for the duration of the Project.
 4. Repair or replace trees and vegetation damaged by construction operations in a manner acceptable to University Project Manager. Use a qualified tree surgeon to perform the work.
- G. Site Enclosure Fence: Within 10 business days of mobilization, furnish and install cones and barricades where necessary for pedestrian safety. Restrict access as applicable.
- H. Security: Provide security program and facilities to protect the Work, existing facilities, and University operations and to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
1. Coordinate with University Police.
 2. After review and approval by University, install temporary enclosure around partially completed areas of construction.
 3. 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.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting wherever required to prevent accidents and losses.
- 3.5 OPERATION, TERMINATION, AND REMOVAL
- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
1. Do not permit temporary offices and similar temporary or permanent spaces to be used as living quarters or for other unintended occupancies or uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Janitorial Services: Provide daily janitorial services for temporary offices, toilets, and similar areas at the project site. Require users of other temporary facilities to maintain clean and orderly premises.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion, unless Architect/Engineer requests that it be retained for a longer period of time. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. University reserves right to take possession of Project identification signs.
 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT REQUIREMENTS

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 administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
 - 2. Section 01 42 00 "References" for applicable industry standards for products specified.
 - 3. Section 01 77 00 "Closeout Procedures" for submittal of project warranties.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract Documents, but must be provided by the Contractor.
- B. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturers or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.
- D. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
- E. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.
 - 1. Name of product and manufacturer.
 - 2. Model and serial number.
 - 3. Capacity.
 - 4. Speed.
 - 5. Ratings.
 - 6. Power characteristics (if applicable).
 - 7. UL label or compliance (if applicable).

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an 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 on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents. Such disclaimers and limitations do not relieve warranty requirements on Work that incorporates product nor do they relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to University.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for University.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time and Form: Comply with requirements in Section 01 77 00 "Closeout Procedures."
- D. Warranty Requirements:
 1. 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.
 2. 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.
 3. 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.
 4. University's Recourse:
 - a. 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.
 - b. 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.

- c. 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.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged, are asbestos free, and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. University reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Engineer will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product and provide only products previously approved during bid phase by written Addendum. The determination of equivalence is at the sole discretion of the Architect/Engineer who has no obligation to prove non-equivalence.
 7. Electrical equipment design and its space requirements are based on the first named item of the Section in which specified or that scheduled on the Drawings. If other than the first named or scheduled item listed for use is selected, modification to other elements of Work may be required. Show all such modification on shop drawings and submittals as appropriate. The cost of such modifications is solely the responsibility of the Contractor.
 8. Where manufacturers are listed as acceptable for specific proprietary products but precise identification by model, series, or trade name is not specified, submit detailed product information for such products for Engineer's acceptance prior to ordering. Include specific requirements for modifications to other construction, including but not limited to, power and utility requirements, characteristics, capacities, size and locations. The cost of such modifications is solely the responsibility of the Contractor.
- B. Product Selection Procedures:
 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

4. Manufacturers:

- a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. If proposing a comparable product by another manufacturer, whether named or not, provide a custom product if manufacturer's standard product does not include salient features of the Basis-of-Design product indicated. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
6. Contractor's Option: Where materials, products, systems or methods are specified to be selected from a list of options, subject to compliance with requirements, the choice of which material, method, product or system will be solely at the Contractor's discretion. There will be no change in Contract Sum or Time because of such choice.

C. Visual Matching Specification: Where Specifications require "match Engineer's sample", provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00

EXECUTION

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 general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of University-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for limits on use of Project site and procedures related to utility interruptions.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor or professional engineer.
- B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan and Request: Submit plan and request describing procedures at least 21 calendar days prior to the time cutting and patching will be performed.
 - 1. Submit request whenever cutting and patching operation affect:

- a. Work of the University or any separate contractor.
 - b. Structural value or integrity of any element of the Project.
 - c. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - d. Efficiency, operational life, maintenance or safety of operational elements.
 - e. Visual qualities of sight-exposed elements.
 2. Include the following information:
 - a. Extent: Describe reason for and extent of each occurrence of cutting and patching, including explanation of why cutting and patching operation cannot be reasonable avoided.
 - b. Changes to In-Place Construction: Describe cutting and patching methods and anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - c. Products: List products to be used for patching and firms or entities that will perform patching work.
 - d. Trades: Indicate trades and subcontractors who will perform the work.
 - e. Dates: Indicate when cutting and patching will be performed.
 - f. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - 1) Include description of provisions for temporary services and systems during interruption of permanent services and systems.
 - 2) Comply with requirements of Section 01 10 00 "Summary" related to existing utility and system interruptions.
 - g. Structural Elements: Where cutting and patching structural elements requires the addition of reinforcement, submit details and calculations signed and sealed by an Engineer registered in the State of Colorado. Indicate how new reinforcing will be integrated with original structure.
 3. Limitations: Approval of cutting and patching request does not waive right of Architect/Engineer or University to later require complete removal and replacement of work found to be unsatisfactorily cut and patched.
- D. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.
- E. Final Property Survey: Submit one electronic and two paper copies showing the Work performed and record survey data.
1. Include certified statement that lines and levels of the work comply with the requirements of the Contract Documents and listing authorized or accepted deviations, cross-referenced to Change Order number, where applicable.
- 1.5 QUALITY ASSURANCE
- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
 - B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include but are not limited to the following:
 - a. Primary operational systems and equipment.
 - b. Control systems.
 - c. Electrical wiring systems.
 - d. Operating systems of special construction.
 3. Hazardous Materials: Do not proceed with cutting and patching operations until University has examined existing construction for the presence of asbestos and/or lead-based coatings. Comply with requirements in Section 01 35 00 "Special Procedures."
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 Section "Sustainable Design Requirements."
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work. Notify University Project Manager and Engineer and obtain approval prior to disturbing, moving or penetrating soil.
 - 1. Arrange for location services for buried utilities including water, sewer lines, electrical lines, and gas lines within construction limits. Obtain location information and stake or mark all known utilities prior to commencing construction activities.
 - a. Contact Utility Notification Center of Colorado (UNCC), 1-800-922-1987, and comply with UNCC guidelines.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Examine stakes and markings for proposed light standard locations, bore pit locations, and electrical systems to verify actual locations of connections before foundation drilling, trenching, and boring.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility or University, as appropriate, 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. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
 - 1. 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.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Engineer when deviations from required lines and levels exceed allowable tolerances. Record deviation which are accepted (i.e., not corrected) on record drawings in accordance with the requirements of Section 01 78 39 "Project Record Documents."
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by University and Engineer.

3.4 FIELD ENGINEERING

- A. Identification: University will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor or professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor or professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated to the extent they are more explicit or stringent than requirements of the Contract Documents.
- C. Install products at the time and under conditions, including weather that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Isolate each part of complete installation from incompatible material as needed to prevent deterioration.
- E. 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.
- F. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- G. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- H. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- I. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned, true and level as applicable, with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
 - 2. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Responsibility: Provide cutting and patching work, including attendant excavation and backfill required to complete the Work or to:
 - 1. Make components fit together properly.
 - 2. Uncover portions of the Work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work or work not conforming to requirements of Contract Documents.
 - 4. Remove samples of installed work as specified for testing.
 - 5. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.
- C. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- D. Temporary Support: Provide temporary support of work to be cut.
- E. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- F. Existing Utility Services and Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations. Employ methods which will prevent settlement or damage to other work.
 - 5. Electrical Services: Cut off conduit to be removed. Cap, valve, or plug and seal remaining portion of conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.

- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements, including tolerance, specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: 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.
 - a. Clean conduit, and similar features before applying paint or other finishing materials.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 UNIVERSITY-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for University's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by University's construction personnel.
 - 1. Construction Schedule: Inform University of Contractor's preferred construction schedule for University's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify University if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include University's construction personnel at preinstallation conferences covering portions of the Work that are to receive University's work. Attend preinstallation conferences conducted by University's construction personnel if portions of the Work depend on University's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven calendar days during normal weather or three calendar days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Collection Point: Review location with University and obtain approval.
- C. Site: Maintain Project site free of waste materials and debris.
- D. Wind Blown Debris: Prevent spread of trash, debris, cartons, packing material, or other waste on or off Project site by wind.
- E. Dust: Sprinkle dusty debris with water.

- F. Packing Materials: Immediately after uncrating or unpacking materials or equipment, remove all crating, lumber, excelsior, wrapping or other like combustible materials from building to central collection facility.
- G. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- H. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- I. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- J. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- K. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- L. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- M. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- N. Limiting Exposures: 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.
- O. Snow and Ice: Remove snow and ice that impedes work from construction site.
- P. Streets: At frequency required by University and/or governing authority, clean adjacent and nearby streets of dirt resulting from construction operations.

3.9 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Excessively high or low humidity.
 - 5. Water or ice.
 - 6. Solvents.
 - 7. Chemicals.
 - 8. Radiation.
 - 9. Puncture.
 - 10. Abrasion.
 - 11. Heavy traffic.
 - 12. Soiling, staining and corrosion.
 - 13. Combustion.
 - 14. High speed operation.
 - 15. Improper lubrication.
 - 16. Unusual wear or other misuse.
 - 17. Contact between incompatible materials.
 - 18. Misalignment.
 - 19. Excessive weathering.
 - 20. Unprotected storage.
 - 21. Improper shipping or handling.
 - 22. Theft.
 - 23. Vandalism.

END OF SECTION 01 73 00

SECTION 01 77 00

CLOSEOUT PROCEDURES

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 administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures, including Notice of Completion and Final Inspection procedures.
 - 2. Occupancy procedures, including Notice of Approval of Occupancy/Use and University Supplemental Notice of Occupancy and Use List.
 - 3. Final Acceptance procedures, including Pre-Acceptance Checklist and University Supplemental Building/Project Acceptance List.
 - 4. Inspections after completion.
 - 5. Warranties.
 - 6. Final cleaning.
 - 7. Repair of the Work.
- B. Related Requirements:
 - 1. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 2. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 3. Section 01 79 00 "Demonstration and Training" for requirements for instructing University's personnel.

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Notice of Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Acceptance.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 NOTICE OF COMPLETION AND SUBSTANTIAL COMPLETION PROCEDURES

- A. Procedures and Submittals Prior to Notice of Completion: Complete and submit all of the following items prior to submitting Notice of Completion to University Project Manager. Include Contractor's comprehensive list of items to be completed, corrected or not in compliance with the Drawings and Specifications.
 - 1. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's preliminary punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
 - 2. Building Inspection Record: Submit completed record with all required corrections noted.
 - 3. Certificate of Occupancy: Submit Certificate of Occupancy (CO) or Temporary Certificate of Occupancy (TCO).
 - 4. Final Completion Schedule: Submit schedule for performing and completing all work indicated on the Contractor' list of incomplete items.
 - 5. Submit sustainable design documentation.
 - 6. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 7. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 8. Submit test/adjust/balance records.
- B. Final Inspection: Submit Notice of Completion to Engineer and University Project Manager. Upon receipt, University will review and if all items on the University Supplemental Notice of Completion Checklist are complete will, within the timeframe required by the Contract, schedule and make an inspection of the Project to determine whether the Work is substantially complete.
 - 1. Final Punch List: Based on the inspection, University Project Manager will prepare a final punch list of work to be completed, work not in compliance with the Drawings or Specifications, and unsatisfactory work for any reason.
 - 2. Re-inspection: If the cumulative number of items identified on the final punch list prevents a determination that the work is substantially complete, complete those items and when complete resubmit Notice of Completion. Upon receipt of resubmittal, Engineer and University will then schedule and make a re-inspection of the Project to determine whether the Work is substantially complete.
- C. Notice of Substantial Completion: When inspection of the Work indicates that the Project is substantially complete and all other Contract provisions required for substantial completion have been satisfied, University Project Manager will issue a Notice of Substantial Completion (State Form SBP-07).

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. MS Excel and PDF electronic file. University Project Manager will return annotated file.

1.8 OCCUPANCY PROCEDURES

- A. Procedures and Submittals Prior to Occupancy: Complete and submit all items on both State Form SBP-01 "Notice of Approval of Occupancy/Use" and University Supplemental Notice of Occupancy and Use List.

1.9 FINAL ACCEPTANCE PROCEDURES

- A. Procedures and Submittals Prior to Final Acceptance: Complete and submit all items on both State Form SBP-05 "Pre-Acceptance Checklist" and University Supplemental Building/Project Acceptance List.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 business days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, University Project Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. University Project Manager will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.10 SETTLEMENT AND FINAL PAYMENT

- A. Submit and complete all of the following as a condition precedent to settlement and final payment:
 1. All guarantees and warranties.
 2. All statement to support local sales tax refunds, if any.
 3. Three (3) sets of operation and maintenance manuals.
 4. One (1) set of as-built Contract Documents showing all job changes.
 5. All demonstration and training completed in accordance with Section 01 79 00.
 6. All punch list items documented as complete.
- B. Final Certificate of Payment: Submit in accordance with the requirements of Section 01 29 00 "Payment Procedures."

1.11 INSPECTIONS AFTER COMPLETION

- A. Warranty/Guarantee Inspections: During the warranty period, accompany Engineer and University Representative, and participate in inspection(s) of the Project to identify defective and deficient work at intervals and as required by the Contract.
- B. List of Deficient or Defective Work: Within 10 business days of inspection, Engineer will provide Contractor with a list of items requiring correction.
- C. Remedial Work: Upon receive of itemized list, immediately correct and remedy deficiencies and defects in a manner satisfactory to the Engineer and University.

1.12 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties to the University Project Manager prior to advertisement of the Notice of Contractor's Settlement. If the Notice of Acceptance designates a commencement date for warranties other than the date of Notice of Acceptance for the Work, or a designated portion of the Work, submit written warranties upon request of the University Project Manager.
- B. Partial Occupancy: 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, submit properly executed warranties to the University Project Manager within fifteen (15) calendar days of completion of that designated portion of the Work.
- C. Special Warranties: 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 through the Engineer for approval prior to final execution. Refer to individual Specification Sections for specific requirements for special warranties.
 - 1. Special warranties shall include a 10 year warranty on LED luminaires.
- D. Form of Submittal: Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 - 1. Number of Copies: Two.
 - 2. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 4. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 - 5. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- E. Provide additional copies of each warranty to include in operation and maintenance manuals.
- F. List of Extended Warranties: Provide a comprehensive list of all manufacturers' standard and special warranties with duration greater than one year after Notice of Acceptance. Organize list into an orderly sequence based on table of contents of the Project Manual.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Clean each surface or unit to condition expected in an average commercial project site cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations immediately prior to Occupancy for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior finishes to a dirt-free condition, free of grease, dust, stains, films, fingerprints, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective and transparent surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including trenches, equipment vaults, manholes, and similar spaces.
 - h. Clean transparent materials. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish glass, taking care not to scratch surfaces.
 - i. Remove labels that are not permanent.
 - j. Clean light fixtures, lamps, and reflectors to function with full efficiency.
 - k. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating

equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.3 ATTACHMENTS

A. Samples of the following forms are appended to this Section for reference following End of Section 01 77 00:

1. University of Colorado Denver | Anschutz Medical Campus Supplemental Notice of Occupancy and Use List.
2. University of Colorado Denver | Anschutz Medical Campus Supplemental Building / Project Acceptance List.

END OF SECTION 01 77 00

Supplemental Notice of Occupancy and Use List

Project Name & Number: _____

Contractor: _____

In addition to completing Notice of Approval of Occupancy / Use (SBP-01), the following items must be completed before Occupancy is approved.

Activity	Date Completed	Remarks
1. Not Used		
2. A copy of the Contractor's in-progress red line "as-built" drawings has been given to BMO representative & a 2 nd copy is provided-for Projects plan room.		
3. Maintenance, operations and spare parts manuals on all installed equipment.		
4. Notice of Partial Substantial Completion concerning roles/ responsibilities of University and Contractor for security, maintenance, utilities reviewed and accepted.		
5. Manufacturer maintenance, operations and spare parts manuals for fixtures and electrical.		
6. Not Used		
7. Warranty Dates and Contact list for all Contractors and Suppliers given to BMO.		
8. Transfer utility account from Contractor to Facilities Operations.		
9. Not Used		
10. If Commissioning Report is completed, BMO has reviewed/ commented on fixtures and electrical		
11. Not Used		
12. Not Used		
13. Not Used		
14. Not Used		
15. Not Used		
16. Not Used		
17. PM to communicate to fire department via Life Safety Officer that building has transitioned to BMO. Alarms at Anschutz Medical Campus report to University Police Dispatch.		

18. Energy and Lighting and Power Management must report remotely & verify with University - Engineering.		
19. Training for BMO and FSS on installed equipment and systems is completed.		
20. Not Used		
21. Not Used		
22. Not Used		
23. PM notifies University Risk Management that project is transferring to University and notifies Contractor that it can eliminate Builders Risk Insurance.		
24. Not Used		
25. Not Used		
26. Not Used		
27. All computers and software required in drawings and specs. are received, including for Energy and Lighting and Power Management, and any specialty software and alarm codes for operating systems.		
28. For all areas to be transferred to University, all waste and debris removed; site, including sidewalks, cleared of debris and construction equipment.		
29. Not Used		
30. Not Used		
31. Not Used		

University Project Manager
(sign & print name)

Date

University BMO Rep.
(sign & print name)

Date

University FSS Rep
(sign & print name)

Date

University Downtown Rep. (If Necessary)
(sign & print name)

Date

Mark N/A by item if it is not applicable to project

Supplemental Building / Project Acceptance List

Project Name & Number: _____

Contractor: _____

In addition to completing Pre-Acceptance Checklist (SBP-05), the following items must be completed before Final Acceptance.

Activity	Date Completed	Remarks
1. Review State Buildings Pre-Acceptance check list & Notice of Approval of Occupancy / use form with BMO rep & confirm agreement with status		
*2. Establish list of post construction change orders & track separately from basic project until items are complete – call it Phase 2 to avoid delay on basic project		
3. O & M Manuals given to BMO Representative and BMO Archivist (2 hard copies and 1 electronic total)		
*4. Record Documents – a hard copy of plans and specifications are provided for plan room & given to BMO & electronic auto cad & specs are given to Archive Officer (Art Steinman) this is to include landscape drawings showing irrigation installation.		
*5. Final Site Walk is completed with University Grounds Supervisor. Drain barriers are removed and storm drains cleared. MS4 storm water plan, CDPHE permits, and evidence of final closeout received by Project Manager and all copied to University Engineering Division.		
*6. Not Used		
7. If exterior work is applicable: Landscape – Include a walk through with University Grounds for 1) new & established 1-year service date; 2) existing damaged landscape is repaired; and 3) irrigation – zone control test is complete.		
8. Not Used		
9. Electrical system one line diagram to be kept at the applicable panel. An electronic version shall be submitted to the University Project Manager.		
10. Not Used		
11. Contractor keys issued by University BMO returned to University Key Shop via PM/ BMO Rep.		
12. Not Used		
13. Not Used		
14. Not Used		

15. Not Used		
16. Not Used		
17. Not Used		
18. Not Used		
19. Not Used		
20. Not Used		
21. Not Used		
22. If commissioning is included for project, Commissioning Agent certification is received by BMO via PM and BMO Rep.		

University Project Manager
(sign & print name)

Date

University BMO Rep.
(sign & print name)

Date

University FSS
(sign & print name)

Date

University Downtown Rep (if necessary)
(sign & print name)

Date

*Warranty dates are not subject to completion of these items by contract

**** Highlighted items are not the responsibility of Contractor but PM and BMO Rep must ensure these are completed and operational prior to occupancy and use.**

Mark N/A by item if it is not applicable to project

3.1.16

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

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 administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Systems, subsystems, and equipment operation and maintenance manuals.
 - 3. Product maintenance manuals.
 - 4. Emergency manuals.
 - 5. Framed operating and maintenance instructions.
- B. Related Requirements:
 - 1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Schedule: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 30 calendar days before commencing demonstration and training. Engineer will return copy with comments.
 - 1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 calendar days of receipt of Engineer's comments and prior to commencing demonstration and training.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. Paper copies. Assemble in accordance with the requirements of this Section.
 - a. Submit three final copies, one to be retained by the Engineer and two to be retained by the University.

- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 30 calendar days before commencing demonstration and training. Engineer will return copy with comments.
 - 1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 calendar days of receipt of Engineer's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY (Not Used)

2.2 GENERAL REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Intent: Prepare data in form of an instructional manual for use by University personnel.
- B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- C. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of University.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Construction Manager.
 - 7. Name and contact information for Engineer.
 - 8. Name and contact information for Commissioning Authority.
 - 9. Cross-reference to related systems in other operation and maintenance manuals.
- D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- F. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- G. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
- H. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size and enable OCR (optical character recognition) to provide searchable text.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- I. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in minimum 1 inch and maximum 2 inch thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch, 20 lb., white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 SYSTEMS, SUBSYSTEMS AND EQUIPMENT OPERATION AND MAINTENANCE MANUALS

- A. General: Provide operation and maintenance manuals where indicated in individual Specification Section and the following:
 - 1. Electrical distribution systems.
 - 2. Other special construction and conveying systems.
- B. Operation Content: In addition to requirements in this Section, include operation data required in individual Specification Sections.
 - 1. Additional Operation Content Required:
 - a. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - b. Performance and design criteria if Contractor has delegated design responsibility.
 - c. Operating standards.
 - d. Operating procedures.
 - e. Operating logs.
 - f. Wiring diagrams.
 - g. Control diagrams.
 - h. Precautions against improper use.
 - i. License requirements including inspection and renewal dates.
 - 2. Descriptions: Include the following:
 - a. Product name and model number. Use designations for products indicated on Contract Documents.
 - b. Manufacturer's name.
 - c. Equipment identification with serial number of each component.
 - d. Equipment function.
 - e. Operating characteristics.
 - f. Limiting conditions.
 - g. Performance curves.
 - h. Engineering data and tests.
 - i. Complete nomenclature and number of replacement parts.
 - 3. Operating Procedures: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Normal shutdown instructions.
 - g. Seasonal and weekend operating instructions.
 - h. Required sequences for electric or electronic systems.
 - i. Special operating instructions and procedures.
 - 4. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- C. Maintenance Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

1. Source Information: Provide the following information in a list for each product included in manual:
 - a. Name, address, and telephone number of Installer or supplier and maintenance service agent.
 - b. Name, address, and telephone number of local source for supply of replacement parts.
 - c. Name, address, and telephone number of maintenance contractor, where appropriate.
 - d. Cross-reference Specification Section number and title.
 - e. Drawing or schedule designation or identifier where applicable.
2. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - a. Standard maintenance instructions and bulletins.
 - b. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - c. Identification and nomenclature of parts and components.
 - d. List of items recommended to be stocked as spare parts.
3. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - a. Test and inspection instructions.
 - b. Troubleshooting guide.
 - c. Precautions against improper maintenance.
 - d. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - e. Aligning, adjusting, and checking instructions.
 - f. Demonstration and training video recording, if available.
4. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - a. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - b. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
5. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
6. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
7. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - a. Include procedures to follow and required notifications for warranty claims.
 - b. Include information sheet covering proper procedures in event of failure and instances which might affect validity of warranties and bonds.

2.4 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: Provide the following information for each product included in manual:
 - 1. Name, address, and telephone number of Installer or supplier and maintenance service agent.
 - 2. Cross-reference Specification Section number and title.
 - 3. Drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.5 EMERGENCY MANUALS (Not Used)

2.6 FRAMED OPERATING AND MAINENANCE INSTRUCTIONS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

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 administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Record Samples.
 - 5. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Section 01 73 00 "Execution" for final property survey.
 - 2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
 - 3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. General: Submit record drawings with duplicate original transmittal letters containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Certification that each document as submitted is complete and accurate.
 - 5. Signature of authorized representative of the Contractor.
- B. Record Drawings: Submit copies of record Drawings as follows:
 - 1. Submit three paper-copy sets of marked-up record prints, two copies will be retained by the University and one copy retained by the Engineer.
 - 2. Submit three paper-copy sets and three digital copies on CD of electronic files for all delegated-design submittals. Two copies will be retained by the University and one copy retained by the Engineer.
- C. Record Specifications: Submit three paper copies of Project's Specifications, including addenda and contract modifications. Two copies will be retained by the University and one copy retained by the Engineer.

- D. Record Product Data: Submit three paper copies of each submittal. Two copies will be retained by the University and one copy retained by the Engineer.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- E. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit three paper copies of each submittal. Two copies will be retained by the University and one copy retained by the Engineer.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Mark using line types and symbols conforming to Contract Documents.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Locations and depths of underground utilities referenced to permanent surface improvements.
 - d. Revisions to routing of piping and conduits.
 - e. Revisions to electrical circuitry.
 - f. Actual equipment locations.
 - g. Locations of controls, junction boxes, and other items requiring access or maintenance.
 - h. Changes made by Change Order.
 - i. Changes made following University Project Manager's or Engineer's written orders.
 - j. Details not on the original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - l. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark additional information important to University that was either shown schematically or omitted from original Drawings.
 - 6. Note Change Order numbers, and similar identification, where applicable.

- B. Record Delegated Design Electronic Files: For all delegated design submittals, including but not limited to landscape irrigation, prepare electronic files in full compliance with University of Colorado Denver | Anschutz Medical Campus Guidelines and Design Standards, Part 1.0, Paragraph "Drawing Production Standards."
- C. Identification: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Engineer.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to substitutions, selection of options, and similar information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Note related Change Orders where applicable.
 - 4. Maintain one complete copy of all Addenda, Change Orders and other written change documents in printed form during construction.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Directory: Include record Product Data directory organized by Specification Section number and title.
- C. Product List: Update and record any changes to Product List submitted in accordance with Section 01 60 00 "Product Requirements", including any changes to brand, model, subcontractor, or Installer so that final list reflects materials, equipment and systems incorporated into the Work.

2.4 RECORD SAMPLES

- A. Prior to Final Acceptance, meet with University Project Manager and Engineer at site to review and identify which submitted samples maintained during the progress of the Work are to be transmitted to the University.
- B. Deliver selected samples to storage area identified by University.
- C. Finishes Binder: Three-ring notebook or notebooks, organized by Specification Section number, providing a listing and description of all material finishes on the Project and including a minimum 6 inch by 6 inch sample thereof to accompany the description. Accompany each material selection indicated with the following:
 - 1. Manufacturer and product name.
 - 2. Pattern name and number, as applicable.
 - 3. Color name, as applicable.
 - 4. Any additional information required to order replacement product.

2.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
 - 1. Include manufacturer's certifications, field test record, copies of permits, licenses, certifications, inspection reports, releases, notices, receipts for fee payments and similar documents.
- B. Directory: Include miscellaneous record submittals directory organized by Specification Section number and title.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project. Update at least weekly.
- B. Maintenance of Record Documents and Samples: Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. If University or Engineer need to access record documents, Contractor shall either meet with them in person or copy the drawings and send them to the requestor.

END OF SECTION 01 78 39

SECTION 01 78 46

EXTRA STOCK MATERIALS

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 descriptions and quantities of required extra stock materials.

1.3 INFORMATIONAL SUBMITTALS

- A. Schedule of Maintenance Materials: Prepare a schedule in tabular form of all extra stock materials required in individual Specification Sections including:
 - 1. Specification Section number and title.
 - 2. Description of required material
 - 3. Quantity of required material.

1.4 MAINTENANCE MATERIALS

- A. Furnish extra materials that match and are from the same production runs as the product installed.
- B. Provide in the quantities indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 MAINTENANCE MATERIAL SCHEDULE

SECTION	TITLE	DESCRIPTION	QUANTITY
26 09 43	NETWORK LIGHTING CONTROLS	Control Devices	3 devices for each device used.
26 20 00	LOW VOLTAGE ELECTRICAL DISTRIBUTION	Fuses	1 set of 3 of each type and size used on the project and fuse cabinet in main electrical room to hold them.
26 56 00	EXTERIOR LIGHTING	LED Luminaires	Provide 10% of the installed quantity of luminaires or a minimum of 1 spare luminaire for each luminaire type used.

END OF SECTION 01 78 46

SECTION 01 79 00

DEMONSTRATION AND TRAINING

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 administrative and procedural requirements for instructing University's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include outline for each training module.
- B. Qualification Data: For instructor, demonstrating qualifications and ability to instruct on maintenance and care of system, equipment and products.
- C. Schedule of Demonstration and Training: Prepare a schedule in tabular form of all demonstration and training required in individual Specification Sections including:
 - 1. Specification Section number and title.
 - 2. Description of required demonstration and training.
- D. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training. Manufacturer's sales staff is not acceptable.
- B. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to demonstration and training.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 - g. A tour of the installation identifying the location of all system components.
 - 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.

- l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
 - n. Sequence of operation.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.
 - f. Product support/service model.
 - g. Purchasing of replacement parts.
9. Instruction specific to Instrumentation and Controls, Electrical Gateway, Network Lighting Controls, or any other new technology that is integrated with another system: Include the following:
 - a. Overview and theory.
 - b. Wiring diagrams, including the one line diagram.
 - c. Creation, editing, and programming of the point database.
 - d. Integration topology and platform for communication.
 - e. Graphics packages and touch screens for the system.
 - f. Alarms and diagnostics.
 - g. Reporting functions dynamically and historically.
 - h. Remote access to the system.
 - i. Database back-up and maintenance.
 - j. Replacement and re-programming of replacement parts.
 - k. Point type and functionality for each type of point.
 - l. Programming.
 - m. Point/object editing.
 - n. Loop tuning.
 - o. Help files and other troubleshooting documentation.

- p. Instruction is given by the staff that setup the integration.
- C. Operation and Maintenance Manuals: Provide appropriate Operation and Maintenance manuals in each training session so that the detail drawings and maintenance activities are outlined and discussed for each application.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module.
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Engage qualified instructors to instruct University's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. University will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Coordinate schedule for all training with University Project Manager and provide the following:
 - a. Minimum 3 weeks notification.
 - b. Training matrix in calendar format.
 - c. Training outline for each session.
 - 2. Do not schedule training until equipment has been started up, commissioned, and is currently operating in its normal condition.
 - 3. Do not schedule overlapping training sessions.
 - 4. Schedule training sessions for a maximum of 4 hours per day; afternoons preferred.
 - 5. Provide separate training session on each system for operational/maintenance groups and user groups.
 - 6. Training sessions will be cancelled and rescheduled unless the following documentation is received:
 - a. Instruction qualifications.
 - b. Evidence that equipment has been started up, commissioned, and is currently operating in its normal condition.
 - c. Operation and Maintenance manuals.
- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Travel, Room and Board: Coordinate any out-of-state training with the University Project Manager.
- E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION SCHEDULE

SECTION	TITLE	DESCRIPTION
08 42 29.33	SWINGING AUTOMATIC ENTRANCES	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain automatic entrances.
10 11 00	VISUAL DISPLAY SURFACES	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain motor-operated, sliding visual display units.
10 22 38	OPERABLE PANEL PARTITIONS	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain operable panel partitions.
10 55 00	POSTAL SPECIALTIES	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain postal specialties.
11 12 00	PARKING CONTROL EQUIPMENT	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain parking control equipment.
11 13 00	LOADING DOCK EQUIPMENT	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain loading dock equipment.
11 14 00	FOOD SERVICE EQUIPMENT	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain foodservice equipment.
11 82 26	FACILITY WASTE COMPACTORS	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain waste compactors according to manufacturer's requirements and ANSI Z245.2.
12 21 13	HORIZONTAL LOUVER BLINDS	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain systems.
12 24 13	ROLLER WINDOW SHADES	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.
13 20 00	SPECIAL PURPOSE ROOMS	Engage a factory-authorized service representative to train and provide training video to University's maintenance personnel to operate, adjust, maintain, and repair controlled environmental rooms and cold rooms.
14 21 00	ELECTRIC TRACTION ELEVATORS	Engage a factory-authorized service representative to train University's maintenance personnel to operate, adjust, and maintain elevator(s).

14 21 13	ELECTRIC TRACTION FREIGHT ELEVATORS	Engage a factory-authorized service representative to train University's maintenance personnel to operate, adjust, and maintain elevator(s).
14 24 00	HYDRAULIC ELEVATORS	Engage a factory-authorized service representative to train University's maintenance personnel to operate, adjust, and maintain elevator(s).
14 24 13	HYDRAULIC FREIGHT ELEVATORS	Engage a factory-authorized service representative to train University's maintenance personnel to operate, adjust, and maintain elevator(s).
23 00 00	HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)	Schedule instructional meetings for The University of Colorado Anschutz Medical Campus Facilities Operations maintenance personnel on the proper operation and maintenance of mechanical systems. Provide the project manager a minimum of 5 days notice prior to any testing.
23 05 13	MOTORS	Engage a factory-authorized representative to train the University's representative for 2 hours for each variable frequency drive installed. Training includes startup, shutdown, emergency operation, maintenance and servicing.
23 08 00	COMMISSIONING OF HVAC	Engage the commissioning authority to provide a customized one to two day training class for the university's engineering personnel in problem solving techniques including the review of mechanical system design as a whole, integrated unit, unique qualities of the installed mechanical system, insights into how to solve system-wide, multi-faceted problems, and identify a variety of resources to assist with problem solving.
23 09 00	INSTRUMENTATION AND CONTROLS	Engage a factory-authorized trained representative to conduct a minimum of 1-four hour on-site training course and an additional 1-four hour on-site training course per 25,000 sq. ft. for designated University personnel.
		Engage a factory-authorized trained representative to conduct an 8-hour seasonal loop training.
		Provide 40 hours of certified training in Instrument and Controls for every 100,000 sq. ft. of a lab/research building.
23 11 13	FACILITY FUEL-OIL PIPING	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain liquid-level gage systems, leak-detection and monitoring systems, and fuel-oil pumps.
23 21 23	PUMPS	Engage a factory-authorized service representative to train a University Representative for 2 hours of instruction for each pumping system provided.

23 25 13	CHEMICAL WATER TREATMENT	Engage a factory-authorized service representative to train operating personnel for 8 hours to familiarize them with all treatment equipment and procedures. Include procedure for taking weekly water test on open-loop systems and the application and safe handling of supplied chemicals.
23 64 16	CENTRIFUGAL WATER CHILLERS	Engage a factory-authorized service representative to train the University's representative for 4 hours including the operation of chillers, accessories and controls, procedures for startup and shutdown, troubleshooting, servicing, preventative maintenance, and review of the maintenance manuals.
23 65 00	COOLING TOWERS	Engage a factory-authorized service representative to train the University's personnel for one, 8-hour day, for operation and maintenance of the cooling towers.
23 76 00	EVAPORATIVE COOLING EQUIPMENT	Engage the manufacturer's representative to train the University's personnel for four (4) hours. Include start-up and shutdown procedures, troubleshooting procedures, and servicing and preventative maintenance schedules and procedures, and the contents of the Operating and Maintenance Data.
26 00 00	ELECTRICAL	Engage a factory-authorized service representative to train the University's Operations personnel a minimum of 8 hours for each system. Provide an additional minimum of 4 hours for any electrical gateway or networked lighting controls.
26 56 00	EXTERIOR LIGHTING	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain luminaire lowering devices.
28 31 00	FIRE DETECTION AND ALARM	Engage a factory-authorized service representative to train the University's Operations personnel a minimum of 8 hours for each system.
32 84 00	PLANTING IRRIGATION	Engage a factory-authorized service representative to train University's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

END OF SECTION 01 79 00

SECTION 02 81 00 - TRANSPORTATION/DISPOSAL OF HAZARDOUS MATERIAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This section provides standards discovery, abatement, disposal, and worker protection for all hazardous materials including asbestos, lead, polychlorinated biphenyls (PCBs), mercury, radioactive materials, and mold.
- B. All hazardous materials and waste must be managed and coordinated with Environmental Health and Safety (EHS) through the University Project Manager.

1.2 REFERENCES

- A. Occupational Safety and Health Administration, 29 CFR 1926.1101, Asbestos.
- B. Occupational Safety and Health Administration, 29 CFR 1926.62, Lead Standard.
- C. Environmental Protection Agency, 40 CFR 763.120, Asbestos Worker Protection Rule.
- D. Environmental Protection Agency, 40 CFR 61, National Emissions Standards for Hazardous Air Pollutants.
- E. Environmental Protection Agency 40 CFR 261.24, Toxicity Characteristic
- F. Environmental Protection Agency, 40 CFR 262, Standards Applicable to Generators of Hazardous Waste
- G. Environmental Protection Agency, 40 CFR 265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities.
- H. Code of Colorado Regulation Number 8 Control of Hazardous Air Pollutants, Part B Asbestos Control, 5 CCR 1001 – 10 Part B.
- I. Colorado Department of Public Health and Environment (CDPHE) Regulations Pertaining to Solid Waste Sites and Facilities, Section 5.5. Management of Asbestos-Contaminated Soil, 6 CCR 1007-2.
- J. Air Quality Control Commission (AQCC) Regulations 19 – Lead-Based Paint Abatement.
- K. Asbestos-Contaminated Soil Management, Standard Operating Procedure Document, Version 1, February 26, 2010.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Performance Requirements - Asbestos
 - 1. Presence on Campus:
 - a. Asbestos is present around the campus. Typical forms of asbestos containing materials (ACM) include pipe insulation.
 - b. Investigate every project where work will occur prior to soil disturbing activities to identify asbestos containing materials (ACM). The University Project Manager is responsible for coordinating and ensuring that an inspection or review of previous surveys and any required sampling be performed prior to finalizing the scope or work and associated budget.

- c. Include the cost of investigations, sampling, waste transportation, disposal and associated costs in the cost of the project.
 - 2. Excavation Notifications: Required as described below prior to beginning soil disturbing activities.
 - a. Localized Limited Quantity Shallow Hand Digging – No notification required.
 - b. Small Scale Localized Hand/Equipment Excavation – No notification required.
 - c. Moderate Scale Localized Equipment Excavation – Notification to the University.
 - d. Large Scale Equipment Excavation – Notification to the University.
 - 3. Discovery of Asbestos:
 - a. Notify contractors and the University Project Manager via project documents to stop work when asbestos is encountered or thought to be encountered. It is the responsibility of the University Project Manager to decide what type of action will follow, in consultation with the University's EHS Department.
 - 4. Asbestos Removal:
 - a. Perform any asbestos removal (abatement), repair, encapsulation or spill clean-up in accordance with the above referenced regulatory standards.
 - b. Utilize qualified and trained personnel for abatement design and removal in accordance with the above referenced regulatory standards.
 - 5. Asbestos Containing Waste
 - a. Follow the University asbestos waste disposal guidelines and Environmental Protection Agency regulations for disposal of asbestos generated at each project.
- B. Performance Requirements – Lead
 - 1. Presence on Campus:
 - a. Typical forms of lead containing materials (LCM) include paint, lead shielding materials, and electronic equipment).
 - b. Consult with EHS through the University Project Manager to determine when LCM investigation is required. The University Project Manager is responsible for coordinating and ensuring that an inspection or review of previous surveys and any required sampling be performed prior to finalizing the scope or work and associated budget.
 - c. Include the cost of investigations, sampling, waste transportation, disposal and associated costs in the cost of the project.
 - 2. Discovery of Lead:
 - a. Suspect LCM at all painted surfaces of older campus buildings, brick, and walls and floors in rooms designated (or previously designated) for radiography.
 - b. Notify contractors and the University Project Manager via project documents when lead is encountered or thought to be encountered. It is the responsibility of the University Project Manager to consult with EHS to decide what type of action will follow.
 - 3. Lead Renovation:
 - a. Perform any renovation of lead containing materials, repair, encapsulation or clean-up in accordance with the above referenced regulatory standards.
 - b. Utilize qualified and trained personnel for renovation in accordance with the above referenced regulatory standards.
 - 4. Handling of Lead Waste:
 - a. Coordinate with EHS through the University Project Manager.
 - b. Include all costs associated with handling of lead waste in the Project Cost.

1.4 SUBMITTALS

- A. Abatement Specifications:
 - 1. Provide a certified asbestos project manager on all asbestos abatement projects in which the amount of friable asbestos material to be abated exceeds 1000 linear feet on pipes or 3000 square feet on other surfaces.
 - 2. The certified asbestos project manager must prepare and approve written abatement specifications.
 - 3. Coordinate with the University EHS Department for additional requirements per project.

B. Asbestos Waste Manifests:

1. Prepare hazardous waste manifests for all asbestos waste shipments associated with University asbestos related projects. Submit copies and originals of these manifests in sequential (numerical) order to the University.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

PART 4 - ILLUSTRATIONS

A. Asbestos-Contaminated Soil Management, Standard Operating Procedure Document, Version 1, February 26, 2010.

1. Coordinate with the University Project Manager for attachments.

ASBESTOS-CONTAMINATED SOIL MANAGEMENT

STANDARD OPERATING PROCEDURE DOCUMENT

UNIVERSITY OF COLORADO
DENVER ANSCHUTZ MEDICAL
CAMPUS

Prepared for



University of Colorado Denver



February 26, 2010



WALSH ENVIRONMENTAL SCIENTISTS AND ENGINEERS, LLC

4888 Pearl East Circle, Suite 108

Boulder, Colorado 80301

(303) 443-3282

Project Number: 4299-630

UNIVERSITY OF COLORADO DENVER ANSCHUTZ MEDICAL CAMPUS (AMC) ASBESTOS-CONTAMINATED SOIL MANAGEMENT STANDARD OPERATING PROCEDURE DOCUMENT

February 26, 2010

Prepared for: University of Colorado Denver
Anschutz Medical Campus

Prepared by:

Tom Butts
State of Colorado Certified Project Designer

Submitted by
WALSH ENVIRONMENTAL SCIENTISTS AND ENGINEERS, LLC
4888 Pearl East Circle, Suite 108
Boulder, Colorado 80301
(303) 443-3282

WALSH Project Number: 4299-630

DISTRIBUTION LIST

UCD

Christina Aguilera
Mike Barden
Dan Kerley
Ken Neeper

Colorado Department of Public Health and Environment

Jeff Swanson

Walsh Environmental

Steve Tarasar
Tom Butts

**University of Colorado
Anschutz Medical Campus
Asbestos-Contaminated Soil Management
Standard Operating Procedure Document**

Table of Contents

1	Purpose.....	1
2	Scope.....	1
3	Primary Contacts, Roles and Responsibilities	1
4	Definitions and Abbreviations	1
5	Disclosure due to Potential to Encounter ACS	3
6	Regulatory Summary and Regulatory References	4
7	Classification of Types of Soil Disturbing Activities	7
8	Excavation Notifications	8
9	Excavation Planning	9
10	Training Requirements.....	9
11	ACS Characterization Protocols and Trigger Levels	12
12	Limited Quantity ACS Management Procedures.....	14
13	Significant Quantity ACS Management Procedures where only Nonfriable Asbestos Material is Present 14	
14	Significant Quantity ACS Management Procedures where Friable Asbestos Material is Present	18
15	Special Considerations	24
16	Project Reporting	25
17	SOP Review and Revision	26
18	Attachments	26

Attachments

Attachment #1	ACS Classification and AMC Boundary Site Drawing (and Survey Drawings)
Attachment #2	Historical Buildings and Steam Tunnels Site Drawing
Attachment #3	SOP Flow Chart
Attachment #4	Soil Sampling and Analysis Plan (SAP)
Attachment #5	Remediation Plan
Attachment #6	CDPHE Notification Summary and Notification Forms

1 Purpose

This Standard Operating Procedure (SOP) document provides written standard operating procedures that are the minimum requirements for the proper training, handling, packaging, and disposal of asbestos-contaminated soil (ACS) during soil disturbing activities at the Anschutz Medical Campus (AMC) of the University of Colorado Denver (UCD). This SOP document provides specific procedures for the “**management**” of asbestos contaminated soil to remove only that asbestos contaminated soil, necessary to perform the work. Where “**remediation**” is intended to remove the full extent and depth of asbestos contaminated soil for a specific area, refer to the attached *Soil Sampling and Analysis* procedures provided as a supplement to this SOP in Attachment #4 and *Remediation* procedures provided as a supplement to this SOP in Attachment #5 of this document. The SOP was prepared for CDPHE review and approval to allow AMC to use this SOP for management of the discovered ACS rather than preparing a site specific soil characterization and management plan (SCMP) each time ACS is discovered at ACM. This document is intended for use by those directly involved with soil disturbing activities on the campus, and those who provide management/supervision of these soil disturbing activities.

UCD AMC is part of the University of Colorado and is a 227-acre campus devoted to biomedical education, patient care, and drug development is located in Aurora, Colorado on the site of the former Fitzsimons Army Medical Center. The campus is located on the north side of Colfax Avenue, between Peoria Street and Fitzsimons Parkway.

2 Scope

The procedures provided in this document shall apply to all personnel and all activities involved with the disturbance of soil known to contain asbestos material or soil that may reasonably be considered to contain asbestos material.

3 Primary Contacts, Roles and Responsibilities

Organization	Role/Responsibility	Contact Information
UCD – Facilities Management	Project Management	Ken Neeper, Manager Infrastructure Development, Phone: 303.724.0249 Email: Ken.Neeper@UCDenver.edu
UCD – Environmental Health and Safety Division	Environmental Compliance – Health and Safety	Christina Aguilera Phone: 303.724.0242 Email: Christina.Aguilera@ucdenver.edu
CDPHE HMWMD	Regulatory Agency	Jeff Swanson – Remediation and Restoration Unit – Federal Facilities Program Phone: 303.692.3416 jrswanso@cdphe.state.co.us
Non-ACS Excavation Contractor	As needed excavation of non-ACS soil in accordance with this plan	To be determined as needed
ACS Excavation Contractor	As needed removal of ACS in accordance with this SOP	To be determined as needed
ACS Consultant	As needed ACS Consulting (soil characterization, remediation oversight, soil spotting, air monitoring)	To be determined as needed

4 Definitions and Abbreviations

4.1 Abbreviations

ACM Asbestos-containing materials

ACS	Asbestos-contaminated soil
AMC	Anschutz Medical Campus
AMS	Asbestos Air Monitoring Specialist, CDPHE Certified
CDPHE	Colorado Department of Public Health and Environment
GIS	Geographic information system
GPS	Geographic positioning system
MPH	Miles per hour
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PCM	Phase Contrast Microscope
PLM	Polarized Light Microscopy
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure

4.2 Definitions

“Air Monitoring Specialist” means a person who performs air monitoring referred to in this guidance and who is certified to perform air monitoring in accordance with Air Regulation No. 8, Part B.

Asbestos Soil Inspector means a person certified in accordance with Air Regulation No. 8, Part B, to perform asbestos inspection and sampling, and who has a minimum of six (6) months experience in asbestos-contaminated soil inspections.

“Asbestos Supervisor” means a person who has been certified as an asbestos Supervisor in accordance with Air Regulation No. 8, Part B.

“Asbestos Project Designer” or **“Project Designer”** means a person who has been certified as an asbestos Project Designer in accordance with Air Regulation No. 8, Part B.

“Adequately wet” means sufficiently mix or penetrate with liquid to completely prevent the release of particulate material and fibers into the ambient air. If visible emissions are observed coming from asbestos-contaminated soil or asbestos-containing material, then the material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet. Guidance on determining when a material is adequately wet can be found in EPA’s *Asbestos NESHAP Adequately Wet Guidance*, EPA 340/1-90-019 (December 1990).

“Asbestos” means the asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), amosite (cummingtonite-grunerite), anthophyllite, and actinolite-tremolite.

“Asbestos-contaminated soil” means soil containing any amount of asbestos.

“Asbestos waste” means any asbestos-containing material whether it contains friable or nonfriable asbestos, that is not intended for further use. This term includes but is not limited to asbestos mill tailings, asbestos from pollution control devices, and containers that contain asbestos.

“Asbestos-containing material” means any material that contains more than one percent (1%) asbestos by weight, area or volume.

“Consultant” refers to entity contracted to perform training, inspections, and air monitoring related to soil disturbing activities in accordance with the SOP.

“Contractor” refers to entity contracted to perform soil disturbing activities in accordance with the SOP.

“Facility Component” means any component associated with a structure, installation, or building and includes buried utilities, tanks, structures or other installations.

“Friable” means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously nonfriable material after such previously nonfriable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

“Leak tight” means that solids, liquids, or gases cannot escape or spill out. It also means dust tight.

“Mechanical” means operated or produced by mechanism or machine. This may include, but shall not be limited to, an excavator, backhoe, grader, tiller, auger, or hand shovel.

“Nonfriable” means material which, when dry, may not be crumbled, pulverized, or reduced to powder by hand pressure.

“**Remediation**” or “**Remediate**” means a cleanup or removal to prevent or minimize the possible current or future release of hazardous substances to prevent an unacceptable threat to present or future public health, welfare or the environment.

“**Site**” or “**solid waste disposal site**” means the location for a facility chosen based upon geologic, hydrogeologic and operational considerations. For the purpose of Section 5.5 of the Solid Waste Regulations “site” means the area or areas where soil-disturbing activities are occurring or will occur.

“**Soil-disturbing activities**” means excavation, grading, tilling, or any other mechanical activity used to disturb the soil.

“**Visible emissions**” means any emissions which are visually detectable without the aid of instruments, coming from material containing asbestos, asbestos waste, asbestos-contaminated soil, or from handling and disposal of asbestos waste, material containing asbestos or asbestos-contaminated soil.

“**Work Area**” means the area where soil disturbing activities are occurring. For asbestos contaminated soil disturbance, Work Area also means the regulated/controlled area boundary.

5 Disclosure due to Potential to Encounter ACS

The Anschutz Medical Campus (AMC) formerly the Fitzsimons Army Medical Center contained numerous buildings, some of which had been demolished and buried by the Army prior to property transfer to UCD. During development of the site by UCD, buried asbestos-containing materials located on building components (primarily direct buried steam lines, etc) and areas of asbestos-contaminated soil (asbestos debris in soil from prior building demolition, etc) have been discovered on the site. Based on excavation activities to date, these occurrences can be characterized as localized. Based on historical findings, the potential to encounter ACS on the AMC campus fall into one of the three following categories:

1. **Known ACS Area** - An area that is classified as having known ACS is one that has confirmed asbestos-containing material in the soil identified either from subsurface intrusive investigation, or from visual observation on the surface, in sidewalls, embankments, etc. This excavation is conducted by properly trained personnel in accordance with the provisions of this SOP.
2. **Moderate to High Potential ACS Area**– An area that is classified as having a **moderate potential** for encountering ACS is one based on historical review that asbestos material may be encountered in the soil *where non-suspect construction debris has been observed historically, including wood, concrete, brick and metal components*. An area that is classified as having a **high potential** for encountering ACS is one based on historical review that *suspect asbestos material is likely to be encountered in the soil where suspect asbestos construction debris has been observed historically*. Areas of Moderate to High Potential for encountering ACS may necessitate additional characterization using surface and subsurface visual inspection methods. For areas of Moderate to High Potential ACS, soil excavation activities shall be observed by an asbestos building inspector with 6 months asbestos in soil experience (asbestos soil inspector). For areas of Moderate to High Potential ACS “On-the-job” ACS awareness training shall be provided to workers directly involved with soil-disturbing activities.
3. **Low Potential ACS Area**– An area that is classified as having a low potential for encountering ACS is one in which historical review does not identify buildings or structures that previously existed at the site, utility corridors, other waste materials, or other indications that asbestos may exist on the site. A site classified as having a low potential for encountering ACS would not be a “reason to believe that visible asbestos may be encountered.” Sites with a low potential for encountering ACS would not necessitate additional characterization, spotting, “on-the-job” awareness training, or other special provisions. However, if construction debris or potential ACM is encountered during the course of soil disturbance, then the area would become a moderate to high potential ACS area and will be subject to awareness training, soil spotting and other provisions as described in this SOP.

Asbestos debris in soil at AMC can consist of friable asbestos debris (pipe insulation, etc), nonfriable asbestos debris (floor tile and cement asbestos sheet used on roofs, etc), or a combination of both. Asbestos debris may be limited to a few small pieces that are removed under limited quantity discovery” procedures, or may be in a more extensive “debris field” that will be removed under “significant discovery procedures” as described in Sections 11 and 12 of this SOP.

Upon the discovery of any suspected construction debris material, the contractor shall immediately stop excavation activities in that area, and notify the UCD project manager so the condition can be inspected to determine if asbestos contaminated soil is present. These determinations will be made by an asbestos soil inspector which is an EPA accredited and CDPHE certified asbestos building inspector with 6 months soil inspection experience. Where asbestos contaminated soil is identified, this material shall be removed by a qualified contractor with properly trained personnel, in accordance with applicable regulations and procedures described in this SOP.

6 Regulatory Summary and Regulatory References

6.1 CDPHE Hazardous Materials Waste Management Division (HMWMD) – “Asbestos Contaminated Soils” *not associated with the “Built Environment”*

To address asbestos in soil, the Colorado Department of Public Health and Environment’s Hazardous Materials and Waste Management Division (HMWMD) has established specific management requirements for asbestos-contaminated soil under Section 5.5 of the Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2). Disposal of ACM, and work done in asbestos-contaminated soil (ACS), must comply with this regulation. The requirements of Section 5.5 of the Solid Waste Regulations apply to the owner or operator of any property with asbestos-contaminated soil at which soil-disturbing activities are occurring or planned for any area containing asbestos-contaminated soil. The requirements of Section 5.5 are triggered when the owner or operator has reason to believe or suspect the presence of asbestos-contaminated soil at a site, (through confirmation by analysis of observed material that is suspected of containing asbestos), or has reason to believe or suspects that visible asbestos will be encountered. An owner or operator that has no reason to know of or suspect asbestos-contaminated soil at a site does not have a duty to sample or otherwise investigate for asbestos-contaminated soil prior to commencing excavation, or other soil disturbing activities, at the site. It is important to understand that there is no language in the Solid Waste Regulations that requires an owner or operator to perform soil-disturbing activities, or to remediate asbestos-contaminated soil. The regulations include specific requirements that apply if asbestos-contaminated soil is disturbed or will be disturbed.

To supplement the regulation, CDPHE developed a guidance document intended to provide direction to contractors, consultants and property owners who are involved in soil disturbing activities in areas with known or suspected asbestos-contaminated soil, or where asbestos-contaminated soil is discovered. The guidance is meant to assist in compliance with the Solid Waste Regulations, and where applicable, Air Quality Control Commission Regulation No. 8, Part B (5 CCR 1001-10, Part B - Asbestos).

CDPHE Solid Waste Regulations identify two methods for addressing ACS, **Management** and **Remediation**.

1. **Management** is the removal of only that asbestos-contaminated soil necessary to perform the work, without the intent to remove additional soil outside the scope, even where observed. Management of soil in place is included under this activity. Under management, post removal soil sampling is recommended but not required for soil management actions.
2. **Remediation** is the planned removal of all asbestos-contaminated soil, removing soil beyond a particular scope of work to remove visible and analytical documented presence of asbestos. Under remediation, clearance soil sampling is required.

Both Management and Remediation approaches require CDPHE approval of a site specific soils work plan or a standard operating procedures (SOP) plan.

Remediation would be the appropriate action where a “No Further Action” letter is sought from CDPHE, or where a consent order has been issued by CDPHE, or when “closure” documentation is desired, as Management is the more accepted cost effective option to address soil contamination where this “No Further Action” is not required.

Remediation of asbestos-contaminated soil is not required under the Solid Waste Regulations, but may be conducted in accordance with Section 5.5.5 of the Regulations. It should also be noted that sampling of asbestos-contaminated soil is not required under Section 5.5 of the Solid Waste Regulations; however, the information that can be gained from sampling may be beneficial for many projects. In addition, when conducting remediation required by CDPHE (consent order, etc), sampling may be necessary to demonstrate that cleanup objectives have been met. Remediation will only be conducted at AMC where it is the intent to remediate and/or receive a no further action letter.

In accordance with Section 5.5.2 of the Solid Waste Regulations, the following projects are exempt from the requirements of Section 5.5 of the Solid Waste Regulations, but may be subject to other sections of the Solid Waste Regulations or other regulatory programs:

1. In situations where the soil contains solely nonfriable material containing asbestos, that has not been rendered friable, the nonfriable material can be removed from the soil and properly disposed in accordance with Section 5.2 of the Solid Waste Regulations. The surrounding soil would not be considered to be asbestos-contaminated soil, and therefore would not be subject to the requirements of Section 5.5 of the Solid Waste Regulations. The determination that a material is nonfriable must be made by an asbestos Building Inspector who has been certified in accordance with AQCC Regulation No. 8, Part B, and who has a minimum of six (6) months experience in asbestos-contaminated soil inspections (see Section 8.3 Worker Training).
2. The requirements of Section 5.5 of the Solid Waste Regulations do not apply to asbestos abatement of facility components (including pipes, ducts and boilers) conducted in accordance with AQCC Regulation No. 8, Part B. However, disposal of asbestos must still comply with Sections 5.1 through 5.4 of the Solid Waste Regulations.
3. The requirements of Section 5.5 of the Solid Waste Regulations do not apply to spill response activities that are subject to the requirements of AQCC Regulation No. 8, Part B. As above, disposal of asbestos must still comply with Sections 5.1 through 5.4 of the Solid Waste Regulations.
4. Ambient occurrences of asbestos that are not due to site-specific activities. Ambient occurrences of asbestos may include, but are not limited to, naturally occurring asbestos or the distribution of asbestos from normal wear of automotive products.
5. Projects involving excavations with a total volume of less than 1 cubic yard of soil using low-emission excavation methods such as hand held tools or light equipment.

The exemption for asbestos abatement projects conducted under AQCC Regulation No. 8, Part B, includes asbestos debris that may come into contact with soil during demolition of structures with asbestos-containing materials and materials containing trace amounts of asbestos (including trace soil in crawlspaces, loose fill vermiculite, etc) that can legally remain during demolition and be disposed of as normal demolition debris. Any asbestos debris left behind after the completion of a demolition project and associated site cleanup, would be subject to the requirements of Section 5.5 of the Solid Waste Regulations if disturbed in the future.

6.2 EPA, OSHA DOT and CDPHE Air Pollution Control Division (APCD) “Asbestos/Asbestos Contaminated Soils” associated with the “Built Environment”

The Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA) and the Colorado Department of Public Health and Environment (CDPHE) define *asbestos-containing material* (ACM) as any material containing greater than 1% asbestos as asbestos-containing material. EPA, OSHA and CDPHE define *friable* materials as those materials that can be crumbled or reduced to powder by hand pressure, whereas *nonfriable* materials cannot. Friable materials are more likely to be released into the air, especially during renovation and demolition of the building. Under EPA and CDPHE regulations, certain types of nonfriable materials (such as tar impregnated roofing and vinyl asbestos floor tile) may remain during normal demolition (provided these materials remain nonfriable during the demolition process) and also may be disposed of as normal demolition debris. In addition drywall joint compound that contains greater than 1% asbestos may remain in a building for demolition and disposal as normal demolition debris provided the joint compound was not used as a surfacing material and the composite result of the drywall and joint compound reported less than 1% asbestos. Additionally, materials containing trace to 1% are not subject to EPA and CDPHE regulations and may remain in a building during

demolition and may be disposed of as normal demolition debris. Under these provisions, it is common for asbestos to remain in a building for demolition and for subsequent disposal as normal demolition debris.

ACM is subject to the EPA National Emissions Standards for Hazardous Air Pollutants (NESHAPs) Regulations for Asbestos (40 CFR Part 61) which includes specific provisions for renovation and demolition projects pertaining to the “built” environment, and disposal of asbestos-containing waste material. ACM is subject to the EPA Toxic Substances Control Act (TSCA) which includes provisions for training and certification for asbestos remediation and consulting activities. The CDPHE is presently responsible for administering the EPA NESHAP and TSCA program for Colorado.

ACM is subject to OSHA Construction Industry Standard for Asbestos (29 CFR Parts 1910.1101). Materials containing 1% or less asbestos may be subject to OSHA regulations under certain classes of work activity, or if air concentrations are at or above the personal exposure limit (PEL) of 0.1 f/cc or the excursion limit of 1.0 f/cc. The OSHA asbestos standard includes provision for hazard communication, training, exposure assessment, respiratory protection, engineering controls, medical evaluations, and other provisions.

ACM is subject to Department of Transportation (DOT) regulations for packaging, labeling and transportation of asbestos under 49 CFR Part 173.

ACM is subject to applicable requirements of the CDPHE Air Pollution Control Division’s (APCD) Regulation 8. The term **Abatement** is defined by the CDPHE under the Air Pollution Control Division Regulation 8, and includes the removal of asbestos-containing materials covering facility components, which includes discovery wrapped steam line found below grade, transit[®] water pipe, or an abandoned buried boiler covered with asbestos. Removal of asbestos in soil associated with facility components would be subject to the requirements under CDPHE Air Pollution Regulation 8, including contractor licensing, worker certifications, permitting, etc.

1. Removal of asbestos-containing material on a facility component, that is located on or in soil that will be disturbed, shall be conducted (as stipulated under Section 5.5 of the Solid Waste Regulations), in accordance with work practices in AQCC Regulation No. 8, Part B, Section III.O, but is not subject to the permit requirements of AQCC Regulation No. 8, Part B, as long as the total quantity of asbestos-containing material is below the following trigger levels:
 - a) 260 linear feet on pipes,
 - b) 160 square feet on other surfaces, or
 - c) The volume equivalent of a 55-gallon drum.
2. Removal of asbestos-containing material on a facility component with asbestos quantities above the trigger levels is subject to the notification, permit, and abatement requirements of AQCC Regulation No. 8, Part B, and is therefore outside the scope of Section 5.5 of the Solid Waste Regulations, as provided in Section 5.5.2(B) of the regulations.
3. Removal of pieces of asbestos-containing material, that are not on a facility component, and are located on or in soil that will be disturbed, shall be conducted under Section 5.5 of the Solid Waste Regulations, in accordance with work practices in AQCC Regulation No. 8 - Part B, Section III.O. The removal activities would not be subject to the permit requirements of AQCC Regulation No. 8, Part B.

Under EPA NESHAPs/CDPHE APCD regulations, the primary consideration under this SOP is adherence to CDPHE APCD Regulation 8 requirements for the discovery of asbestos-containing materials on buried facility components such as piping, boilers, etc and the proper removal in accordance with the EPA NESHAPs and CDPHE APCD regulations. Under CDPHE APCD regulations, secondary consideration under this SOP is the proper removal of all construction debris including nonfriable materials allowed to remain during demolition, asbestos-containing joint compound (where composite result reported less than 1%) and trace-1% asbestos materials. Where demolition debris is allowed to remain after demolition activities have been completed, any presence of asbestos in the soil would then be subject to the CDPHE HMWD ACS regulations. This issue is addressed in more detail in Section 13 (Special Considerations) of this SOP.

All work on asbestos-containing materials (ACM) must comply with the applicable requirements of EPA, OSHA, DOT and CDPHE APCD asbestos regulations.

6.3 References

- CDPHE. 2006. *Asbestos-Contaminated Soil Guidance Document*. Prepared in draft form April 2006 by the Hazardous Materials and Waste Management Division.
- CDPHE. 2006. *Asbestos-Contaminated Soil Regulations*. Section 5.5 of the Hazardous Materials and Waste Management Division's Regulations Pertaining to Solid Waste Disposal Sites and Facilities
- CDPHE. 2008, Air Quality Control Commission Regulation No. 8, Part B (5 CCR 1001-10, Part B - Asbestos).
- OSHA. *Construction Industry Standards for Asbestos*. 29 CFR 1926.1101

7 Classification of Types of Soil Disturbing Activities

The following are the classifications of soil disturbing activities under this SOP.

1. **“Localized Limited Quantity Shallow Hand Digging-** This covers localized limited quantity (less than 1 cubic yard of soil) shallow hand digging from surface to 24 inches in depth, that is typical in the normal day-to-day operations of the campus, including sprinkler repair, planting shrubs and small potted plants, and installing fence posts/signs, etc.
2. **“Small Scale” Localized Hand/Equipment Excavation-** This covers deeper (greater than 24 inches) localized excavation generating greater than 1 cubic yard of soil, and includes hand digging or small/light equipment (backhoe, mini excavator, tree planters, min-excavators, and hole drilling augers, etc) for minor utility repair, tree planning, etc. With these types of excavations, the work is a very short (day duration), and the soil is typically deposited in the same location from which it is removed, and is not typically subject to relocation.
3. **“Moderate Scale” Localized Equipment Excavation –** This covers larger scale “localized” excavations that involve trenching or pothole excavation typically to install or repair buried utilities. With these types of excavations, the work is a is short to moderate duration (days to weeks), is conducted with a moderate sized “back-hoe” or excavator” and the soil is typically deposited in the same location from which it is removed, and is not typically subject to relocation. An example of this would be utility corridor trenching.
4. **“Large Scale” Equipment Excavation –** This covers largest scale excavations that involve mass excavation of a site, usually for building construction or other site development purposes. With these types of excavations, the work is a moderate to long duration (weeks to months), is conducted with large excavators, scrapers, front end loaders, etc, and the soil is typically subject to relocation on and off-site, with potential for additional soil import, depending on final grade requirements. An example of this would be “mass excavation” performed for construction of a new building.

8 Excavation Notifications

The following table summarized the types of **notifications required prior to conducting soil disturbing activities**.

	Low Potential ACS condition	Moderate to High Potential ACS condition	Known ACS condition
Localized Limited Quantity (less than 3 cubic yards) Shallow Hand Digging (less than 24 inches in depth for sprinkler repair, shrub/planting small potted plants, installing fence posts/signs etc	No notification required	No notification required	No notification required
Localized Small Scale Hand/Equipment Excavation more than 3 cubic yards and greater than 24 inches in depth (minor utility repair, tree planning, etc)	No notification required	Notification to UCD prior to start	Notification to UCD and CDPHE prior to start
Moderate Scale Localized Equipment Excavation (utility trenching)	Notification to UCD prior to start	Notification to UCD prior to start	Notification to UCD and CDPHE prior to start
Large Scale Equipment Excavation (mass excavation)	Notification to UCD prior to start	Notification to UCD prior to start	Notification to UCD and CDPHE prior to start

CDPHE will be notified within 24 hours of an unexpected ACS and/or ACM discovery. CDPHE will be notified at least 10-days prior to any planned soil-disturbing activity in areas of known ACS and/or ACM. The HMWMD can be notified by using the Notification Form attached to this plan, and emailed to CDPHE contact identified in Section 3 of this SOP. If ACS is encountered and an area reclassified as “known ACS condition” that CDPHE will be notified prior to start or re-start of work.

Additional notification shall be provided to UCD if construction debris is encountered in areas determined to be low potential ACS condition. **Notification to UCD includes notification to UCD Facilities Planning Department contact and UCD Environmental Health and Safety Division contacts as provided in Section 3 of this SOP.** The Contractor shall notify and receive approval from the UCD project manager prior to any soil being exported or imported to the project. Contractor shall coordinate any inspections, spotting, or testing requested by the UCD project manager for any exported or imported soils to the project. For emergency repair projects to utilities, etc, notification will be provided to CDPHE by the next business day.

9 Excavation Planning

Prior to performing any soil disturbance activities, those persons performing the soil disturbing activity shall check the AMC ACS Asbestos Contaminated Soils Classification Site Drawing (Attachment #1) to determine the classified ACS condition for the area where soil disturbing activities will occur. Comply with notification, training and work procedures provisions of this document based on the classified condition for the area where excavation will occur which will be classified into one of the following three categories:

- *Low Potential ACS Condition (areas shaded green)*
- *Moderate to High Potential ACS Condition (areas shaded yellow)*
- *Known ACS Condition (shaded coded red)*

The following soil spotting activities will be utilized during all excavation activities for moderate to large scale excavation activities when moderate to high potential ACS conditions exist:

1. All surface work areas will be pre-inspected by the asbestos soil inspector prior to commencement of soil disturbance activities.
2. Excavation Area: conduct a subsurface visual inspection for asbestos material during excavation. The asbestos soil inspector will inspect all areas of the excavation as removal of soil proceeds, and will inspect the bottom of the excavation for visible ACM.
3. Stockpile and Backfill Areas: closely inspect stockpiled area as soil is dumped/piled.

Where ACS is identified and impacted by planned excavation, the characterization, removal and disposal of contaminated soil shall be conducted in accordance with the provisions of this SOP. Once the asbestos soil inspector has delineated the ACS boundaries (depth and extent through visual inspection characterization protocols as provided in Section 11 of this SOP), the Contractor may continue excavation in other non-ACS areas with continued spotting by an asbestos soil inspector.

For localized limited quantity (less than 1 cubic yard) shallow (less than 24 inches) hand digging for normal day-to-day operations, including sprinkler maintenance, installation of signs/posts, planting of small plants and shrubs, etc, these activities are exempt from this SOP since these activities typically occur in newly constructed areas with shallow digging occurring in the top fill layer placed during new construction, which has a low potential to contain asbestos debris, and less than 1 cubic yard by hand-digging is exempted under CDPHE HMWMD regulations. Notification shall be provided to UCD if construction debris is encountered under these exempted activities.

For additional planning purposes and as a reference, an historical site map is provided in Attachment #2 that shows the building and steam tunnel locations for the former Fitzsimons Army Medical Center. Attachment #3 contains a flow chart that summarizes the key components of this SOP document.

10 Training Requirements

10.1 SOP circulation

The following entities/persons involved with soil disturbing activities shall be provided a copy of this SOP prior to performing work.

1. Those performing soil disturbing activities in areas with moderate to high potential to encounter ACS
2. Those providing awareness soil training
3. Those providing soil inspection or soil spotting activities during normal excavation activities.
4. Those performing soil disturbing activities in a known ACS condition area

5. Those providing air monitoring and inspection associated with soil disturbing activities in a known ACS condition area.

10.2 Awareness Training

For areas with *moderate to high* potential to encounter ACS, all those persons involved with the excavation regardless of size shall be provided on the job hazard communication awareness (awareness) training for those individuals associated with the soil disturbing activities as follows:

“On-the-job” asbestos soils awareness training as defined in Section 5.5.6 of the Solid Waste Regulations will be provided to workers directly involved in soil-disturbing activities on sites where there is known ACS or a “reason to believe” ACS may be encountered. The training will address such topics as history and background of asbestos, identifying types of asbestos, health effects, engineering controls, and actions to take when suspect asbestos materials are encountered. The training will be conducted with oversight and curriculum development by an asbestos building inspector, asbestos supervisor or project designer.

The awareness training must provide information necessary for the individuals to perform their duties in a way that ensures compliance with the requirements of Section 5.5 of the Solid Waste Regulations. The training must be conducted by an Asbestos Supervisor, Building Inspector or Project Designer, certified in accordance with AQCC Regulation No. 8, Part B, and who has a minimum of six (6) months experience in asbestos-contaminated soil management.

10.3 ACS Soil Disturbance Training

For **moderate to large scale excavation** activities in areas with **known ACS**, provide on the job hazard communication awareness training for those individuals associated with the soil disturbing activities. In addition personnel overseeing, directing, inspecting and/or handling asbestos or asbestos-contaminated soil during soil excavation activities shall have the following minimum training and certifications:

1. At least one (1) trained supervisor (competent person) shall be on site during excavation activities (current EPA Asbestos Supervisor Certification)
2. CDPHE HMWMD training required for persons performing asbestos-contaminated soil disturbing activities including on the job asbestos contaminated soil awareness training and training in accordance with OSHA standard 1926.1101 (k) (9) (vii) for those performing soil disturbing activities in an area with asbestos waste or asbestos contaminated soil (EPA Asbestos Supervisor/Worker training is recommended).
3. A current annual physical with medical release / respirator usage form and respirator fit test.

This training requirement applies to equipment operators but is not required for drivers of trucks carrying contaminated material for disposal to approved landfills. Drivers are only required to complete the awareness training.

For **Small Scale excavation** activities with **known ACS**, provide awareness training for those individuals associated with the soil disturbing activities. In addition personnel overseeing, directing, inspecting and/or handling asbestos or asbestos-contaminated soil during small scale soil excavation activities shall have the following minimum training and certifications:

1. At least one (1) trained supervisor (competent person) shall be on site during excavation activities.
2. CDPHE HMWMD training required for persons performing asbestos-contaminated soil disturbing activities including on the job asbestos contaminated soil awareness training and training in accordance with OSHA standard 1926.1101 (k) (9) (vii) for those performing soil disturbing activities in an area with asbestos waste or asbestos contaminated soil (Training Equivalent with OSHA Class III training for “small scale short duration” activities that will disturb asbestos recommended).

3. A current annual physical with medical release / respirator usage form and respirator fit test.

10.4 ACS Inspection and Air Monitoring Training

Individuals performing soil inspection and identification of asbestos in soil must have a current asbestos Building Inspector certification in accordance with AQCC Regulation No. 8, Part B, and must have a minimum of six (6) months experience conducting asbestos-contaminated soil inspections. Individuals with this level of training and experience are referred to in this SOP as “asbestos soil inspectors”.

Individuals preparing and signing Soil Characterization and Management Plans must have a current Asbestos Project Designer certification in accordance with AQCC Regulation No. 8, Part B.

Individuals performing asbestos air monitoring associated with asbestos-contaminated soil disturbing activities must have a current Air Monitoring Specialist certification in accordance with AQCC Regulation No. 8, Part B

10.5 Additional Considerations

In addition, individuals with the potential for exposure to asbestos fibers should be trained in the proper usage of personal protective equipment and have a current annual physical with a medical release/respirator usage form in accordance with the employer’s medical surveillance program. Personal exposure air monitoring should be conducted in accordance with the employer’s exposure assessment program.

11 ACS Characterization Protocols and Trigger Levels

The following summarizes the potential conditions that may be encountered during soil disturbing activities at the AMC:

1. Localized areas of **friable and/or nonfriable** asbestos debris in soil that constitute “significant quantity” as provided under the “trigger level” of this plan. Triggering “major” response procedures as provided in this plan.
2. Localized areas of **friable and/or nonfriable** debris in soil that constitute “limited quantity” as provided under the “trigger level” portion of this plan, triggering “minor” spill response during planned excavation spotting activities.
3. Localized areas with construction debris with no asbestos debris, such as brick, metal, and PVC pipe, and non-asbestos suspect debris (confirmed by bulk sampling).
4. Localized areas where no visible construction debris, or visible suspect asbestos containing materials are present.

To provide a basis for appropriate level of assessment (limited vs. significant) and management for discovered asbestos debris, the following summarizes specific trigger levels to be used under this SOP. These trigger levels are “**limited quantity discovery**” and “**significant quantity discovery**” of **visible friable and/or nonfriable asbestos debris** and have corresponding assessment and response actions based on the limited or significant finding:

11.1 Limited Quantity Material Discovery Assessment and Management Protocol

Entry into Limited Quantity Assessment and Management Protocols: Where up to 3 pieces (with multiple pieces of asbestos within a few inches of each other to be treated as one piece of asbestos) of friable and/or nonfriable asbestos debris are identified within a 10-foot radius, record the locations with a GPS unit, photograph and log pertinent information such as location, description of material, type of debris, etc.

Exit from Limited Quantity Assessment and Management Protocols: Carefully wet and remove the visible debris and 3 cubic feet of soils surrounding each debris piece. All debris will be adequately wetted, and removed by appropriately trained and protected personnel. All debris and associated soil will be placed into appropriately labeled disposal bags, for proper disposal based on the material friability.

11.2 Significant Quantity Material Discovery Assessment and Management Protocol

Entry into Significant Quantity Assessment and Management Protocols: Where greater than 3 pieces (with multiple pieces of asbestos within a few inches of each other to be treated as one piece of asbestos) of friable and/or nonfriable asbestos debris are identified within a 10-foot radius, this will constitute a debris field. The asbestos soil inspector will conduct surface and subsurface visual assessment with the assistance of excavation equipment to determine the extent and depth of the asbestos debris field. All asbestos debris field corner points will be documented with a GPS unit, on a drawing and by photograph. Photograph and log pertinent information such as type of debris, quantity, etc.

Exit from Significant Quantity Assessment and Management Protocols: Removal of debris field based on a visual determination to the extent of excavation, or removal of *extent of find (EOF) plus 1 foot of soil, and removal of depth of find (DOF) plus 1 foot of soil for subsurface contamination, and removal of extent of find (EOF) plus 1 foot of soil where only surface contamination is identified.* Where visible friable and/or nonfriable asbestos debris is still observed at the extent of planned excavation, the area will be over excavated by 1 foot, and then covered with a geotechnical membrane and labeled/demarcated as asbestos-contaminated soil, and covered with 1 foot of clean fill. The boundary will be recorded with a GPS unit, on a drawing, and by photograph.

11.3 Visual Characterization for Significant Discovery

Site characterization (surface and subsurface visual assessment) will be conducted by using visual inspection to identify depth and extent of visible significant debris using potholing and trenching techniques for asbestos debris. Soil sampling and analysis is not part of the characterization process under this SOP, and any collection and analysis of soil samples for asbestos content requires written authorization from UCD.

11.4 Surface Investigation

Surface investigation for areas identified as having potential asbestos-containing debris will be conducted for suspect asbestos debris. Surface investigation will include sampling suspect asbestos-containing material, or will assume material is asbestos-containing. Marker paint and flags will be used to demarcate locations of any suspect debris. Locations will be identified with a GPS device. The surface investigation will include photographing and logging pertinent information such as location, type of debris, quantity, etc.

11.5 Investigation Personal Protective Equipment

At a minimum, appropriate PPE must be worn when doing asbestos inspections or otherwise accessing an area suspected or known to contain asbestos. At a minimum, asbestos soil inspectors performing the inspection and/or personnel performing the pickup of non-friable asbestos must wear disposable booties and disposable rubber gloves, which should then be discarded as asbestos waste prior to exiting the site. At a minimum, asbestos soil inspectors performing the inspection and/or personnel performing the pickup of friable asbestos must wear a half-face air-purifying respirator with HEPA cartridge filtration, disposable protective suite, disposable booties and disposable rubber gloves. Disposable protective equipment should then be discarded as asbestos waste prior to exiting the site. Additional protective equipment shall be used as appropriate.

11.6 Demarcation of Discovery Locations and ACS Boundaries

Locating debris and other site conditions by GPS where specified in this SOP is considered the primary method for documenting these locations, but distance measurement (XYZ coordinate) descriptions may be used where a site grid is utilized or where locations are adjacent to structures or features. Grid/Structure reference points shall be documented with GPS in the event grid markers or structures are removed.

12 Limited Quantity ACS Management Procedures

Where the asbestos soil inspector visually observes up to three pieces of friable and/or nonfriable asbestos debris within a ten (10) foot radius, follow the procedures listed below.

For **nonfriable** asbestos material, adequately wet, using hand-removal methods only, gather and place the material and approximately 12 inches of surrounding soil in 6-mil poly bags. For **friable** asbestos material, adequately wet, using hand-removal methods only, gather and place material and 3 cubic feet of surrounding soil in 6-mil poly bags (double bags). Continue work with extra attention to possible additional asbestos in that vicinity. Stage waste bags in a lined drum or roll-off container. Dispose of waste as asbestos contaminated waste in accordance with CDPHE regulations and this SCMP.

All personnel involved in the removal of Limited Quantity asbestos debris will wear at a minimum a half-face air purifying respirator with HEPA filtration, and disposable protective suit, disposable overbooties and disposable gloves. Decontamination of all tools and equipment involved in the removal of asbestos debris is required prior to leaving the work area. Disposable suits, overbooties and gloves shall be disposed of as asbestos waste.

13 Significant Quantity ACS Management Procedures where only Nonfriable Asbestos Material is Present

Where the asbestos soil inspector visually observes more than three pieces nonfriable asbestos debris within a ten (10) foot radius, follow the procedures listed below.

13.1 Soil Wetting and Stabilization

The Work Area will be adequately wetted to prevent any fugitive dust emissions that may be generated during initial setup and mobilization into the area. The Contractor shall use water hoses from a tank truck or directly from a fire hydrant or other water source. Water will be applied at low pressure so as to not generate dust or splattering. During all soil disturbing activities, wetting of soil will be sufficient to ensure soils are adequately wet (no visibly dry soil and no visible emissions) throughout the soil disturbing activities.

13.2 Dust and Emissions Control

General dust control will be achieved by use of water trucks that will regularly spread water on all access roads throughout the project site to ensure no visible dust generation by vehicle traffic during soil disturbance activities.

Whenever contaminated soil and debris are being impacted, the Contractor will ensure that no emissions are generated. UCD's representative will be on site to monitor the moisture of the soil being skimmed during removal and will ensure that it is adequately wet (and to observe for any visible emissions). An asbestos soil inspector will conduct these visual inspections.

If emissions are observed during the removal process, activities will immediately cease and work practices will be reviewed and modified by the Contractor. The Consultant will log all instances where visible dust emissions occurred and immediately notify UCD and CDPHE by phone and in writing, of all occurrences, and will obtain any direction from UCD and CDPHE.

13.3 PPE

During the actual soil disturbance activity, all persons within the designated work area shall utilize appropriate personal protective equipment, including appropriate respiratory protection with a minimum half face respirator with HEPA filtration required anytime active soil disturbance is occurring, protective full body tyvek[®] suit with attached

hood and booties, gloves, rubber boots, and other protective wear as appropriate based on conditions (cold stress, heat stress, insects, etc)

13.4 Removal/Excavation

The Contractor will remove adequately wet soil in lifts with the lift thickness is determined by the depth of the adequately wet soil. The application of amended water to work area will be completed in accordance with all applicable regulations, variances, the work plan, and the on-site observations by the Consultant. Polyethylene sheeting will be placed over uncontaminated soils in the swing radius of the excavator or along the transport route of loading equipment to prevent cross-contamination. Care will be taken to avoid contamination of the excavating equipment. This will be accomplished by driving and keeping excavating equipment on non-contaminated soil.

Equipment that comes in contact with contaminated soil, or that was within the designated work area will be decontaminated. Conduct work with appropriate phasing/sequencing that will minimize cross-contamination potential.

13.5 Wind and Work Stoppage Conditions

Soil disturbance operations will not be conducted if winds produce visible emissions of dust or create dust when moving equipment or soil.

13.6 Environmental Monitoring

During the execution of the soil removal, the AMS will collect air samples to assist in determining the adequacy of the engineering and environmental controls employed at the site. Air monitoring will be conducted during ACS significant discovery soil removal activities where only nonfriable material is visible. All air samples will be collected by a CDPHE certified Air Monitoring Specialist (AMS).

The air monitoring is described below.

1. **Sampling Media:** Air samples will be collected by drawing air through a 25-millimeter mixed cellulose ester filter, 0.8-micron pore size, with an open-faced, long cowl using low-flow personal sampling pumps at approximately 2 liters per minute (or flow rate to provide a sufficient LOQ/LOD). Each low-volume pump will be fitted with a computer microchip, which electronically regulates airflow and allows a fixed flow rate of air to pass over the face of the filter. The flow rate and the volume of air passed through the filter will be determined based on the National Institute for Occupational Safety and Health (NIOSH) 7400 analytical method. Each pump will be calibrated before and after the collection of each sample using a primary standard.
2. **Sample Analysis:** Sample analyses will be performed by a microscopist using a phase contrast microscope (PCM) according to the NIOSH 7400 Method. The microscopist will be a CDPHE certified Air Monitoring Specialist (AMS) and a participant in the NIOSH Proficiency Analytical Testing Program and have been deemed proficient. Analyses of transmission electron microscopy (TEM) air samples will be submitted to a National Institute for Standards and Technology National Voluntary Laboratory Accreditation Program accredited laboratory using TEM according to Asbestos Hazard Emergency Response Act protocol.
3. The daily air monitoring sampling scheme will be as follows:
 - a. Air samples will be strategically placed as close to work area without impeding equipment and worker activity, and will be collected continuously during excavation and loading operations and submitted the same day for PCM analysis. **A total of 5 samples will be collected per shift per work area.**
 - b. Of the 5 samples collected, three (3) perimeter samples will be placed to triangulate the work area, moving as necessary to follow the active “area-of-disturbance”, but *remaining fixed in relation to each other*. One (1) additional perimeter “floating sample” will be placed downwind from work activities, where potential fiber emissions are most likely to be detected. All perimeter samples shall be collected as close to the “point of disturbance” as possible, without subjecting the air monitoring equipment to damage from the operations. One (1) additional sample, to be considered the potential worst-case scenario “area equivalent” sample, will be collected on personnel closest to disturbance operations, such as the person operating the water hose.
 - c. The results from these samples for comparison to 0.01 f/cc (and presence of asbestos for when analyzed by TEM) and should not be construed as “OSHA exposure assessment air samples”.
 - d. **Performance Based Air Sampling:** Five (5) samples, including personnel and perimeter samples, will be submitted for PCM analysis. If analysis yields results with detectable fiber levels (based on fiber count) then TEM analysis will be conducted on the two (2) highest PCM samples for the first 3 days of each nonfriable excavation event. If no asbestos fibers are detected after the first 3 days of each event, then TEM analysis of the two (2) highest PCM samples will be reduced, to be conducted randomly twice per week. The AMS will determine on which two days *TEM analysis* will be conducted. TEM analysis will continue to be performed on any sample with PCM results exceeding 0.01fibers/cc. .
4. PCM verbal results will be made available by the start of the next business day or as soon as practical after the start of the next business day. TEM verbal results will be made available within 24-hours of receipt of samples by the laboratory, and written results will be made available within 24 hours from the time the verbal result is received. UCD and CDPHE will be immediately notified if any sample results show any concentration of airborne fibers. If any asbestos fibers are detected by TEM, all investigative activities will be stopped and engineering controls will be evaluated by Contractor and Consultant, and will be discussed with UCD and CDPHE to determine if changes in engineering controls or additional PPE are required.
5. As an alternative to Environmental Air Monitoring for significant quantity nonfriable excavation, where soil sampling is performed in areas containing only visible nonfriable asbestos debris (per a soil sampling plan as agreed upon by UCD and CDPHE), and where soil sampling data demonstrates that no asbestos is present in the soil, and excavation work practices will not render the nonfriable material friable, environmental air monitoring may be reduced to PCM on workers only with the written approval of UCD and CDPHE.

13.7 Personal Air Monitoring

Air sampling of personnel is an employer based responsibility, and as such shall be the responsibility of each employer associated with soil disturbing activities. The “area equivalent” samples collected on personnel are

interpreted as “worst case area” samples and are not intended to provide OSHA exposure information, but can be used by employers for general informational purposes.

13.8 Truck/Container Staging/Lining and Waste Loading

All truck drivers will be instructed to close all windows and shut-off air delivery systems (fans on air-conditioning and heating systems) when entering the loading area. All travel and positioning of waste transport Truck/Trailers on the site should be visually verified clean soil to minimize the need for decontamination procedures. At the loading location, install a ten-mil polyethylene sheeting or thicker “lay-down pad” that will be placed on the ground under dumpsters/trucks to catch any spilled material. Spilled material will be cleaned up immediately and not allowed to dry out or accumulate. Additional poly shall be draped over trailer tires/fenders to minimize the need for decontamination after loading. After the load has been secured, and the load cover tarp is installed, the poly sheeting lay down loading pad will be properly decontaminated using wet wipe and or HEPA vacuuming methods. The loaded transportation truck may then proceed down the designated exit route.

13.9 Waste Transportation and Disposal

Containers of nonfriable asbestos waste, asbestos-contaminated soil with visible nonfriable asbestos, or ACS with no visible asbestos will be labeled, in accordance with the requirements of Section 5.2 of the Solid Waste Regulations. In accordance with the disposal requirements for nonfriable asbestos waste at least one 6-mil polyethylene liner/sheeting will be in trucks used for transport of soil that contains visible nonfriable asbestos. Polyethylene liners/sheeting should be designed and sized for the container to be used and should be folded over sides of trailers or containers to protect against contamination during loading and to facilitate decontamination. After loading, the liners/sheeting will be sealed and mechanically fastened in a manner that ensures that it remains intact and leak-tight during transportation and disposal operations. Containers of nonfriable asbestos waste, asbestos-contaminated soil with visible nonfriable asbestos, and asbestos-contaminated soil with no visible asbestos, shall be labeled noting “asbestos, danger” and the generator, and placed on top of sealed liner.

In addition, Department of Transportation (DOT) asbestos placards shall be placed on all four vertical sides of the container or vehicle being used for transport of ACS. The Contractor should direct the schedule of transportation of asbestos-contaminated soil. When loaded, each truck should be assigned a manifest to serve as the shipping document for that particular load.

Asbestos-contaminated soil shall be transported and disposed in a leak tight container in accordance with the CDPHE disposal requirements. Documentation stating that the soil originating from the site will not be used as daily cover or sold as clean fill shall accompany each load of asbestos-contaminated soil removed from the site.

Disposal of asbestos-contaminated soil will be conducted in accordance with the following requirements, in accordance with Section 5.5.7 of the Solid Waste Regulations:

1. Asbestos-contaminated soil containing only visible nonfriable asbestos, that has not been rendered friable, will be disposed of as nonfriable asbestos in accordance with Section 5.2 of the Solid Waste Regulations.
2. Asbestos-contaminated soils containing no visible asbestos will be disposed in a manner similar to nonfriable asbestos waste, as described in Section 5.2 of the Solid Waste Regulations.

13.10 Personnel Decontamination

A fully functioning 3-chamber decontamination trailer (or equivalent) will be placed outside the work zone to function as a remote shower location, with a clean room and an equipment room. All workers involved in removal/packaging ACS will be double suited while in the work area and will shed one suit prior to leaving the work area and immediately proceed to the decontamination facility. All workers will decontaminate per OSHA regulations and CDPHE Regulation No. 8. Decontamination water will be filtered using a 5 micron filter, or in accordance with local requirements if more stringent, prior to disposal to the sanitary sewer.

13.11 Equipment Decontamination

All equipment and tools that come into contact with, or are used for removal of ACS will be decontaminated (free of all visible dust and debris) using wet cleaning (fire hose for trackhoe equipment, wet rags for hand tools, etc) and HEPA vacuuming methods (interior of equipment cab, etc), prior to leaving the work zone. Equipment decontamination will be conducted within a decontamination station constructed adjacent to the work zone. The decontamination station will be constructed of 10-mil polyethylene sheeting (and other materials as necessary, such as EPDM rubber roofing, etc) in such a way as to capture all contaminated material and wastewater from the decontamination process. All waste water from the decontamination station will be filtered to a minimum of 5-microns (or in accordance with local requirements if more stringent, prior to discharge to a sanitary sewer), or may be used for wetting ACS.

13.12 Final Inspection Procedures

As the project progresses, visual inspection will be performed to ensure that all observable asbestos-containing materials have been removed from the soil surface. During removal of soil, the soil will be removed in a manner that will provide a flat, even surface (with no spoil piles) for visual inspection. The inspections will be performed for the surface area removed that day, as a preliminary inspection. Due to the wet nature of the removal and the soil, adequate drying time is required before a final visual inspection can be conducted.

The removal of soil in the debris field area will be considered complete when the visible asbestos-containing material has been removed and an asbestos soil inspector makes a final decision that all contaminated soil in the debris field has been removed to depth and extent of excavation (where remaining visible material will be covered with a membrane and labeled), or depth of find plus 1 foot of soil (DOF+1) and extent of find plus 1 foot of soil (EOF+1).

13.13 Managing ACS left in place

Where visible asbestos containing material is observed at the depth and extent of excavation, 1 additional foot of soil shall be removed, the area shall be covered with a geotech membrane, labeled as asbestos contaminated soil, and then the membrane shall be covered with 1 foot of clean fill to bring back to desired grade/level. Prior to covering with clean fill, photographs will be collected from each compass point of the boundary, and the corner points of the boundary shall be obtained using measurements for a control point or with a GPS device.

14 Significant Quantity ACS Management Procedures where Friable Asbestos Material is Present

Where the asbestos soil inspector visually observes more than three pieces friable asbestos debris within a ten (10) foot radius, follow the procedures listed below.

14.1 Site Control, Demarcation, Fencing and Wind Screening

The Work Area will be demarcated on all four sides using a movable/portable wind barrier to prevent wind dispersal of soil during excavation activities. Moveable/portable wind barriers will be placed on all four sides and immediately adjacent to the point of excavation, and will be of adequate height and configuration (size) to minimize wind soil dispersal at the point of excavation. For smaller areas or highly mobile removal activities, moveable "directional" mobile wind fencing may be used, but must be positioned upwind and adjacent to soil removal activities at all times. Where only directional wind fencing is used, asbestos barrier tape shall be installed to identify the remaining boundary of the Work Area (where wind fence is not positioned).

14.2 Protection of Adjacent Structures

When the abatement area is close to occupied structures, external critical barriers may need to be constructed. All openings in the structure, including windows, doorways, vents or other openings will be sealed with 6-mil poly.

14.3 Soil Wetting and Stabilization

The Work Area will be adequately wetted to prevent any fugitive dust emissions that may be generated during initial setup and mobilization into the area. The Contractor shall use water hoses from a tank truck or directly from a fire hydrant or other water source. Water will be applied at low pressure so as to not generate dust or splattering. During all soil disturbing activities, wetting of soil will be sufficient to ensure soils are adequately wet (no visibly dry soil and no visible emissions) throughout the soil disturbing activities.

14.4 Dust and Emissions Control

General dust control will be achieved by use of water trucks that will regularly spread water on all access roads throughout the project site to ensure no visible dust generation by vehicle traffic during soil disturbance activities.

Amended water and or stabilization agents will be applied for dust control within all disturbed ACS areas. The Contractor will maintain the dust control process throughout the course of the project during soil disturbing activities. Removal of soils and debris will be done with heavy equipment which has been adapted to have a water misting system installed on the equipment to minimize dust emissions at the point of removal. Water will be applied in a manner that does not cause run-off or splattering. In addition, a water misting system will be constructed to wet the material at the point of loading into the dumpster prior to final packaging.

Whenever contaminated soil and debris are being impacted, the Contractor will ensure that no emissions are generated. UCD's representative will be on site to monitor the moisture of the soil being skimmed during removal and will ensure that it is adequately wet (and to observe for any visible emissions). An asbestos soil inspector will conduct these visual inspections.

Site management and inspectors will monitor the quantity of surface area disturbed at any given time; also the amount of surface not stabilized will be kept to the minimum quantity necessary for meaningful work to occur. If site conditions change so that dust suppression becomes questionable on the amount of disturbed area, a portion of that area will be stabilized and work will proceed on a reduced area.

If emissions are observed during the removal process, activities will immediately cease and work practices will be reviewed and modified by the Contractor. The Consultant will log all instances where visible dust emissions occurred and immediately notify UCD and CDPHE by phone and in writing, of all occurrences, and will obtain any direction from UCD and CDPHE.

14.5 PPE

During the actual soil disturbance activity, all persons within the designated work area shall utilize appropriate personal protective equipment, including appropriate respiratory protection with a minimum half face respirator with HEPA filtration required anytime active soil disturbance is occurring, protective full body tyvek® suit with attached hood and booties, gloves, rubber boots, and other protective wear as appropriate based on conditions (cold stress, heat stress, insects, etc)

14.6 Removal/Excavation

Utilizing an excavator, mini excavator or backhoe with a bucket mounted spray bar system; the soil excavation will proceed within the designated work area. The spray bar system will consist of nozzles inside the back top edge of the bucket and two outside the bucket with nozzles spray pattern overlapping that will provide adequate wetting to

eliminate fugitive dust, but avoid splatter or drift from spraying. Additional hand wetting will be used to eliminate fugitive emissions, but avoid splatter or drift from spraying.

The Contractor will remove adequately wet soil in lifts with the lift thickness is determined by the depth of the adequately wet soil. The application of amended water to work area will be completed in accordance with all applicable regulations, variances, the work plan, and the on-site observations by the Consultant. Polyethylene sheeting will be placed over uncontaminated soils in the swing radius of the excavator or along the transport route of loading equipment to prevent cross-contamination. Care will be taken to avoid contamination of the excavating equipment. This will be accomplished by driving and keeping excavating equipment on non-contaminated soil.

Equipment that comes in contact with contaminated soil, or that was within the designated work area will be decontaminated. Conduct work with appropriate phasing/sequencing that will minimize cross-contamination potential.

14.7 Wind and Work Stoppage Conditions

Soil disturbance operations will not be conducted if winds produce visible emissions of dust or create dust when moving equipment or soil. All wind speed measurements will be taken at locations in close proximity to, and representative of, the work area in which the soil is being handled.

Shutdown conditions: Soil removal/disturbance operations will immediately and temporarily cease when one or more of the following 4 conditions have been met:

1. Any wind gust reaching or exceeding 20 mph as determined by hand-held instruments;
2. Sustained wind speeds reaching or exceeding 12 mph averaged over a period of 10 minutes;
3. Winds are producing visible emissions or creating movement of dust or debris in or near the removal/disturbance area, or
4. Winds are impacting on the ability of engineering controls to work as designed.

During wind-related work shutdowns, other work activities not involving soil removal or disturbance (e.g., lining dumpsters) may continue.

Resume Conditions: Soil disturbance activities may resume after all of the following 4 conditions have been met:

1. All wind gust readings for a period of 20 minutes drop below 20 mph as determined by hand-held instruments;
2. Sustained wind speeds are below 12 mph averaged over a period of 20 minutes;
3. Winds are no longer producing visible emissions or creating movement of dust in or around the removal/disturbance area, and
4. Winds are not impacting on the ability of engineering controls to work as designed.

14.8 Environmental Monitoring

During the execution of the soil removal, the AMS will collect air samples to assist in determining the adequacy of the engineering and environmental controls employed at the site. Air monitoring will be conducted during ACS significant discovery soil removal activities where visible friable asbestos material is present. All air samples will be collected by a CDPHE certified Air Monitoring Specialist (AMS). The air monitoring is described below.

1. **Sampling Media:** Air samples will be collected by drawing air through a 25-millimeter mixed cellulose ester filter, 0.8-micron pore size, with an open-faced, long cowl using low-flow personal sampling pumps at approximately 2 liters per minute (or flow rate to provide a sufficient LOQ/LOD). Each low-volume pump will be fitted with a computer microchip, which electronically regulates airflow and allows a fixed flow rate of air to pass over the face of the filter. The flow rate and the volume of air passed through the fi

liter will be determined based on the National Institute for Occupational Safety and Health (NIOSH) 7400 analytical method. Each pump will be calibrated before and after the collection of each sample using a primary standard.

2. **Sample Analysis:** Sample analyses will be performed by a microscopist using a phase contrast microscope (PCM) according to the NIOSH 7400 Method. The microscopist will be a CDPHE certified Air Monitoring Specialist (AMS) and a participant in the NIOSH Proficiency Analytical Testing Program and have been deemed proficient. Analyses of transmission electron microscopy (TEM) air samples will be submitted to a National Institute for Standards and Technology National Voluntary Laboratory Accreditation Program accredited laboratory using TEM according to Asbestos Hazard Emergency Response Act protocol.
3. The daily air monitoring sampling scheme will be as follows:
 - a. Air samples will be strategically placed as close to work area without impeding equipment and worker activity, and will be collected continuously during excavation and loading operations and submitted the same day for PCM analysis. **A total of 8 samples will be collected per shift per work area.**
 - b. Of the 8 samples collected, four (4) samples will be arranged at the 4 points of the compass surrounding the work area with two (2) additional samples deemed as "perimeter floating samples". The perimeter floating samples will be placed in areas where emitted asbestos fibers are most likely to be detected (downwind from work activities). Two potential worst-case scenario "area equivalent" samples will be collected on at least 2 workers who are expected to have the greatest potential exposure to asbestos during abatement operations. The results from these samples are for comparison to 0.01f/cc (and presence of asbestos for when analyzed by TEM) and should not be construed as "OSHA exposure assessment air samples".
4. Eight (8) samples, including personnel and perimeter samples, will be submitted for PCM analysis. If analysis yields results with detectable fiber levels (based on fiber count) then TEM analysis will be conducted on two (2) highest PCM samples to evaluate engineering controls. After two (2) weeks of TEM sampling, the analytical results and engineering controls will be assessed to determine if adequate controls are in place. If controls are deemed adequate by UCD and CDPHE, the number of *TEM samples* may be reduced as approved by UCD and CDPHE. On an ongoing project basis, any sample with PCM results exceeding 0.01 fibers/cc must be analyzed by TEM. For large areas of disturbance, additional perimeter monitoring points shall be added if the active area of soil disturbance is larger than approximately 1 acre in size. One additional monitoring point should be added for each additional 200 linear feet of perimeter (approximately 1 sample per additional ¼ acre increase in area). For active areas of soil disturbance greater than 1 acre, additional samples shall be analyzed by TEM at a minimum rate of 25% of the total number of samples collected, based on highest PCM results. However, TEM analysis is not required if PCM results are non-detect (based on fiber count).
5. PCM verbal results will be made available by the start of the next business day or as soon as practical after the start of the next business day. TEM verbal results will be made available within 24-hours of receipt of samples by the laboratory, and written results will be made available within 24 hours from the time the verbal result is received. UCD and CDPHE will be immediately notified if any sample results show any concentration of airborne fibers. If any asbestos fibers are detected by TEM, all investigative activities will be stopped and engineering controls will be evaluated by Contractor and Consultant, and will be discussed with UCD and CDPHE to determine if changes in engineering controls or additional PPE are required.

14.9 Personal Air Monitoring

Air sampling of personnel is an employer based responsibility, and as such shall be the responsibility of each employer associated with soil disturbing activities. The "area equivalent" samples collected on personnel are interpreted as "worst case area" samples and are not intended to provide OSHA exposure information, but can be used by employers for general informational purposes.

14.10 Truck/Container Staging/Lining and Waste Loading

All truck drivers will be instructed to close all windows and shut-off air delivery systems (fans on air-conditioning and heating systems) when entering the loading area. All travel and positioning of waste transport Truck/Trailers on the site should be visually verified clean soil to minimize the need for decontamination procedures. At the loading location, install a ten-mil polyethylene sheeting or thicker "lay-down pad" that will be placed on the ground under

dumpsters/trucks to catch any spilled material. Spilled material will be cleaned up immediately and not allowed to dry out or accumulate. Additional poly shall be draped over trailer tires/fenders to minimize the need for decontamination after loading. After the load has been secured, and the load cover tarp is installed, the poly sheeting lay down loading pad will be properly decontaminated using wet wipe and or HEPA vacuuming methods. The loaded transportation truck may then proceed down the designated exit route.

To accomplish proper characterization of soil (preliminary visual inspection and verification visual inspection at staging area), movement of soil to staging areas for subsequent loading, transportation and disposal is necessary. Staged soil must be stabilized when loading is not occurring. Upon removal of staged ACS placed on “non-ACS area”, the contractor shall remove an additional 12 inches of soil to address any cross-contamination that may have occurred to the non-ACS area.

14.11 Waste Transportation and Disposal

Containers of friable asbestos waste, or asbestos-contaminated soil with visible friable asbestos, shall be labeled, in accordance with the requirements of Section 5.3 of the Solid Waste Regulations. In accordance with the disposal requirements for friable asbestos waste (Section 5.3.5(A) of the Solid Waste Regulations) at least two 6-mil polyethylene liners/sheeting shall be used for soil that contains visible friable asbestos. Polyethylene liners/sheeting should be designed and sized for the container to be used and should be folded over sides of trailers or containers to protect against contamination during loading and to facilitate decontamination. After loading, both liners/sheeting should be mechanically fastened and sealed separately. The liners/sheeting shall be sealed in a manner that ensures that they remain then leak-tight during transportation and disposal operations.

In addition, Department of Transportation (DOT) asbestos placards shall be placed on all four vertical sides of the container or vehicle being used for transport of ACM/ACS. The Contractor should direct the schedule of transportation of asbestos-contaminated soil. When loaded, each truck should be assigned a manifest to serve as the shipping document for that particular load.

Asbestos-contaminated soil shall be transported and disposed in a leak tight container in accordance with the CDPHE disposal requirements. Documentation stating that the soil originating from the site will not be used as daily cover or sold as clean fill shall accompany each load of asbestos-contaminated soil removed from the site.

Disposal of asbestos-contaminated soil will be conducted in accordance with the following requirements, in accordance with Section 5.5.7 of the Solid Waste Regulations:

1. Asbestos-contaminated soils containing visible friable asbestos will be disposed in a leak tight container as friable asbestos waste in accordance with the requirements of Section 5.3 of the Solid Waste Regulations.

14.12 Personnel Decontamination

A fully functioning 3-chamber decontamination trailer (or equivalent) will be placed outside the work zone to function as a remote shower location, with a clean room and an equipment room. All workers involved in removal/packaging of friable or significant quantities of nonfriable ACM will be double suited while in the work area and will shed one suit prior to leaving the work area and immediately proceed to the decontamination facility. All workers will decontaminate per OSHA regulations and CDPHE Regulation No. 8. Decontamination water will be filtered using a 5 micron filter, or in accordance with local requirements if more stringent, prior to disposal to the sanitary sewer.

14.13 Equipment Decontamination

All equipment and tools that come into contact with, or are used for removal of ACS will be decontaminated (free of all visible dust and debris) using wet cleaning (fire hose for trackhoe equipment, wet rags for hand tools, etc) and HEPA vacuuming methods (interior of equipment cab, etc), prior to leaving the work zone. Equipment decontamination will be conducted within a decontamination station constructed adjacent to the work zone. The

decontamination station will be constructed of 10-mil polyethylene sheeting (and other materials as necessary, such as EPDM rubber roofing, etc) in such a way as to capture all contaminated material and wastewater from the decontamination process. All waste water from the decontamination station will be filtered to a minimum of 5-microns (or in accordance with local requirements if more stringent, prior to discharge to a sanitary sewer), or may be used for wetting ACS.

14.14 Final Inspection Procedures

As the project progresses, visual inspection will be performed to ensure that all observable asbestos-containing materials have been removed from the soil surface. During removal of soil, the soil will be removed in a manner that will provide a flat, even surface (with no spoil piles) for visual inspection. The inspections will be performed for the surface area removed that day, as a preliminary inspection. Due to the wet nature of the removal and the soil, adequate drying time is required before a final visual inspection can be conducted.

The removal of soil in the debris field area will be considered complete when the visible asbestos-containing material has been removed and an asbestos soil inspector makes a final decision that all contaminated soil in the debris field has been removed to depth and extent of excavation (where remaining visible material will be covered with a membrane and labeled), or depth of find plus 1 foot of soil (DOF+1) and extent of find plus 1 foot of soil (EOF+1).

14.15 Managing ACS left in place

Where visible asbestos containing material is observed at the depth and extent of excavation, 1 additional foot of soil shall be removed, the area shall be covered with a geotech membrane, labeled as asbestos contaminated soil, and then the membrane shall be covered with 1 foot of clean fill to bring back to desired grade/level. Prior to covering with clean fill, photographs will be collected from each compass point of the boundary, and the corner points of the boundary shall be obtained using measurements for a control point or with a GPS device.

14.16 Spill Control

Where asbestos contaminated soil is spilled during loading or transport, the Contractor shall immediately ensure the spilled material is immediately collected in accordance with wetting and emission control provisions of this SCMP. For spills that occur on clean soil, remove 12 inches of soil under spill area as precautionary measure. For spills that occur on hard surfaces such as asphalt roadways or concrete parking lots, provide wet cleaning and HEPA vacuuming until all visible dust and debris have been removed.

Where water run-off occurs resulting in visible erosion and sediment transfer from asbestos contaminated soil areas to non-asbestos contaminated soil areas, remove top 12 inches of soil where the visible erosion and sediment deposition occurred.

14.17 Erosion Control

To control wind erosion of ACS, use of silt fencing or wind fencing may be used, where appropriate. Stabilize asbestos containing soil with friable debris by covering with magnesium chloride (or equivalent soil stabilizer) or 6-mil poly until removal can occur. Securely fasten poly sheeting to prevent removal by the wind.

To control water erosion, the use of silt fencing, erosion control mats, straw wattles or equivalent erosion control methods shall be used in areas where run-off is likely. Where ACS will remain, cover with geotech membrane, and then cover with 12 inches of clean fill and cover with appropriate vegetative growth or ground cover to prevent erosion.

15 Special Considerations

15.1 Emergency Buried Utility Repair Projects

Specific provisions of this SOP require some planning and response time that may not be appropriate in an emergency response situation to repair a buried utility. This section identifies the minimum requirements under this SOP for the first 24 hours of excavation and repair, to ensure that necessary repairs can be made to buried utilities promptly in an emergency situation where the utility must be repaired immediately (which may include evening and weekend work), where ACS is encountered during the emergency response, only worker protection, adequate wetting and no visible emission provisions of this SOP will apply within the first 24 hours, with remaining provisions including material characterization, soil training, air monitoring, disposal, etc to take effect after the first 24 hours of the excavation and repair. By ensuring adequate wetting and no visible emissions during emergency excavation during the first 24-hours, this will allow necessary work to continue, and will provide a window for implementing remaining provisions of this SOP including testing of suspect materials and where ACS is identified, and for implementing management actions under this SOP. Where suspect material is identified in soil that has been excavated during the emergency repair, this soil shall not be placed back into the hole/pit until characterization can be conducted by an asbestos soil inspector.

15.2 Importing and Exporting Soil

The Contractor shall notify and receive approval from the UCD project manager prior to any soil being exported or imported to the project. Contractor shall coordinate any inspections, spotting, or testing requested by the UCD project manager for any exported or imported soils to the project.

15.3 Building Demolition Debris Removal Verification

To ensure demolition debris is removed during the demolition phase in accordance with applicable regulations, an asbestos soil inspector will conduct a site inspection during the final stage of demolition to determine if all demolition debris has been removed. As a precautionary measure, as part of the final demolition site cleaning, a layer of clean soil should be removed to ensure no construction debris remains upon completion of the demolition process as verified by inspection by an asbestos soil inspector, with the exception of non-asbestos-containing/contaminated “structural” fill such as concrete and brick as approved by UCD.

15.4 Soil Stockpiling Management Procedures

Stockpiling of asbestos contaminated soils will only occur under CDPHE and UCD approval, as removal of contaminated soil will be under a direct load approach unless otherwise approved by UCD and CDPHE. When soil movement and stockpiling is necessary, based on site logistics, stockpiled soil must be stabilized and covered when not in use, and must not be allowed to remain on site longer than 5 working days.

For excavation and stockpiling of non-asbestos contaminated soils that are subject to “soil spotting provisions” (moderate to high potential ACS), an asbestos soil inspector will be present at all areas where stockpiled soils are placed, and will be in radio communication with the asbestos soil inspector inspecting soils at the excavation point to ensure prompt and efficient response to discovery of visible ACM debris at either location.

15.5 Management Practices for Significant Discovery of only Nonfriable materials

Where only nonfriable materials are observed (no friable debris) in a significant discovery “debris field”, the following are required procedures:

1. Ensure material and soil is adequately wet and no visible emission occur during excavation and loading activities.

2. Packaging and disposal as nonfriable asbestos containing waste material.

15.6 Soil Sampling

The primary method for determining asbestos contaminated soil under this SOP and under CDPHE HMWMD regulation is visual identification of suspect material that is confirmed or presumed to be asbestos. Soil sampling is considered an optional activity and will be conducted only with UCD written authorization to conduct soil sampling on the campus. There are two primary situations where UCD may authorize soil sampling:

1. Soil sampling to provide general information about imported or exported soils as part of the management procedures under the SOP.
2. UCD written authorization to conduct soil sampling in conjunction with "Remediation" actions (as provided in Attachment #5) conducted to remove the full extent and depth of asbestos contaminated soil from a specified area. Remediation soil sampling may include "baseline" characterization for soil sampling collected prior to a remediation action, and will include collection of "clearance" (post-removal) soil sampling to verify removal of all asbestos (including trace amounts in soil as determined by PLM analysis).

Refer to Attachment #4 for surface soil sampling and analysis procedures.

15.7 Remediation

If the objective of an ACS removal activity is remediation of a specific location to remove the complete extent and depth of asbestos in soil at a specific location, including trace in soil as determined by PLM analysis, or for the purpose of obtaining a no further action determination under some other regulatory framework, such work must be in accordance with the remediation plan provided as a supplement to this SOP in Attachment #5. The remediation plan integrates the sampling and analysis plan (SAP) provided in Attachment #4 and describes soil handling and soil clearance (visual and bulk sampling) criteria. Refer to Attachment #5 for surface remediation procedures.

16 Project Reporting

Upon completion of soil disturbing activities, to aid in future management of site and any remaining ACS conditions known to exist, a close out report will be provided to the UCD to document work performed, and any ACS material known to exist that will remain for management.

The project close-out report shall include the following minimum components:

1. Property description and description of areas with asbestos-contaminated soils
2. Description of soil disturbing activities involving ACS (emission control procedures) and non-ACS conditions
3. Description of all field operations or daily logs
4. Containment logs (where appropriate)
5. Air Monitoring logs and analytical results associated with ACS removal actions
6. Description/results of all asbestos bulk sampling events, including sample locations descriptions and sample diagram/drawing showing sample locations
7. Analytical results associated with bulk sampling events
8. Disposal summaries and manifests
9. Maps showing excavation profiles
10. Documentation of asbestos left in place including drawings, photographs and GPS coordinates for corner points of known ACS.
11. Photographs showing pre-, during and post excavation/removal conditions
12. Accreditation and Certification documentation for activities covered under the Work Plan (Inspector, Air Monitoring Specialist, Supervisor, and Worker)

17 SOP Review and Revision

17.1 SOP Review

Annually, the UCD Facilities Planning Department contact and UCD Environmental Health and Safety Division contact as provided in Section 3 of this SOP shall review this SOP with an asbestos accredited/certified Project Designer with 6-month asbestos soil experience to identify any needed revisions to this SOP.

17.2 SOP Review

Based on annual review, any revisions to the SOP shall be submitted to CDPHE as a “revised” SOP with a new revision number and revision date for CDPHE review and approval.

18 Attachments

Attachment #1	ACS Classification and AMC Boundary Drawing (and Site Survey Drawings)
Attachment #2	Historical Buildings and Steam Tunnels Site Drawing
Attachment #3	SOP Flow Chart
Attachment #4	Soil Sampling and Analysis Plan (SAP)
Attachment #5	Remediation Plan
Attachment #6	CDPHE Notification Summary and Notification Forms

ATTACHMENT 1

ACS CLASSIFICATION AND AMC BOUNDARY SITE DRAWING AND SITE SURVEY DRAWINGS

ATTACHMENT #2

**HISTORICAL BUILDING AND STEAM TUNNEL
SITE DRAWING**

ATTACHMENT #3

SOP FLOW CHART

ATTACHMENT #4

SOP SUPPLEMENTAL PROCEDURES SOIL SAMPLING AND ANALYSIS PLAN (SAP)

General

1. Sample aliquots should be collected using a scooping device (stainless steel spoon or equivalent), and transferred to a composite sample container.
2. When all aliquots have been collected, the composite sample container should be sealed and labeled with a sample number unique to the boring from which the sample was collected. The sample should be homogenized by the laboratory prior to analysis.
3. A field sampling form or log book entry should be maintained for each sample. The form or log book entry should contain the location, date and time of each sample, a description of the type of and friability of any suspect material encountered, and any observations made during sample collection.
4. Proper chain-of-custody protocols should be followed for all samples collected.

Analytical Procedures

1. Soil samples should be analyzed by PLM for bulk asbestos samples (Method – EPA/600/R-93/116). The samples should be homogenized by the laboratory prior to sample analysis.

Surface Soil Sampling

1. Divide the area to be inspected into a grid, using stakes or paint to mark grid nodes. The area of each grid square will be determined based on the size of the site, and existing knowledge of the extent and concentration of surface asbestos;
2. Grids are (50' x 50') on an X and Y axis utilizing planned north with the south west corner of each grid being the reference point for each grid site wide. X axis designation is numerical and Y axis grid designation is alphabetical.
3. Each grid point is identified in the lower left (Southwest) corner with a 48" wood lathe with pink ribbon alpha numerically (i.e. B15, CA12).
4. Sub-grids (25' x 50') rectangle grids within each (50' x 50') grid are identified with pin flags alpha numerically (i.e. B15-1, CA12-2).
5. Where grids extend beyond a scope of work boundary and/or property boundary, this boundary will be designated with a string line to delineate scope in partial grids (where grids overlay on scope of work or property boundary).
6. Using flags, paint or GPS, mark locations of any suspected asbestos found;
7. Record locations of suspected asbestos found using a map, log or other documentation. The absence of asbestos in a grid square will also be documented;
8. Place suspected asbestos material in a sample bag, adequately wetting it prior to disturbing it; and record time and date, location and description of material collected.
9. A composite aliquot soil sample will be collected within each sub-grid 1,250 square feet (25' x 50') by an asbestos soil inspector. The asbestos soil inspector will collect ten aliquots of surface soil (top 1 inch) within each sub-grid. Two sample aliquots will be collected from the southwest quadrant, southeast quadrant, northwest quadrant, northeast quadrant, and the relative center of

the sub-grid (totaling ten aliquots per sub-grid). A grid will be considered an asbestos contaminated soil grid where soil sampling data reports the presence of asbestos in any sub grid within that grid (thus progressive analysis may be used to create sample sets for each grid, with a positive stop used where analysis shows asbestos present (eliminating the need to analyze the second sub grid).

10. Samples will be placed in a sample jar, labeled, and location, time, date will be documented.
11. The sample will be homogenized at the laboratory;
12. Follow proper chain of custody protocols.

Subsurface Soil Sampling - Borings

1. A composite sample should be collected from each soil boring. The sample should be made up of five (5) to ten (10) aliquots representative of the soil boring. The actual number of aliquots may vary depending on the depth of sampling and the conditions observed.

Subsurface Soil Sampling – Potholes and Trenches

1. Collect a composite sample made up of five (5) to ten (10) aliquots representative of the soil encountered in the trench or pothole. The actual number of aliquots may vary depending on the depth of sampling and the conditions observed. In addition, it may be warranted to collect separate samples from various strata, with aliquots collected from individual strata, to better characterize observed conditions.

Informational Soil Samples for Imported/Exported Soil

1. The asbestos soil inspector will collect composite samples comprised of 10-point aliquots from 10% of the total number of loads dumped (for imported soils) and/or loaded (for exported soils). Soils sampled for informational purposes shall be managed in an appropriate manner (stockpiled by day, area, etc) to allow appropriate management of soil based on soil sampling data. All soil samples will be submitted to an accredited laboratory for PLM analysis on a “rush” turnaround.

Interpretation of Sampling Data

1. Samples reporting no asbestos detected shall be interpreted as non-ACS, and samples reporting the presence of asbestos shall be considered ACS.

ATTACHMENT #5

SOP SUPPLEMENTAL PROCEDURES REMEDIATION PLAN

Where the intent is to remediate (removal all visible debris and asbestos in soil to a concentration of no asbestos detected in the soil, based on soil sampling), the following supplement to the SOP provides specific remediation provisions.

The following provisions identified in Section 12 of the SOP shall apply to ACS surface soil remediation (soil removal, packaging, transportation and disposal) procedures:

- Notifications Planned Asbestos-contaminated Soil Disturbance
- Limited Quantity Discovery Management and Disposal
- Site Control, Demarcation, Fencing and Wind Screening
- Protection of Adjacent Structures
- Soil Wetting and Stabilization
- Dust and Emissions Control
- PPE
- Equipment/Engineering Controls
- Removal/Excavation
- Soil Stockpiling
- Wind and Work Stoppage Conditions
- Environmental Monitoring
- Personal Air Monitoring
- Truck/Container Staging/Lining and Waste Loading
- Waste Transportation and Disposal
- Personnel Decontamination
- Equipment Decontamination
- Final Inspection Procedures

All ACS identified based on visual characterization (extent and depth) of find, shall be removed plus an additional 12 inches of soil beyond the extent of find (EOF) and 12 additional inches beyond the depth of find (DOF) which identifies the 3-dimension box of soil removed under the remediation.

After removal to EOF and DOF based on visual and preliminary soil sampling data, post remediation “surface clearance” soil sampling will be conducted in accordance with the Soil Sampling and Analysis Plan (Attachment #4) of this SOP, on a grid by grid basis. Any grid reporting the presence of asbestos will be considered to have “failed” and will require removal of additional twelve (12) inches of soil, and the “clearance process will be repeated until “no asbestos detected” is reported for that grid, after which that grid will then have deemed to “pass”. Once all grids in the delineated area have been characterized, remediated, and passed “clearance soil testing”, the remediation action will be considered complete

ATTACHMENT #6

**CDPHE HMWMD NOTIFICATION SUMMARY AND NOTIFICATION
FORMS**

STATE OF COLORADO

Bill Ritter, Jr., Governor
Martha E. Rudolph, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S. Laboratory Services Division
Denver, Colorado 80246-1530 8100 Lowry Blvd.
Phone (303) 692-2000 Denver, Colorado 80230-6928
TDD Line (303) 691-7700 (303) 692-3090
Located in Glendale, Colorado
<http://www.cdphe.state.co.us>



Colorado Department
of Public Health
and Environment

April 28, 2010

Mr. Ken Neeper
Manager Infrastructure Development
University of Colorado Denver
Mail Stop F418
1945 North Wheeling Street
Aurora, CO 80045

RE: Asbestos-Contaminated Soil (ASC) Management, Standard Operating Procedure (SOP) Document,
University of Colorado Denver Anschutz Medical Campus, February 26, 2010

Dear Mr. Neeper,

The Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (the "Division"), has received and reviewed the above referenced standard operating procedures for the proper management of asbestos-contaminated soils during soil disturbing activities at the Anschutz Medical Campus of the University of Colorado Denver. The Anschutz Medical Campus is located on the site of the former Fitzsimons Army medical Center in Aurora, Colorado. The Division has no additional comments and hereby approves the Anschutz Medical Campus ACS Management SOP Document.

If you have any further questions or comments please contact me at 303-692-3416 or via e-mail at jeffrey.swanson@state.co.us.

Sincerely,

Jeffrey R. Swanson, P.E.
Federal Facilities Restoration and Reuse Unit
Remedial Program

CC: Tom Butts, Walsh Environmental Scientists and Engineers
Monica Sheets, CDPHE
Rob Eber, AGO
File Copy: RD007-13.1

END OF SECTION 02 81 00

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SYSTEM REQUIREMENTS

- A. Design Requirements:
 - 1. Concrete for Cast-in-Place light standard foundations shall comply with CDOT Specifications for Road and Bridge Construction Section 601 Structural Concrete for Class B concrete.
 - 2. Reinforcement steel shall comply with CDOT M&S Standard Details M-613-1.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Materials:
 - 1. Concrete Materials shall comply with CDOT Specifications for Road and Bridge Construction Section 601 Structural Concrete and CDOT M&S Standard Details M-613-1.
 - 2. Portland Cement Replacement: Fly ash to reduce portland cement up to 40 percent is acceptable for concrete mixtures for footings, foundation walls, walls, columns, and other vertical surfaces; not permitted for slabs.

PART 3 - EXECUTION

3.1 INSTALLATION

- 1. Installation shall comply with CDOT Specifications for Road and Bridge Construction Section 601 Structural Concrete and CDOT M&S Standard Details M-613-1.

3.2 FIELD QUALITY CONTROL

- A. Testing: By The University-engaged agency.
- B. Special Inspections: By The University-engaged special inspector.
- C. Cost of Testing: To be included as part of Project budget.

END OF SECTION 03 30 00

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

1.2 DEFINITIONS

- A. Refer to Article 100 of the currently adopted National Electrical Code for definitions as applicable to this project.
- B. Other definitions:
 - 1. "Concealed": Embedded in masonry, concrete or other construction, in trenches, or in enclosures.
 - 2. "Exposed": Not installed underground or "concealed" as defined above.
 - 3. "Furnish" or "Provide": To supply, install and connect up complete and ready for safe and regular operation of particular work unless specifically otherwise noted.
 - 4. "Install": To erect, mount and connect complete with related accessories.
 - 5. "Indicated", "Shown" or "Noted": As indicated, shown or noted on drawings or specifications.
 - 6. "Related Work" includes, but is not necessarily limited to, mentioned work associated with, or affected by, the work specified.
 - 7. "Reviewed", "Satisfactory", "Accepted", or "Directed": As reviewed, satisfactory, accepted, or directed by or to Engineer.
 - 8. "Similar": Equal in materials, weight, size, design, construction, capacity, performance, and efficiency of specified product.
 - 9. "Supply": To purchase, procure, acquire and deliver complete with related accessories.
 - 10. "Wiring": Raceway, fittings, wire, boxes and related items.

1.3 SUBMITTALS

- A. Submittals shall be made in accordance with General Conditions of Contract and the requirements of Section 01 33 00.
- B. Shop drawings shall include equipment catalog cuts or manufacturer's printed data identifying: dimensions, weights, recess openings, equipment arrangements, electrical characteristics with bus size, electrical rating, material, wiring diagrams indicating circuit arrangement and NEMA rating for, but not limited to the following:
 - 1. Medium voltage distribution equipment, cable and devices (13.2 kv and above)
 - 2. Low-Voltage Transformers
 - 3. Switchboards
 - 4. Panel boards
 - 5. Enclosed Switches and Circuit Breakers
 - 6. Network Lighting Controls
 - 7. Automatic Transfer Switches
 - 8. Contactors
 - 9. Wiring Devices
 - 10. Exterior Lighting
 - 11. Hangers and Supports for Electrical Systems
 - 12. Grounding and Bonding
 - 13. Modular Wiring Systems
 - 14. Electrical Systems Control
 - 15. Lightning Protection System
 - 16. Electronic Meters
- C. Submittals shall also include all equipment sizes and clearances.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: All electrical work at the University shall be performed by a State of Colorado licensed contractor under the supervision of a licensed electrician. Contractors shall verify that electricians are currently licensed by the State of Colorado and shall supply Project Manager with names and license numbers. Contractor shall have a minimum of 3 years of satisfactory performance in conducting the type of work specified.
1. ANSI/NFPA 70 - National Electrical Code.
 2. ANSI/IEEE C2 - National Electrical Safety Code.
 3. NECA - Standard of Installation.
 4. NFPA – National Fire Protection Association.
 5. IEEE – The Institute of Electrical and Electronics Engineers.
 6. NEMA – National Electrical Manufacturer Association.
 7. The University/Anschutz Medical Campus Project Guidelines and Standards.
 8. International Building Code in accordance with the Campus Building Official.
 9. ASTM - American Society of Testing Materials
 10. IPCEA - Insulated Power Cable Engineers Association
 11. Underwriter's Laboratories (UL)
 12. American National Standards Institute (ANSI)
 13. Other requirements as listed elsewhere in these specifications.
- B. The drawings and specifications take precedence when they are more stringent than codes, statutes, or ordinances in effect. Applicable codes, ordinances, standards and statutes take precedence when they are more stringent than, or conflict with the drawings and specifications.
- C. Record Documents:
1. Maintain a separate set of contract electrical drawings at the site to show the following:
 - a. Major raceway systems, size and location, for both exterior and interior; locations of control devices; distribution and branch electrical circuitry; and fuse and circuit breaker size and arrangements.
 - b. All branch circuits, feeders, communications conduits embedded in concrete, dimensioned from prominent building lines.
 - c. Equipment locations (exposed and concealed) dimensioned from prominent building lines.
 - d. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
- D. Operations and Maintenance Data:
1. O and M Data shall be provided in accordance with Section 01 78 23 including the following information:
 - a. Description of function, normal operating characteristics and limitations, fuse curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
 - b. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 - c. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - d. Servicing instructions and lubrication charts and schedules.
 - e. Complete list of parts and wiring diagrams.
 - f. Names, addresses and telephone numbers of the Contractor, Sub-contractors and local company responsible for maintenance of each system or piece of equipment.
 - g. All information shall be permanently bound in a 3-ring binder. The job name and address, and Contractor's name and address shall be placed on the cover and spine of each binder in a permanent manner. Dymo-tape is not acceptable.
 - h. Copies of all test reports shall be included in the manuals.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products in accordance with manufacturer's instructions, and the requirements of Section 01 10 00.

1.6 WARRANTY

- A. All electrical equipment, materials and workmanship warranties shall be provided and shall include the following:
 - 1. The Contractor warrants the electrical system, material and workmanship, for a period of one year from the date of the University final acceptance of the installation unless as otherwise noted in Commissioning.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. All equipment and materials installed shall be new, unless otherwise specified. Defective or damaged materials shall be replaced or repaired, prior to final acceptance, in a manner acceptable to the Engineer or The University and at no additional cost to the University.
- B. All electrical materials shall be acceptable for installation only if labeled or listed UL and, if accepted, by the authority having jurisdiction.
- C. All major equipment components shall have the manufacturer's name, address, model number, and serial number permanently attached in a conspicuous location.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Construct Work in sequence under provisions of Division 1 where applicable.
- B. Electrical Contractor shall coordinate Divisions 26 work with the installer of other work to ensure that code required clearances relating to space required for access to electrical equipment is properly maintained.
- C. Install Work using procedures defined in NECA Standard of Installation.
- D. Workmanship shall conform to highest industry standards for each trade involved in installation of the Work.
- E. Upon completion of work, all equipment and materials shall be installed complete, thoroughly checked, correctly adjusted, and left ready for intended use or operation. All work shall be thoroughly cleaned and all residues shall be removed from surfaces.
- F. Exterior surfaces of all material and equipment shall be delivered in a perfect, unblemished condition.
- G. All penetrations required through completed concrete construction shall be core drilled at minimum size required. Precautions shall be taken when drilling to prevent damage to structural concrete. The Contractor shall obtain permission from the Engineer and Structural engineer before proceeding with drilling.
- H. Sleeve Seals: Provide sleeve seals for penetrations located in foundation walls below grade, or in exterior walls, of one of the following:

1. Caulk between sleeve and raceway with approved Caulk material.
 2. Mechanical Sleeve Seals: Modular mechanical type, as manufactured by Thunder line Corp., consisting of interlocking synthetic rubber links shaped to continuously fill annular space between raceway and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal.
-
- I. Install equipment and materials to provide required Code clearances and access for servicing and maintenance. Allow ample space for removal of parts, fuses, lamps, etc., that require replacement or servicing according to the National Electric code and the AHJ.
 - J. Extend all conduits so that junction and pull boxes are in accessible locations.
 - K. Verify final locations for stakes and markers with field measurements and with the requirements of the actual equipment to be connected.
 - L. Electrical system layouts indicated on drawings are generally diagrammatic but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of raceways and locations of outlets by structure and equipment served. Take all dimensions from engineering drawings.
 - M. Consult all other drawings. Verify all scales and report any dimensional discrepancies or other conflicts to Engineer before submitting bid.
 - N. All home runs to panel boards are indicated as starting from nearest splice box and continuing in general direction of that panel. Continue such circuits to panel as though routes were completely indicated.
 - O. Furnish and install all necessary hardware required for equipment specified under this Division.
 - P. Abandon in place all unused conduit, junction boxes, panels, and other electrical components back to the source.
 - Q. Clean all luminaries, lamps and lenses prior to final acceptance. Replace all inoperative lamps.
 - R. Contractor shall furnish and install new LED luminaire, light standard, foundation and raceway for a complete roadway/pedestrian lighting system. Contractor shall 24" deep trench, bury and compression backfill the schedule 80 PVC conduit and conductors to the new luminaire locations as shown on the plans. Add additional breakers and lighting contactors in the existing lighting control centers to accommodate the new lighting systems as shown on the plans. Contractor shall return all landscape and irrigation systems disturbed under this project to pre-construction condition at job completion.
 - S. Contractor shall furnish and install new LED luminaire, light standard, foundation and raceway extended from the existing switched circuits in the area. Contractor shall intercept the existing raceway with an in-grade polymer concrete splice box, 24" deep trench, bury and compression backfill the schedule 80 PVC conduit and conductors to the new luminaire locations as shown on the plans. Contractor shall return all landscape and irrigation systems disturbed under this project to pre-construction condition at job completion.
-
- 3.2 TESTING, CLEANING AND CERTIFICATION
- A. Operating and Acceptance Tests: Provide all labor, instruments, and equipment for the performance of tests as specified below and elsewhere in these specifications.
 1. Perform a careful inspection of the main switchboard bus structure and cable connections to verify that all connections are mechanically and electrically tight.

2. For a one-day period after the project has been placed into normal service, record the full load current in each phase or each line at the panel and submit to the Engineer.
 - B. Test Reports:
 1. Test Reports: Submit three (3) copies of test results.
 2. The final University inspection of the project will not be made until a satisfactory report is received and approved by the University Project Manager.
 3. Results shall include:
 - a. Resistance to ground readings for main distribution switchboard service ground.
 4. Testing shall be done by Electrical Contractor.
 - C. Clean-Up: Remove all materials, scrap, etc., relative to the electrical installation, and leave the premises and all equipment, lamps, fixtures, etc. in a clean, orderly condition. Any costs to the University for cleanup of the site will be charged against the Contractor.
- 3.3 COMMISSIONING (DEMONSTRATION)
- A. Acceptance Demonstration: Upon completion of the work, at a time to be designated, the Contractor shall demonstrate for the University the operation of the entire installation, including all systems provided under this contract.
 - B. The Contractor shall furnish the services of a qualified representative of the supplier of each item or system who shall instruct specific personnel, as designated by the University, in the operation and maintenance of that item or system.
 1. Instruction shall be given when the particular system is complete, and shall be of the number of hours indicated. A representative of the Contractor shall be present for all demonstrations.

END OF SECTION 26 05 00

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

- A. Provide complete wire and cable system to meet the requirements of the project. Provide wire sizes in accordance with NEC.

1.2 SUBMITTALS

- A. Product data shall be submitted for in accordance with the requirements of Section 26 05 00 each of the following:
 - 1. Wires
 - 2. Cables
 - 3. Connectors

1.3 QUALITY ASSURANCE

- A. Wire and cable shall be provided and installed in accordance with the requirements of Section 26 05 00.
- B. Installer Qualifications and Certifications: Firms with at least 3 years of successful installation experience with projects utilizing electrical wiring cabling work similar to that required for this project.
- C. Regulatory Requirements: Conform to applicable code relations regarding toxicity of combustion products of insulating materials
- D. Manufacturers: Firms regularly engaged in manufacture of electrical wire and cable products of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Wire and cable shall be delivered, stored and handled in accordance with the requirements of Section 26 05 00.
- B. Deliver wire and cable properly packaged in factory-fabricated type containers, or wound on NEMA-specified type wire and cable reels.
- C. Store wire and cable in clean dry space in original containers. Protect products from weather, damaging fumes, construction debris and traffic.
- D. Handle wire and cable carefully to avoid abrading, puncturing and tearing wire and cable insulation and sheathing. Ensure that dielectric resistance integrity of wires/cables is maintained.

1.5 WARRANTY

- A. Wire and cable warranties shall be provided in accordance with the requirements of Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by the following (for each type of wire, cable, and connector):
1. Wire and cable:
 - a. Triangle - PWC
 - b. American Wire and Cable Co.
 - c. Anaconda-Ericsson Inc; Wire and Cable Div.
 - d. Belden Div; Cooper Industries
 - e. General Cable Corporation
 - f. General Electric
 - g. Okonite
 2. Connectors:
 - a. O-Z/Gedney Co.
 - b. AMP, Inc.
 - c. Burndy Corporation
 - d. Ideal Industries, Inc.
 - e. 3M Company
 - f. Thomas and Betts Corp.

2.2 MATERIALS, GENERAL

- A. Wires and Cables:
1. Provide new wire and cable suitable for the temperature, conditions, and location where installed. All cable shall be new and shall conform to or exceed IPCEA requirements. Building wire shall be insulated with THHN/THWN-2/THW-2 or XHHW insulation, rated 600 volt.
 2. Conductors: Provide solid conductors for power and lighting circuits 12 AWG and smaller. Provide stranded conductors for 10 AWG THHN/THWN-2 and larger. In sizes 250 MCM and larger use type THW or THWN. In sizes #1 AWG and smaller all conductors shall have heat/moisture resistant thermoplastic insulation type THW or THWN (75 degree C), except as follows:
 - a. Where conduit temperature will exceed 100 degree F, use type THHN (90 degree C). Type XHHW (90 degree C) permissible in dry locations.
 - b. In 120-volt incandescent fixtures, type AF (150 degree C).
 - c. In wire ways of fluorescent lighting fixtures types THW-MTW, THHN (90 degree C).
 3. Conductor Material: Provide copper for all wires and cables.
 4. Metal Clad Cable is not acceptable for this project. Use colors of wires as specified in paragraph 3.5 of this section.
 5. For general applications, other than special use, use THHN insulated wire.
 6. Type NM, NMC, NMS cable are not acceptable for any application.
 7. Use copper wire only.
 8. No wire splices shall be allowed in the conduit or conduit fittings. All splices shall be done in an approved box.
 9. Grounding conductors shall be copper type THHN/THWN-2 with green integrally-colored insulation, sized to NEC or as shown on plans, whichever is larger.
 10. Minimum conductor size shall be #12 AWG, 600V rated, unless otherwise noted on plans.
- B. Connectors:
1. Provide UL type factory-fabricated, solder less metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Use connectors with temperatures equal to or greater than those of the wires upon which used.
 2. Provide outdoor, underground rated wire nuts and ground rod lug terminations for this project.
 3. Provide breakaway type, in-line fuse holders (for hot conductor) and breakaway connectors (for neutral conductor) in hand hole of each light standard pole.
- C. Wiring to Light Fixtures:

1. Type THHN/THWN to LED luminaires installed exterior, 12-gauge minimum.
- D. Wire Connectors:
1. For wires size #8 AWG and smaller, insulated pressure type (with live spring) rated 105 degree C, 600 volt, for building wiring and 1000 volt in signs or fixtures. 3M or Ideal.
 2. For wires size #6 AWG and larger, T & B or equivalent compression type with 3M #33 or #88 tape insulation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that mechanical work likely to damage cable has been completed.

3.2 INSTALLATION, GENERAL

- A. Install electrical cables, wires and connectors in compliance with applicable requirements of NEC, NEMA, UL, and NECA's "Standard of Installation", and in accordance with recognized industry practices.
- B. Coordinate wire/cable installation work, including electrical raceway and equipment connection work, with other work. Pull no wire into any portion of conduit system until all construction work, which might damage the wire, has been completed.
- C. Wires and Cables:
1. On systems greater than 600V thoroughly swab raceway before installing wire. Pull conductors simultaneously where more than one is being installed in same raceway. Use pulling compound or lubricant on all cable installations. Compound used shall not deteriorate conductor or insulation.
 2. Use pulling means including, fish tape, cable, rope and basket weave wire/cable grips which will not damage cables or raceway. Do not use rope hitches for pulling attachment to wire or cable. Do not exceed manufacturer's tension requirements.
 3. Keep conductor splices to minimum. Install all wire continuous from outlet to outlet or terminal to terminal. Splices in cables when required shall be made in hand holes, pull boxes, or junction boxes and shall be in strict accordance with cable manufacturer's recommendations utilizing solder less connectors NEMA/UL approved for the use. Splice only in accessible junction boxes. Use splices and tap connectors which are compatible with conductor material.
 4. Install splices and tapes, which possess equivalent or better mechanical strength and insulation ratings than conductors being spliced.
 5. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standard 486 for copper.
 6. Provide adequate length of conductors within electrical enclosures and form the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than 10 AWG cables to individual circuits. Make terminations so there is no bare conductor at the terminal.
 7. Make up splices in outlet boxes with 8-inch minimum of correctly color-coded tails left in box. Splices in wires size #8 AWG and smaller shall be made with insulated spring type wire connectors, "Scotchlok" or equivalent. Splices in larger wire and cables shall be made with indent connectors NEMA/UL approved for the purpose.
 8. Use split bolt connectors for copper wire splices and taps, 6 AWG through 1 AWG. Tape un-insulated conductors and connectors with electrical tape to 150% of the insulation value of conductor. Rubber, friction and 3M-33 or 88 or better. Two (2) layers minimum each.
 9. Use copper compression connectors for copper wire splices and taps, 1/O AWG and larger. Tape un-insulated conductors and connectors with electrical tape to 150% of the insulation value of the conductor. Rubber, friction and 3M-33 or 88.

10. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
11. Thoroughly tape the ends of spare conductors in boxes and cabinets.
12. Install exposed cable, parallel and perpendicular to surfaces, or exposed structural member, and follow surface contours, where possible.
13. Make all ground, neutral and line connections to receptacle and wiring device terminals as recommended by manufacturer. Provide ground jumper from outlet box to individual ground terminal of devices.
14. Parallel conductors shall be cut to the same length and be the same type of wire.
15. All splices in control panels, terminal junction boxes, and low voltage control circuits shall be on numbered terminal strip.
16. All junction boxes shall be fully accessible.
17. All wiring shall be routed through an acceptable raceway regardless of voltage application, unless specified otherwise under other sections of these standards.

3.3 TESTING, CLEANING AND CERTIFICATION

- A. Refer to Section 26 05 00 for testing, cleaning, and certification requirements.
- B. Prior to energizing circuitry, check installed wires and cables with megaohm meter to determine insulation resistance levels to ensure requirements are fulfilled. Test shall be made on all feeders regardless of size and on all branch circuits with No. 4 AWG and larger conductors.
- C. Prior to energizing, test wires and cables for electrical continuity and for short-circuits.
- D. Subsequent to wire and cable hook-up, energize circuitry and demonstrate functioning in accordance with requirements. Where necessary, correct malfunctioning units, and then retest to demonstrate compliance.

3.4 COMMISSIONING (DEMONSTRATION)

3.5 SCHEDULES

- A. Color code secondary service, feeder, and branch circuit conductors as follows:

120/208 Volts	Phase	277/480 Volts
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green
Switch leg - Pink 3 & 4 way travelers - Purple		

- B. Conductors shall be solid color for entire length.
- C. EXCEPTION:
 1. Conductors 8 AWG and larger may be black and shall be with color-coded at each termination and in each box or enclosure. For a distance of 6 inches use half-lapped 3/4 inch plastic tape in the specified color. Do not cover cable identification markings. Adjust tape locations to prevent covering of markings.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

- A. Ground the electrical service system neutral at service entrance equipment to grounding electrode system: concrete encased electrode and supplementary grounding electrodes in compliance with NEC.
- B. Ground each separately derived system neutral to nearest referenced ground bar as shown on drawings.
- C. Ground rod at light standard foundation for lightning protection grounding of pole:
 - 1. Provide a 5/8" by 10'-0" copper clad driven ground 4" (minimum) below surface and 6" (minimum) away from concrete base.
 - 2. Provide #6 AWG soft drawn bare copper conductor from the grounding lug at the hand hole in the pole base to the ground rod.
 - 3. Exothermic weld or underground rated lug connect ground conductor to ground rod.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Provide a separate insulated equipment-grounding conductor in all feeders. Terminate each ground conductor to the bushing and ground lug.
- B. All grounding materials shall be copper with the exception of ground rod, which may be copper clad steel.
- C. Provide a corrosion-resistant finish to field connections, buried metallic bonding products, and where factory applied protective coatings have been destroyed, where subject to corrosive action.
- D. Provide an equipment-grounding conductor in all nonmetallic and flexible conduits.
- E. Provide equipment-grounding conductor in all branch circuits. Route to equipment enclosures, equipment, and panels, etc. and ground as required.
- F. Use mechanical grounding connectors for all grounding connections. Exothermic welded connections may be used underground or to building steel.
- G. Minimum ground resistance:

Table	
Equipment	Earth Ground Resistance to Equipment (Ohms)
Pad Mount Transformer	5
Secondary neutrals and other ground	10
Lightning protection grounds	5

- H. Provide a separate insulated equipment-grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, buss or bushing.
- I. Provide grounding bushings and bonding jumpers for all conduits terminating in reducing washers, concentric, eccentric or oversized knockouts at panel boards.

- J. Provide bonding wire in all flexible conduits.

END OF SECTION 26 05 26

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SYSTEM DESIGN REQUIREMENTS

- A. Provide complete raceway system required to meet project requirements in sizes as required by NEC.
- B. Utilize boxes as part of the electrical raceway system. Size boxes in accordance with NEC requirements and this standard.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Conduit:
 - a. Allied
 - b. Republic
 - c. Carlon
 - 2. Fittings and Bodies:
 - a. O/Z Gedney
 - b. Regal was purchased by Bridgeport
 - c. Bridgeport
 - d. Raco
 - e. Appleton
 - 3. Conduit Seals:
 - a. Chase-Foam CTC PR-855, or approved equal
 - 4. Wire ways:
 - a. Hinged cover or screw cover complete with all necessary fittings which shall be of one manufacturer.

2.2 MATERIALS, GENERAL

- A. Metal Conduit and Tubing:
 - 1. Galvanized Steel Rigid Conduit (GRC):
 - a. Conduit: Provide rigid steel conduit, hot-dipped galvanized with threaded ends Fittings: Threaded galvanized steel, bushings shall have nylon-insulated throat.
 - 2. Electrical Metallic Tubing (EMT):
 - a. Conduit: Galvanized steel tubing, galvanized on the outside and coated on the inside with a hard smooth lacquer finish. Fittings: Steel compression fittings for rain-tight and concrete-tight applications. Bushings shall be threaded and have nylon insulated throat or nylon bushing.
 - 3. Intermediate metal conduit (IMC)
 - a. Conduit: Provide intermediate steel conduit hot-dipped galvanized Fittings: Threaded galvanized steel, bushings shall have nylon-insulated throat.
 - 4. Rigid Aluminum Conduit:
 - a. Not allowed unless otherwise noted.
 - 5. Flexible Metal Conduit:
 - a. Conduit: Continuous spiral wound, interlocked, zinc-coated steel, NEMA/UL approved for grounding.
 - b. Fittings: Cadmium plated, malleable iron. Straight connector shall be one-piece body, female end with clamp and deep slotted machine screw for securing conduit, and threaded male end provided with a locknut. Angle connectors shall be two-piece body with

- removable upper section, female end with clamp and deep slotted machine screw for securing conduit, and threaded male end provided with a locknut. All fittings 1 inch and larger shall be terminated with threaded bushings having nylon insulated throats.
 - c. Maximum length of 6 feet.
 - d. Minimum size of 1/2 inch.
 - 6. Liquid-Tight Flexible Metal Conduit:
 - a. Conduit: Continuous spiral wound, interlocked zinc-coated steel with polyvinyl chloride (PVC) jacket, NEMA/UL approved for grounding.
 - b. Fittings: Cadmium plated malleable iron. Straight and angle connectors shall be the same as used with flexible metal conduit but shall be provided with a compression type steel ferrule and neoprene gasket sealing rings.
 - 7. Non-metallic Rigid Conduit
 - a. PVC plastic schedule 40 where in open landscape.
 - b. PVC plastic schedule 80 where installed under roadway or parking lot.
 - B. Conduit Bodies:
 - 1. General: Types, shapes and sizes, as required to suit individual applications and National Electric Code (NEC) requirements. Provide matching gasket covers secured with corrosion-resistant screws.
 - 2. Metallic Conduit and Tubing: Use metal conduit bodies. Use bodies with threaded hubs for threaded raceways and in hazardous locations.
- 2.3 MATERIALS, GENERAL
- A. Sheet Steel: Flat rolled, code-gage, galvanized steel.
 - B. Fasteners for General Use: Corrosion resistant screws and hardware including cadmium and zinc plated items.
 - C. Fasteners for damp or wet locations: Stainless steel screws and hardware.
 - D. Exterior Finish: Gray baked enamel for items exposed in finished locations except as otherwise indicated.
 - E. Metal outlet, device, and small wiring boxes:
 - 1. General: Boxes shall be of type, shape, size, and depth to suit each location and application.
 - 2. Steel Boxes: Boxes shall be sheet steel with stamped knockouts, threaded screw holes and accessories suitable for each location including mounting brackets and straps, cable clamps, exterior rings and fixture studs.
 - F. Outlet Boxes, Pull and Junction Boxes (J-Boxes):
 - 1. General: Boxes shall have screwed or bolted-on covers of material same as box and shall be of size and shape to suit application.
 - 2. Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing.
 - 3. Hot dipped galvanized steel boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanized after fabrication. Cover shall be gasketed.
 - 4. Outlet Boxes: Hot-dipped galvanized of required size, 4 inch square, 2" depth minimum or octagonal and of depth required for flush mounted devices and lighting fixtures. Cast-type with gasketed covers for surface-mounted devices. All outlets for exterior application shall be cast, weatherproof type with gasket and cast cover plate.
 - 5. Junction and Pull Boxes: Use outlet boxes as J-boxes wherever possible. Larger J-boxes pull boxes shall be accessible and shall be fabricated from sheet steel, sized according to code.
 - G. Non metallic boxes are not permitted.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Conduit Sizes:

1. The conduit shall be sized in accordance with NEC.
 - a. For power and lighting circuits, the minimum conduit size shall be 3/4"
 - b. Flexible and Liquid-tight Flexible Conduit: Minimum 1/2 inch for all runs. Maximum 6-foot length.
 - c. Conduits used for home runs shall contain only the conductors for the circuits indicated on the drawings. Combining unrelated multiple home runs into a single conduit would not be permitted.

B. Type of Conduit Used

1. Rigid Galvanized conduit or intermediate metallic steel conduit shall be installed in the following areas.
 - a. All outdoor non-conditioned locations concealed and exposed.
2. Electrical Metallic Tubing (EMT):
 - a. Interior exposed above 10 feet to floor.
 - b. Not permitted underground, in concrete, and in hazardous or corrosive areas.
3. Liquidtight metal conduit shall be provided for: Makeup of transformer or equipment, and/or raceway connections where isolation of sound and vibration transmission is required. For connections in locations exposed to weather, watertight flexible conduit shall be used.
4. Non-metallic Rigid Conduit:
 - a. In concrete and underground.
 - b. Not permitted for interior use.

C. General: Install electrical raceway in accordance with manufacturer's written installation instructions, applicable requirements of NEC, and as follows:

1. Complete installation of electrical raceways before starting installation of conductors within raceways.
2. Provide supports for raceways as required per NEC. Prevent foreign matter from entering raceways by using temporary closure protection.
3. Make bends and offsets so the inside diameter is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel. All bends shall be made in an approved bending machine or factory-made. Hickey bends will not be permitted in conduits larger than 3/4 inch.
4. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. Install expansion fittings across all structural construction joints and expansion/deflection couplings across all structural expansion joints and in every 200 feet of linear conduit run. A flexible bonding jumper at least three times the nominal width of the joint shall be installed.
5. Install exposed raceways parallel and perpendicular to nearby surfaces or structural members and follow the surface contours as much as practical. Paint all exposed raceways to match surrounding area.
6. Run exposed and parallel raceways together. Make bends in parallel runs from the same centerline so that the bends are parallel. Factory elbows may be used only where they can be installed parallel. In other cases, provide field bends for parallel raceways.
7. Make raceway joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Make raceway terminations tight. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors. Joints in non-metallic conduits shall be made with solvent cement in strict accordance with manufacturer's recommendations.
8. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. RGC shall be secured with

- double locknuts and an insulated metallic bushing. EMT shall be secured with one locknut and shall have nylon-insulated throats or threaded nylon bushings from 1/2 inch to 1 inch. 1-1/4 inch and above shall be metal with nylon insulated throats. Use grounding type bushings for feeder conduits at switchboards, panel boards, pull boxes, transformers, motor control centers, VFDs, etc.
9. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.
 10. Install pull wires in empty raceways. Use #14 AWG zinc-coated steel or monofilament plastic line having not less than 200-pound tensile strength. Leave not less than 12 inches of slack at each end.
 11. Install raceway-sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL 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 at the following points and elsewhere as indicated:
 - a. Where conduits enter or leave hazardous locations.
 - b. Where required by the NEC.
 12. Flexible Connections: Use short length (maximum of 6 feet) of flexible conduit equipment subject to vibration, noise transmission, or movement. Use liquid tight flexible conduit in wet locations. Install separate ground conductor in all flexible connections.
 13. Conduit Seals: Conduit passing through concrete walls shall be sealed.
 14. Where conduits are to be installed through structural framing members, the contractor shall provide sleeves. Cut all openings in concrete with rotary type drill, or other method as approved by the University Project Manager. Holes cut with pneumatic hammer will not be accepted. For areas where sleeves have not been provided, the Engineer's written approval must be obtained prior to cutting, notching or drilling of structural framing members.
 15. Ream the ends of all cut and/or threaded conduit. Ends shall be cut square.
 16. Use of running threads for rigid metallic conduit are not permitted. When threaded couplings cannot be used, provide 3-piece union or solid coupling.
 17. Conduits shall not cross pipe shafts or ventilation duct openings "access panel".
 18. Conduit shall not obstruct full and direct access to equipment requiring maintenance. This includes but is not limited to valves, actuators and terminal box controllers.
 19. Install an insulated ground conductor in all conduits.
 20. Provide separate raceway systems for each of the following:
 - a. Lighting
 - b. Power Distribution
 21. Provide for waterproofing of all raceways, fittings, etc., which penetrate the roof to preserve the weatherproof integrity of the building. Installation of materials shall conform to the following:
 - a. General:
 - 1) Install all raceways concealed except at surface cabinets, for motor and equipment connections and in mechanical equipment rooms. Install a minimum of 6 inch from flues, steam pipes or other heated pockets for water-flashing and counter-flashing or pitch pockets for waterproofing of all raceways, outlets, fittings, etc., which penetrate roof. Route exposed raceways parallel or perpendicular to building lines with right angle turns and symmetrical bends. Concealed raceways shall be run in a direct line, and where possible, with long sweep bends and offsets.
 - 2) Provide raceway expansion joints with necessary bonding conductor at building expansion joints and where required to compensate for raceway or building thermal expansion and contraction. Terminate raceways 1-1/4 inch and larger with insulated bushing or rain tight connections with insulated throats.
 22. Special areas methods for raceway installation (with appropriate seal-offs, explosion-proof fittings, etc.), in all special occupancy areas, as defined and classified in Article 500 of the National Electric Code (NEC), shall be in accordance with that Article.
 23. If type MC or AC cable is used for branch circuits, the home run conduit will be EMT and must run from the panel to within 10 feet horizontally of the first device served.

D. Raceway Installation:

1. Surface raceways, where indicated on drawings, shall be metal and of a size approved for number and size of wires to be installed, shall be installed in a neat, workmanlike manner, with runs parallel or perpendicular to walls and partitions. Raceways, elbows, fittings, outlets and devices shall be of same manufacturer, and designed for use together.
 2. Wire ways, where indicated, complete with elbows, tees, connectors, adaptors, etc., with all parts factory-fabricated and of same manufacture.
- E. Ground rod at light standard foundation for lightning protection grounding of pole:
1. Non-metallic Rigid Conduit:
 - a. Provide 24" (minimum) depth measured from top of conduit to grade.
 - b. Provide flow fill and compression backfill after conduits are in-place.
 - c. Return landscape to pre-construction condition at job completion.

3.2 INSTALLATION, GENERAL

- A. Boxes:
1. Every J-box shall be secured, independent of conduit entries into the box. Boxes shall be secured to the building structure. Ceiling wire shall not be used to support (secure) J-boxes.
 2. Box fill shall be governed by code requirements. Only the allowable amount of conduit entries shall be allowed into the box.
 3. Box covers shall be marked so as to indicate the voltage, panel number, and circuit number of the enclosed conductors.
 4. Each J-box shall have only one voltage installed.
 5. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs.
 6. Sizes shall be adequate to meet NEC volume requirements, but in no case smaller than sizes indicated.
 7. Remove sharp edges where they may come in contact with wiring or personnel.
 8. Flush in-grade, exterior pull/splice boxes shall be as follows:
 - a. Polymer Concrete
 - b. 12" deep, (minimum) bottomless box with minimum of 12" of pea gravel bed below box for drainage.
 - c. Tier 22 rated
 - d. Sized per NEC with 8 times the largest diameter of trade size conduit installed in the box in one of the boxes width or length dimensions.
 - e. 2-bolt cover with factory engraved label "ELECTRIC".
- B. Installation of Pull and J-Boxes:
1. Box selection: For boxes in main feeder conduit runs, use minimum 8-inches square by 4-inches deep or as needed per NEC. Do not exceed 6 entering and 6 leaving raceways in a single box.
 2. Every J-box shall be secured, independent of conduit entries into the box. Boxes shall be secured to the building structure. Provide rigid supports for all J-boxes, ceiling wire supports are not acceptable.
 3. Box fill shall be governed by code requirements. Only the allowable amount of conduit entries shall be allowed into the box.
 4. Box covers shall be marked so as to indicate the voltage, panel numbers, and circuit number of the enclosed conductors. Use pre-printed labels, marking cover with permanent marker is not acceptable.
 5. Polymer concrete boxes:
 - a. Flush to surrounding grade
 - b. Flush to concrete, if installed in sidewalk
 - c. Provide 12" (minimum) of gravel below box for drainage.
 - d. Near light standard pole base foundation wherever possible.
 - e. 90 degree turn up conduits inside edge of box
- C. Grounding:

1. Electrically ground metallic cabinets, boxes, and enclosures. Where wiring to item includes a grounding conductor, provide a grounding terminal in the interior of the cabinet, box or enclosure.
- D. Pull and J-Boxes and Cabinets:
1. Construct J-boxes or pull boxes not over 150 cubic inches in size as standard outlet boxes, and those over 150 cubic inches the same as "Cabinets," with hinged covers of same gauge metal. Removable covers must be accessible at all times.
 2. All cabinets shall be set rigidly in place with fronts straight and plumb, center panel board interiors in door openings.

END OF SECTION 26 05 33

SECTION 26 05 43 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

- A. Underground Electrical Primary:
 - 1. Secondary and branch circuit raceways:
 - a. Provide Schedule 40 PVC conduit for all underground branch circuit in landscape or pedestrian sidewalk areas. Provide 24" (minimum) depth measured from top of conduit to grade and 48" (maximum).
 - b. Provide Schedule 80 PVC conduit under roadway surface or HDPE conduit if directional bore is required. Provide 30" (minimum) depth measured from top of conduit to grade and 48" (maximum).
 - c. Provide HDPE conduit under roadway surface if directional bore is required. Provide 30" (minimum) depth measured from top of conduit to grade.
 - 2. Unless otherwise stated during the pre-design conference, the University will provide an underground junction point or switch point within the contract limits (or close by) for termination of primary building feeder. Contractor will provide and install raceway and conductors between said junction point and the building transformer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Underground Electrical Secondary or Branch Service:
 - 1. RNC: NEMA TC 2 Polyvinyl Chloride Conduit (PVC) Type EPC-40-PVC and EPC-80-PVC, UL 651 with matching fittings by same manufacturer as conduit, complying with NEMA TC 3 A and UL 514B. Continuous HDPE: Comply with UL 651B
 - a. Subject to compliance with requirements, provide a comparable product by one of the following:
 - 1) ARNCO Corp.
 - 2) RACO; Hubbell
 - 3) Beck Manufacturing
 - 4) Cantex, Inc.
 - 5) Certain Teed Corporation.
 - 6) Condux International, Inc.
 - 7) ElecSys, Inc.
 - 8) Electri-Flex Company.
 - 9) IPEX Inc.
 - 10) Lamson & Sessions; Carlon Electrical Products.
 - 11) Spiraduct/AFC Cable Systems Inc.
 - 12) Kraloy
 - 13) Thomas & Betts Corporation.
 - b. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)
 - c. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 - 2. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover.
 - a. Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.
 - b. Comply with ASTM C 858 for design and manufacturing processes.

- c. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have TIER 22, load rating consistent with that of handhole or box.
- d. Subject to compliance with requirements, provide comparable product by one of the following:
 - 1) Quazite: Hubbell Power Systems, Inc.
 - 2) Armocast Products Company.
 - 3) Carson industries LLC
 - 4) Oldcastle Precast Group
 - 5) NewBasis.
- e. Color: Gray
- f. Configuration: Units shall be designed for flush burial and have open bottoms unless otherwise indicated.
- g. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- h. Cover Legend: Molded lettering, "ELECTRIC".
- i. Handhole size 11" x 18" x 12" deep unless noted otherwise on the drawings.

B. Directional Bore

- 1. Materials are defined as pipe or conduit that becomes the installed product. Incidental materials that may or may not be used to install the product depending on field requirements are not paid for separately and will be included in the cost of the installed product.
- 2. The following material standards are to be interpreted as the minimum in place standards. Use materials that are appropriate for the stresses generated by the selected equipment and field conditions. It is not intended to portray that the use of materials with these minimum material standards will retain their required properties if the stress limits are exceeded for which they were designed during installation. Ensure that the appropriate material is used to retain compliance once it is installed.

Material Standards for HDD Installation		
Material Type	Non-Pressure	Pressure
Polyethylene (PE)	ASTM D 2447	ASTM 2513 ASTM D 2447
High Density Polyethylene (HDPE)	ASTM D 2447 ASTM D 3350 ASTM F714	ASTM D 2447 ASTM D 3350 ASTM F714 ASTM 2513
Polyvinyl-Chloride (PVC)	ASTM F 789	N/A
Steel	ASTM A139 Grade B ⁽¹⁾	AWWA C200 API 2B ⁽²⁾
⁽¹⁾ No hydrostatic test required ⁽²⁾ Dimensional tolerances only		

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Underground Electrical Secondary or Branch Service:
 - 1. Secondary and branch circuit raceways:

- a. Provide 24" (minimum) depth measured from top of conduit to grade for all conduit runs within landscape and pedestrian areas. 48" (maximum) depth.
- b. Provide 30" (minimum) depth measured from top of conduit to grade for all conduit runs within raceway and parking lot areas where vehicle traffic will cross the conduit run. 48" (maximum) depth.
- c. Provide 30" (minimum) depth measured from top of conduit to grade for all conduit runs within raceway and parking lot areas where vehicle traffic will cross the conduit run and directional bore is required. Provide polymer concrete boxes on both ends of all directional bores.
- d. Provide flow fill and compression backfill after conduits are in-place.
- e. Return landscape or roadway to pre-construction condition at job completion.

3.2 INSTALLATION, DIRECTIONAL BORE

A. Scope of Work:

1. The work specified in this Section documents the approved construction methods, procedures and materials for Directional Boring, also commonly called Horizontal Directional Drilling (HDD).

B. General:

1. HDD is a trenchless method for installing a product that serves as a conduit for liquids, gasses, or as a duct for pipe, cable, or wire line products. It is a multi-stage process consisting of site preparation and restoration, equipment setup, and drilling a pilot bore along a predetermined path and then pulling the product back through the drilled space. When necessary, enlargement of the pilot bore hole may be necessary to accommodate a product larger than the pilot bore hole size. This process is referred to as back reaming and is done at the same time the product is being pulled back through the pilot bore hole.
2. Accomplish alignment of the bore by proper orientation of the drill bit head as it is being pushed into the ground by a hydraulic jack. Determine orientation and tracking of the drill bit by an above ground radio detection device which picks up a radio signal generated from a transmitter located within the drill bit head. Then electronically translate the radio signal into depth and alignment. In order to minimize friction and prevent collapse of the bore hole, introduce a soil stabilizing agent (drilling fluid) into the annular bore space from the trailing end of the drill bit. The rotation of the bit in the soil wetted by the drilling fluid creates a slurry. The slurry acts to stabilize the surrounding soil and prevent collapse of the bore hole as well as provides lubrication.
3. Select or design drilling fluids for the site specific soil and ground water conditions. Confine free flowing (escaping) slurry or drilling fluids at the ground surface during pull back or drilling. Accomplish this by creating sump areas or vacuum operations to prevent damage or hazardous conditions in surrounding areas. Remove all residual slurry from the surface and restore the site to preconstruction conditions.

C. Construction Site Requirements.

1. The Americans with Disabilities Act: When and where installations temporarily disrupt pedestrian use of sidewalk areas for periods exceeding two consecutive work days, provide an alternate route that meets ADA requirements.

D. Site Conditions:

1. Carry out excavation for entry, exit, recovery pits, slurry sump pits, or any other excavation as specified in Section 120. Sump pits are required to contain drilling fluids if vacuum devices are not operated throughout the drilling operation, unless approved by the Engineer.
2. Within 48 hours of completing installation of the boring product, clean the work site of all excess slurry or spoils. Take responsibility for the removal and final disposition of excess slurry or spoils. Ensure that the work site is restored to preconstruction conditions or as identified on the plans.
3. Provide MOT in accordance with the Department Design Standards and the MUTCD when and where the former is silent. (d) Exposure of product shall be limited to 3 feet and 14 consecutive days unless approved by the Engineer.

- E. Damage Restoration:
1. Take responsibility for restoration for any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid (frac-out), or the directional drilling operation, at no cost to the Department.
 2. Remediation Plans:
 - a. When required by the Engineer, provide detailed plans which show how damage to any roadway facility will be remedied. These details will become part of the As-Built Plans Package. Remediation Plans must follow the same guidelines for development and presentation of the As-Built Plans. When remediation plans are required, they must be approved by the Engineer before any work proceeds.
- F. Quality Control.
1. Take control of the operation at all times. Have a representative who is thoroughly knowledgeable of the equipment, boring and Department procedures, present at the job site during the entire installation and available to address immediate concerns and emergency operations. Notify the Engineer 48 hours in advance of starting work. Do not begin installation until the Engineer is present at the job site and agrees that proper preparations have been made.
 2. When there is any indication that the installed product has sustained damage and may leak, stop all work, notify the Engineer and investigate damage. The Engineer may require a pressure test and reserves the right to be present during the test. Perform pressure test within 24 hours unless otherwise approved by the Engineer. Furnish a copy of test results to the Engineer for review and approval. The Engineer is allowed up to 72 hours to approve or determine if the product installation is not in compliance with the specifications. The Engineer may require non-compliant installations to be filled with excavatable flowable fill.
 3. Testing may consist of one of the following methods and must always meet or exceed the Department's testing requirements:
 - a. Follow the product manufacturer's pressure testing recommendations.
 - b. Ensure that product carrier pipes installed without a casing meet the pressure requirements set by the owner. If the owner does not require pressure testing, the Engineer may require at least one test.
 - c. A water tight pipe and joint configuration where the product is installed beneath any pavement (including sidewalk) and front shoulders is required. The Engineer will determine when and where water tight joint requirements will be applied to the ultimate roadway section for future widening. When a product is located elsewhere, the pipe and joint configuration must meet or exceed soil tight joint requirements. Conduct tests for joint integrity for one hour. The test for a soil tight joint allows up to 0.1 gallon of water leakage at a sustained pressure of 2 PSI. The water tight joint criteria allows no leakage at all for a sustained pressure of 5 PSI.
 4. If conditions warrant removal of any materials installed in a failed bore path, as determined by the Engineer, it will be at no cost to the Department. Promptly fill all voids by injecting all taken out of service products that have any annular space with excavatable flowable fill.
 5. The method of locating and tracking the drill head during the pilot bore will be shown in the plans. The Department recognizes walkover, wire line, and wire line with surface grid verification, or any other system as approved by the Engineer, as the accepted methods of tracking directional bores. Use a locating and tracking system capable of ensuring that the proposed installation is installed as intended. If an area of radio signal interference is expected to exceed 5 feet, the Engineer may specify the use of a suitable tracking system. The locating and tracking system must provide information on:
 - a. Clock and pitch information
 - b. Depth
 - c. Transmitter temperature
 - d. Battery status
 - e. Position (x,y)
 - f. Azimuth, where direct overhead readings (walkover) are not possible (i.e. subaqueous or limited access transportation facility)

- g. Ensure proper calibration of all equipment before commencing directional drilling operation.
 - h. Take and record alignment readings or plot points such that elevations on top of and offset dimensions from the center of the product to a permanent fixed feature are provided. Such permanent fixed feature must have prior approval of the Engineer. Provide elevations and dimensions at all bore alignment corrections (vertical and horizontal) with a minimum distance between points of 100 feet. Provide a sufficient number of elevations and offset distances to accurately plot the vertical and horizontal alignment of the installed product. A minimum of three elevation and plot points are required.
 - i. Install all facilities such that their location can be readily determined by electronic designation after installation. For non-conductive installations, attach a minimum of two separate and continuous conductive tracking (tone wire) materials, either externally, internally or integral with the product. Use either a continuous green sheathed solid conductor copper wire line (minimum #12 AWG for external placement or minimum #14 AWG for internal placement in the conduit/casing) or a coated conductive tape. Conductors must be located on opposite sides when installed externally. Connect any break in the conductor line before construction with an electrical clamp, or solder, and coat the connection with a rubber or plastic insulator to maintain the integrity of the connection from corrosion. Clamp connections must be made of brass or copper and of the butt end type with wires secured by compression. Soldered connections must be made by tight spiral winding of each wire around the other with a finished length minimum of 3 inches overlap. Tracking conductors must extend 2 feet beyond bore termini. Test conductors for continuity. Each conductor that passes must be identified as such by removing the last 6 inches of the sheath. No deductions are allowed for failed tracking conductors. Failed conductor ends must be wound into a small coil and left attached for future use.
6. Product Bore Hole Diameter: Minimize potential damage from soil displacement/settlement by limiting the ratio of the bore hole to the product size. The size of the back reamer bit or pilot bit, if no back reaming is required, will be limited relative to the product diameter to be installed as follows:

Maximum Pilot or Back-Runner Bit Diameter When Rotated 360 Degrees	
Nominal Inside Pipe Diameter Inches	Bit Diameter Inches
2	4
3	6
4	8
6	10
8	12
10	14
12 and greater	Maximum Product OD plus 6

7. Drilling Fluids: Use a mixture of bentonite clay or other approved stabilizing agent mixed with potable water with a minimum pH of 6.0 to create the drilling fluid for lubrication and soil stabilization. Vary the fluid viscosity to best fit the soil conditions encountered. Do not use any other chemicals or polymer surfactants in the drilling fluid without written consent from the Engineer. Certify to the Engineer in writing that any chemicals to be added are environmentally safe and not harmful or corrosive to the facility. Identify the source of water for mixing the drilling fluid. Approvals and permits are required for obtaining water from such sources as streams, rivers, ponds or fire hydrants. Any water source used other than a potable water may require a pH test.
8. Equipment Requirements: Ensure that appropriate equipment is provided to facilitate the installation as follows:

HDD Equipment

System Description	Pipe ⁽¹⁾ Diameter Inches	Bore Length Feet	Torque Ft-Lbs	Trust/Pullback Lbs
Maxi-HDD	18 and greater	>1,000	>10,000	>70,000
Midi-HDD	Up to 16	Up to 1,000	1,900 to 9,999	20,001 to 69,999
Mini-HDD	Up to 6	Up to 600	Up to 1,899	Up to 20,000
⁽¹⁾ For the above, multiple pipe or conduit installations must not exceed the total outside pipe diameters stated above.				

- a. Match equipment to the size of pipe being installed. Obtain the Engineer's approval for installations differing from the above chart. Ensure that the drill rod can meet the bend radius required for the proposed installation.
9. Thrust/Pullback Requirements: Unless approved by the Engineer, limit use of HDD equipment to installing the following product sizes and lengths based on the following product size, force and length relationships.

HDD Bore Equipment Thrust/Pullback Capacity						
Lbs	5,000 to 7,000	7,001 to 12,000	12,001 to 16,000	16,001 to 25,000	25,001 to 40,000	>40,000
Product Size ⁽¹⁾ Inches	Maximum Pullback Distance In Feet					
4 or <	400 or <					
6 or <		600 or <				
8 or <			800 or <			
10 or <				1,000 or <		
12 [300] or <					2,000 or <	
>12 [300]						Engineer's Discretion
⁽¹⁾ for the above, where a single pull of multiple conduits is to be attempted, the applicable product size must be determined by the diameter of a circle that will circumscribe the individual conduits as a group.						

G. Drilling Operations:

1. Installation Process: Ensure adequate removal of soil cuttings and stability of the bore hole by monitoring the drilling fluids such as the pumping rate, pressures, viscosity and density during the pilot bore, back reaming and pipe installation. Relief holes can be used as necessary to relieve excess pressure down hole. Obtain the Engineer's approval of the location and all conditions necessary to construct relief holes to ensure the proper disposition of drilling fluids is maintained and unnecessary inconvenience is minimized to other facility users.
 - a. To minimize heaving during pull back, the pull back rate is determined in order to maximize the removal of soil cuttings without building excess down hole pressure. Contain excess drilling fluids at entry and exit points until they are recycled or removed from the

- site or vacuumed during drilling operations. Ensure that entry and exit pits are of sufficient size to contain the expected return of drilling fluids and soil cuttings.
- b. Ensure that all drilling fluids are disposed of or recycled in a manner acceptable to the appropriate local, state, or federal regulatory agencies. When drilling in suspected contaminated ground, test the drilling fluid for contamination and appropriately dispose of it. Remove any excess material upon completion of the bore. If in the drilling process it becomes evident that the soil is contaminated, contact the Engineer immediately. Do not continue drilling without the Engineer's approval.
 - c. The timing of all boring processes is critical. Install a product into a bore hole within the same day that the pre-bore is completed to ensure necessary support exists.
2. Boring Failure: If an obstruction is encountered during boring which prevents completion of the installation in accordance with the design location and specification, the pipe may be taken out of service and left in place at the discretion of the Engineer. Immediately fill the product left in place with excavatable flowable fill. Submit a new installation procedure and revised plans to the Engineer for approval before resuming work at another location. If, during construction, damage is observed to the Anschutz facility, cease all work until resolution to minimize further damage and a plan of action for restoration is obtained and approved by the Engineer.
- H. Documentation Requirements.
1. Boring Path Report: Furnish a Bore Path Report to the Engineer within seven days of the completion of each bore path. Include the following in the report:
 - a. Location of project and financial project number including the Permit Number when assigned
 - b. Name of person collecting data, including title, position and company name
 - c. Investigation site location (Contract plans station number or reference to a permanent structure within the project right-of-way)
 - d. Identification of the detection method used
 - e. Elevations and offset dimensions as required in D-5
 2. As-Built Plans: Provide the Engineer a complete set of As-Built Plans showing all bores (successful and failed) within 30 calendar days of completing the work. Ensure that the plans are dimensionally correct copies of the Contract plans and include roadway plan and profile, cross-section, boring location and subsurface conditions as directed by the Engineer. The plans must show appropriate elevations and be referenced to a Department Bench Mark when associated with a Department project, otherwise to a USGS grid system and datum, or a specific location on top of an existing Department head wall. Plans must be same scale in black ink on white paper, of the same size and weight as the Contract plans. Submittal of electronic plans data in lieu of hard copy plans is preferred and may be approved by the Engineer if compatible with the Department software. Specific plans content requirements include but may not be limited to the following:
 - a. The Contract plan view shows the center line location of each facility installed, or installed and placed out of service, to an accuracy of 1 inch at the ends and other points physically observed in accordance with the bore path report.
 - b. As directed by the Engineer, provide either a profile plan for each bore path, or a cross-section of the roadway at a station specified by the Engineer, or a roadway centerline profile. Show the ground or pavement surface and crown elevation of each facility installed, or installed and placed out of service, to an accuracy within 1 inch at the ends and other exposed locations. On profile plans for bore paths crossing the roadway show stationing of the crossing on the Contract plans. On the profile plans for the bore paths paralleling the roadway, show the Contract plans stationing. If the profile plan for the bore path is not made on a copy of one of the Contract profile or cross-section sheets, use a 10 to 1 vertical exaggeration.
 - c. If, during boring, an obstruction is encountered which prevents completion of the installation in accordance with the design location and specification, and the product is left in place and taken out of service, show the failed bore path along with the final bore path on the plans. Note the failed bore path as "Failed Bore Path - Taken Out of Service". Also show the name of the Utility owner, location and length of the drill head and any drill stems not removed from the bore path.

- d. Show the top elevation, diameter and material type of all utilities encountered and physically observed during the subsoil investigation. For all other obstructions encountered during a subsoil investigation or the installation, show the type of material, horizontal and vertical location, top and lowest elevation observed, and note if the obstruction continues below the lowest point observed.
 - e. Include bore notes on each plan stating the final bore path diameter, product diameter, drilling fluid composition, composition of any other materials used to fill the annular void between the bore path and the product, or facility placed out of service. Note if the product is a casing as well as the size and type of carrier pipe placed within the casing as part of the Contract work.
- I. Method of Measurement. The method of measurement will be based on the length of product measured in place along the surface of the ground, complete and accepted. No additions or deductions will be made for sweeps in either the vertical or horizontal direction to complete the installation.
- J. Basis of Payment. Price and payment will be full compensation for all work specified in this Section, including furnishing and installing pipe or conduit, from plan point of beginning to plan point of ending at plan depth, removal of excavated materials and spoils, removal and disposal of drilling fluids, backfilling, and complete restoration of the site. Bundled product in a single bore will be paid for as a single bore based on the required drill bit head or back reamer head size. Separate payment shall not be made for individual products in a bundle.
 - 1. The installation and attachment of tracking conductors (wire or tape) will be included in the cost of the bore and will not be paid for separately.
 - 2. No payment will be made for failed bore paths, injection of flowable fill, products taken out of service or incomplete installations.
 - 3. No payment will be made for directional boring until a Bore Path Report has been delivered to the Engineer. After the Engineer's acceptance of the Bore Path Report, payment will be made in the amount of 70% of the unit price bid, for Directional Boring. The remaining 30% of the unit price bid will be made after submittal of As-Built Plans, in accordance with 4.6 B.
 - 4. Payment will be made under: Item No. 26 05 33 PART 3 - Directional Bore - per foot of bore diameter.

END OF SECTION 26 05 43

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

- A. Plug-in type devices are not acceptable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide wiring devices of one of the following:
1. Devices:
 - a. Harvey Hubbell Inc.
 - b. Leviton Mfg. Co.
 - c. Pass and Seymour Inc.
 - d. Bryant Electric Co.
 - e. General Electric Co.
 2. Wall (Local) Switches: Numbers used below are those of Hubbell. Equivalent Cooper, P & S, or Leviton.
 3. Fire Rated Poke-through Receptacle: Hubbell systems or approved equal.
 4. Multi-Outlet Assembly (MOA): Hubbell or Wiremold.

2.2 MATERIALS, GENERAL

- A. Receptacles:
1. Duplex receptacles shall be of the heavy-duty type, NEMA 5-20 Rconfigurations. They shall be capable of being side or back wired, with clamp type terminals for back wiring. The grounding blades shall be aligned in such a manner that they are parallel to the longitudinal plane of the receptacle. Plus type receptacles are not permitted.
 2. All duplex, single, and special receptacles shall be heavy duty, standard grade listed by Underwriter's Laboratories, and have a single brass mounting strap with self-grounding and have a hex-head green grounding screw and be side and back wired. Each device shall bear the UL/FS Label.
 3. Convenience Receptacle Configuration: NEMA WD 1; Type 5-20R. All receptacles connected to emergency circuits shall have a red face. Color selection for normal devices shall be verified with Engineer prior to ordering.
 4. Standby Receptacles: Single or duplex minimum 20-amp, color red.
 5. Isolated Ground Circuit: Single or duplex minimum 20-amp, color orange, with isolated ground.
 6. House Keeping Receptacles: Duplex 20-amp, color blue.
 7. Telephone or CRT Receptacles: 4 inch square box with one gang plaster ring and 5/8 inch diameter grommet hole split plate.
 8. Special Purpose Receptacles: Provide where shown on drawings. Standard grade, standard color, and of the appropriate code and NEMA configuration to match the supply circuit and load involved. Provide proper grounding through receptacle for equipment.
 9. Fire Rated Poke-through: Provide where shown on drawings. Poke-through shall provide services as shown on drawings and have a carpet saver feature.

Duplex	20A	125V	HBL5362
Duplex – Isolated Ground Fault	20A	125V	GFR5362
Duplex – Isolated Ground	20A	125V	IG5362
Single	20A	125V	HBL5361
Single	30A	125V	HBL9308

Single	20A	250V	HBL5652
Single	30A	250V	HBL9330
Single	30A	125/250V	HBL9430A

B. Switches:

1. Wall Switches for Lighting Circuits: NEMA WD1; FS W-S-896E; AC, quiet type, specification grade, listed by Underwriter's Laboratories with toggle handle, rated 20 amperes or greater at 277 volts AC, unless noted otherwise. Mounting straps shall be metal and be equipped with a green hex-head ground screw. Each switch shall bear the UL/FS Label.
2. Handle: Red for emergency power circuits. Verify color for normal power devices with Engineer prior to ordering.
3. Pilot Light Type: Lighted handle lit when switch is "on."
4. Locator Type: Continuously lighted handle.

Single-Pole Switches	#1221	20 amps	277 volts
Three-Way Switches	#1223	20 amps	277 volts
Four-Way Switches	#1224	20 amps	277 volts
Switch with Pilot	Series 1200		

C. Wiring Device Accessories:

1. Wall Plates: Provide Wall plates for single and combination wiring devices, of types, sizes, and with ganging and cutouts as indicated. Select plates which mate and match wiring devices to which attached. Construct with metal screws for securing plates to devices; screw heads colored to match finish of plates. Identify all wall plates used for receptacles with branch circuit number. Provide blank wall plates for all cable, data, telephone and junction and outlet boxes. Where cables are routed through the wall plate, provide grommets in wall plate openings to protect cables. Provide plates possessing the following additional construction features:
 - a. Material and Finish: Stainless steel smooth or match existing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify boxes are installed at proper height and openings are neatly cut and will be completely covered by wall plates.
- B. Verify branch circuiting wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 INSTALLATION, GENERAL

- A. Install wiring devices of type as indicated on drawings. All connections shall be made up tight and device set plumb. Use care in installing device in order to prevent damage to device and wire in outlet box. Install wiring devices as indicated, in accordance with manufacturer's written instruction, applicable requirements of NEC and in accordance with recognized industry practices to fulfill project requirements.
- B. Coordinate with other work, including painting, electrical boxes and wiring work, as necessary to interface installation of wiring devices with other work.
- C. Install wiring devices only in electrical boxes that are clean; free from excess building materials, dirt, and debris.
- D. Install wiring devices after wiring work has been installed and wall finishes have been completed. Install wall plates plumb and level, after painting work is completed. Provide a device plate for each outlet to suit device installed and install blank plates or covers for J-boxes and empty outlets.

- E. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices or as required per UL Standards 486A.
- F. Upon installation of wall plates and receptacles, advise Contractor regarding proper and cautious use of convenience outlets. At time of Final Completion, replace those items that have been damaged, including those burned and scored by faulty plugs.
- G. Provide equipment grounding connections for wiring devices, unless otherwise indicated.

3.3 TESTING, CLEANING, AND CERTIFICATION

- A. Refer to Standard Section 26 05 00 for testing, cleaning, and certification requirements.
- B. Prior to energizing circuitry, test wiring for electrical continuity, and for short-circuits. Ensure proper polarity of connections is maintained. Subsequent to energization, test wiring devices to demonstrate compliance with requirements.
- C. Test ground fault interrupter operation with both local and remote fault simulations in accordance with manufacturer recommendations.

END OF SECTION 26 27 26

SECTION 26 56 00 - EXTERIOR LIGHTING

Sections 26 56 00 of the Standard Specifications are hereby revised for this project, replacing the entire section as follows:

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.
- B. Summary
 - 1. The Work described in this section consists of information related to providing and installing exterior luminaires, landscape luminaires, light sources, ballasts, drivers, light standards, foundations, and control wiring and equipment required for completion of the project.
- C. Related Sections include the following:
 - 1. SECTION 01 22 00 – UNIT PRICES
 - 2. SECTION 01 33 00 – SUBMITTAL PROCEDURES
 - 3. SECTION 01 78 46 – EXTRA STOCK MATERIALS
 - 4. SECTION 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL
 - 5. SECTION 26 05 19 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
 - 6. SECTION 26 05 26 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
 - 7. SECTION 26 05 33 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
 - 8. SECTION 26 05 43 – UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
 - 9. SECTION 26 09 43 – NETWORK LIGHTING CONTROLS
 - 10. SECTION 26 27 26 – WIRING DEVICES

1.2 DEFINITIONS

- A. The term Engineer refers to the Lighting Designer, Electrical Engineer, University Project Engineer or Owner's Representative individually or collectively.
- B. Luminaire: An electrical device used to create light by use of an electric light source. The term Luminaire includes the housing, reflectors, housing lens, optical lenses/assembly, LED circuit board, heat sink, electrical connectors, ballast/driver compartment, photocell receptacle, photocell controller, gaskets, latches, hardware, mounting bracket, and external or internal shield.
- C. Light Source: An electric device that converts electrical energy into visible light. The term Light Source includes the light emitting source (filament, arc tube, cathode or diode), bulb, and base, and/or circuit board.
- D. Ballast / Driver: An electrical device that regulates the voltage and current to the Light Source.
- E. Pole: Luminaire support structure.
- F. Light Standard: A light pole assembly that includes the pole, base plate, base plate template, base cover, nut covers, hand holes, hand hole covers, and mast arm.

- G. Foundations: A precast or cast-in-place concrete structure used to anchor the Light Standard in place, and includes the concrete, reinforcing steel, ground rods, conduit, connector bolts, anchor bolts, nuts, and washers.

1.3 STANDARDS

- A. Comply with the applicable provisions of the referenced standards except as modified by governing codes and the Contract Documents. In the event of conflict between referenced standards, this specification or within themselves, the more stringent standard or requirement shall govern.

- 1. UL Underwriter's Laboratory
- 2. NRTL Nationally Recognized Testing Laboratory
- 3. NEC NFPA 70 National Electrical Code
- 4. ANSI American National Standard Institute A117.1-1961
- 5. ASTM American Society for Testing and Materials
- 6. NEMA National Electrical Manufacturers Association
- 7. ADA Americans with Disabilities Act
- 8. IESNA Illuminating Engineering Society of North America
- 9. IEC International Electrotechnical Commission
- 10. ICC International Code Council
- 11. NECA National Electrical Contractors Association
- 12. The Architectural Barriers Act (Public Law 90-480)

- B. All luminaires and assembled components shall be new, of good quality, free of defects and be approved by and bear the label of UL for the applicable location and conditions (wet, damp, dry etc.) or other approved testing agencies, i.e. CSA, ETL, unless otherwise specified in writing.
- C. All luminaires shall meet all required local, state and/or national building, electrical and energy codes and regulations.

1.4 GENERAL REQUIREMENTS

- A. Lighting and Electrical Contract Drawings are diagrammatic and indicate general design, layout, and arrangement of equipment and various systems. Provide all luminaires as shown complete with all light sources and accessories, completely wired, controlled and securely attached to supports. Install all lighting and electrical equipment per NEC requirements and manufacturer's recommendations.
- B. Where a catalog number and narrative or pictorial descriptions are provided, the written description shall take precedence and prevail.
- C. General Contractor shall provide Electrical Subcontractor with entire lighting specification (including luminaire illustrations and sketches); Electrical Subcontractor shall provide each specified Manufacturer with complete information about the luminaires they will supply.
- D. Luminaire details shown may be modified by the Manufacturer provided all the following conditions have been met:
 - 1. Luminaire performance is equal or improved;
 - 2. Structural, mechanical, electrical, safety, and maintenance characteristics are equal or improved;
 - 3. Cost to the Owner is reduced or equal;
 - 4. Modifications have been reviewed by the Engineer and have been approved by the Engineer in writing.

- E. All lighting and electrical equipment locations shall be marked in the field for review by the Engineer prior to drilling, trenching or boring. Dimensions of all products and equipment shall be taken from manufacturers' data for actual equipment to be furnished. All dimensions and measurements must be verified in the field. Contractor shall be responsible for all measurements taken in the field.

1.5 DESIGN REQUIREMENTS

- A. Meet light levels and uniformity ratios as recommended by IESNA recommended practice manual: Roadway Lighting (RP-8-14), Table 3: Lighting Design Criteria for Streets, Collector Street Classification, Medium Pedestrian Area Classification.
- B. Meet light levels and uniformity ratios as recommended by IESNA recommended practice manual: Lighting for Parking Facilities (RP-20-98), Table 1: Recommended Maintained Illuminance Values for Parking Lots (Basic Requirements).
- C. All luminaires with more than 5500 initial luminaire lumens must have an uplight rating of U0, per IES Technical Memorandum TM-15-11 Luminaire Classification System for Outdoor Luminaires.

1.6 BIDDING

- A. Follow bidding procedures as described in Division 01 of this specification.
- B. Provide unit prices as described in SECTION 01 22 00 UNIT PRICES.
- C. Product Substitutions: Products shall be provided as specified. No substitutions will be considered.

1.7 SUBMITTALS

- A. For standard catalog items with no modifications, submit a complete list of all equipment and materials intended for installation, in accordance with the Contract Documents. For approval the submitted information shall include the following:
 - 1. Catalog cut sheets prepared by the manufacturer. The cut sheets shall include all pertinent information to identify the luminaires including manufacturers name, luminaire type designation from Contract Documents, and complete catalog number. The cut sheets shall clearly show all elements to be supplied and all corresponding product data including: light source (lumen and wattage rating, CCT and CRI), ballast / driver manufacturer and model number, voltage, light standards, anchor bolts, luminaire mountings, accessories or options, and any miscellaneous items detailed in the written description of the specification. If the cut sheet shows more than one (1) luminaire type, all non-applicable information shall be crossed out.
 - 2. For non-solid state light sources provide luminaire photometric data in IESNA PC electronic file format in accordance with IESNA LM-63-02, based on test results from an independent Nationally Recognized Testing Laboratory.
 - 3. For solid state light sources manufacturer shall provide luminaire efficacy (lm/W), total luminous flux (lumens), luminous intensity (candelas) chromaticity coordinates, CCT and CRI optical performance, polar diagrams, and relevant luminance and illuminance photometric data. Provide photometric data in IESNA PC electronic file format in accordance with IESNA LM-79-08, based on test results from an independent Nationally Recognized Testing Laboratory.
 - 4. Cables, splicing, and termination devices.
 - 5. Conduits, conduit bends and splices, and electrical bushings.
 - 6. Fuseholders, fuses, and cable disconnect devices.
 - 7. Wiring and connection diagrams of all cabinets, circuits, luminaires, contactors, and ground rods.
 - 8. Grounding systems.
 - 9. For solid state light source provide TM-21-11 and LM-80-08 data, based on test results from an independent Nationally Recognized Laboratory.

- B. For all submittals above, manufacturer shall provide submittals with luminaire installation instruction sheets.
- C. For all submittals above, manufacturer shall provide submittals within two weeks of receipt of order. All submittals shall have project name and luminaire type clearly shown.
- D. Luminaire cut sheets and shop drawings shall be submitted in quantities and format as described in SECTION 01 33 00 SUBMITTAL PROCEDURES.
- E. All luminaires of the same type classification shall be provided by the same manufacturer.
- F. The Engineer shall make the final determination as to whether or not the submittal contains sufficient information and reserves the right to request a shop drawing if the luminaire cut sheet is insufficient.
- G. Operation and Maintenance Manuals
 - 1. Contractor shall provide Operation and Maintenance Manuals for all luminaires, light standards, light sources and ballasts/drivers if requested by Engineer. Manuals shall include:
 - a. Catalog cut sheets for luminaires, light standards, light sources and ballasts/drivers.
 - b. Luminaire manufacturer's installation and maintenance instructions.
 - c. Luminaire shop drawings for modified and/or custom luminaires.
 - d. Complete catalog number including luminaire, light source, accessories and electrical components, as purchased.

1.8 MATERIALS AND WORKMANSHIP

- A. All materials and apparatus required for the Work, except as specified otherwise, shall be new, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the spaces.
- B. All component parts of each item of equipment or device shall bear the manufacturer's nameplate, giving at least the name of the manufacturer, description, size, type, serial number, and electrical characteristics in order to facilitate maintenance or replacement. This nameplate shall not be visible during normal operation of the equipment.
- C. Blemished, damaged, or unsatisfactory luminaires shall be replaced in a satisfactory manner to the Engineer.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver lighting in factory-fabricated containers or wrappings, consistent with ICC regulations, which properly protect luminaries from damage.
- B. Store luminaires and light standards in original packaging. Store inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity, laid flat, and blocked off ground.
- C. Handle luminaires and light standards carefully to prevent damage, breaking, and scoring of finishes. Do not install damaged units or components; replace with new.

1.10 WARRANTY

- A. All luminaires and workmanship shall be guaranteed free of defects and fully operational for a minimum Manufacturer's warranty of ten years after the receipt and acceptance of the luminaires by the Contractor.

Any luminaires or workmanship found to be defective during the Contractor's warranty period will be either fixed or replaced by the Contractor at no cost to the Owner. The warranty shall cover all failures including:

1. Failure in luminaire housing, wiring, connections, drivers / ballasts, and photoelectrical devices, if applicable.
 2. More than 10 percent decrease in lumen output.
 3. Significant change in light output color.
- B. During the Manufacturer's warranty period, technical support shall be available from the manufacturer via telephone within 24 hours of the time the call is made, and this support shall be made available from factory certified personnel or factory certified installers at no additional charge to the Owner.

1.11 EXTRA MATERIALS

- A. Furnish to the Owner and store at the site where directed, extra stock of each type of luminaire and light source type installed in the project in quantities as required by Owner per SECTION 01 78 46 EXTRA STOCK MATERIALS, packaged in manufacturer's unopened cartons, with protective covering for storage and identified with labels describing contents.
- B. Furnish items above with appropriate quantity of each exposed trim, fastener, bracket and other items as required for complete installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Open Parking Lots and Street Lighting:
 - a. Primary Manufacturer - Gardco "Round Form 10" CA Style:
 - 1) CA22L-DIM; single or double luminaire head depends on location, use type 3 distribution; universal 120-277V, 0-10V integral dimming driver; 8,500 nominal lumens with a maximum of 110 nominal luminaire watts; 7-pin ANSI Standard photocell receptacle with shorting cap (for future wireless control node); LEDs to be 3000K CCT and 80 or greater CRI; luminaire to be UL listed for wet locations; finish to be campus standard color RAL7038. Pole: RA5, 30 ft high, fixed base, accommodates single or double configuration as required, finish color RAL7038
 - b. General Description: Pole mounted, aluminum type luminary (single and double-head), thirty (30) foot aluminum pole, both with color paint (RAL7038)
 2. General Campus Lighting:
 - a. Primary Manufacturer - Gardco "Round Form 10" MP Style:
 - 1) Form 10 LED; MP17L-DIM; P12 yoke fitter; type 5 distribution; universal 120-277V, 0-10V integral dimming driver; 5,500 nominal lumens with a maximum of 70 nominal luminaire watts; 7-pin ANSI standard photocell receptacle with shorting cap (for future wireless control node); LEDs to be 3000K CCT and 80 or greater CRI; luminaire to be UL listed for wet locations; finish to be campus standard color RAL7038. Pole: RA4, 10 ft high, fixed base, finish color – RAL7038.
 - b. General Description: Pole-mounted, aluminum type luminaire with solid top (single head), ten (10) foot aluminum pole, both with color paint – RAL7038
- B. GENERAL
1. All new aluminum products shall be treated in such a manner as to render it corrosion resistant, either anodized or Super TGIC (triglycidyl isocyanurate) polyester powder coated.
 2. Ferrous mounting hardware and accessories shall be finished using either a galvanic or phosphate primer / baked paint process to prevent corrosion and discoloration of adjacent materials.

3. Fasteners shall be manufactured of non-magnetic stainless steel or anodized aluminum.
4. All materials used in fabrication and mounting luminaires shall be of a non-corrosive nature.
5. Luminaires shall be free of light leaks and shall be designed to provide sufficient ventilation of light sources and ballasts/drivers including vent holes where required.
6. Wiring channels and light source holder mountings shall be rigid and accurately manufactured.
7. All light source holders shall be of high quality shall hold light sources securely against normal vibrations and maintenance handling.
8. Rivets, springs, and other hardware shall not be visible after installation.
9. Flat glass lenses shall be heat and impact resistant tempered borosilicate glass unless otherwise noted.
10. Wiring:
 - a. Complete wiring includes control wiring, luminaire wiring, main circuit wiring, ground wiring, service entrance wiring, and all other wiring necessary for a complete installation.
 - b. Voltage Rating
 - 1) For voltages up to 120 volts luminaire wiring shall be rated for 600 volts minimum.
 - 2) For voltages above 120 volts luminaire wiring shall be rated for 600 volts minimum.
 - c. Temperature Rating – Internal to Luminaire
 - 1) All wiring shall be code-approved for luminaire wiring, and shall comply with the following temperature ratings unless luminaire design or local codes require higher temperature wire.
 - d. Conductors shall be sized to prevent a voltage drop of more than 3 percent per feeder run. All conductors shall be installed in conduit. When 120 volt luminaires are installed, 120/240 VAC shall be brought to the base of each light standard, and individual luminaires shall be connected to one leg or the other in a manner that minimizes overall voltage drop.
 - e. A complete grounding system shall be installed for the entire lighting installation. Grounding shall consist of: ground cables, conduits, grounding rods, wire or strap, and ground fittings, as required by the National Electrical Code. All electrical conductors shall be identified and tagged as follows: Electrical conductor cable tags shall be located at each splice termination. The tags shall be attached with cable ties. The information shall be written on the tag with a permanent marker. The information shall include the direction and approximate length of the cable, and the feeder or circuit destination (line and load sides). Each incoming (line side) conductor shall be individually color coded with one tape mark; each outgoing conductor (load side) shall be coded with two tape marks.
11. Temperature Rating – External to Luminaire
 - a. All flexible cord wiring between luminaire components or to electrical receptacle and not in wireways shall have a minimum temperature rating of 105 degrees Celsius.
 - b. Cord type shall be suitable for application and shall be fitted with proper strain relief and watertight entries where required by application.
12. Splices
 - a. Splices internal to luminaire shall be made within separate splice compartments and shall utilize nylon insulated crimped connections or insulated quick disconnects.
 - b. Splices to branch circuit wiring in separate junction boxes shall utilize flame retardant thermoplastic caps with fully seated helical metal spring and threaded entry.
13. No internal wiring shall be visible at normal viewing angles, i.e. above 45-degrees from vertical. Use additional wire clamps if necessary. Anticipate increased visibility if luminaires are mounted on or recessed within a sloping surface.
14. Any luminaire fed from more than one panel, i.e. for normal and night or emergency operation, shall have separate neutrals to each panel.

2.2 LIGHT STANDARDS

- A. A light standard shall consist of a metal pole, base plate, base plate template, base cover, nut covers, hand hole, hand hole cover, and mast arm.

- B. All structural components of light standards, couplers, anchor bolts, luminaires, and other attachments to be used for lighting shall be designed for a minimum of 100 MPH sustained wind velocity with gusts up to 130%, in accordance with AASHTO LTS-4.
- C. All standards shall have cable-entrance holes and hand holes. Metal surfaces shall be free of any imperfections marring the appearance and of any burrs or sharp edges that might damage the cable.
- D. Light standard assemblies, including hand hole and hand hole cover, shall be rated for 2500 hour salt spray test endurance.
- E. After erection and alignment of the light standard, the space between the foundation and the base plate shall be filled with non-shrink grout.
- F. Light standard assemblies shall be fabricated and placed in accordance with the details and dimensions shown on the Drawings. The careful erection and aligning of the components furnished shall be considered a most essential feature of the installation and shall be within 0.25 degrees from plumb.
- G. Where dissimilar metals are used in the materials of the light standard, Contractor shall ensure protection against galvanic corrosion.
- H. All miscellaneous bolts shall meet the requirements of ASTM A 325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. All nuts, bolts, and washers supplied which are not galvanized shall have chemical properties of ASTM A 325, Type III.
- I. All anchor bolts shall be fabricated from steel, as specified by the Manufacturer, unless otherwise noted, and that portion of the anchor bolts and nuts, which shall be exposed above foundation, shall be galvanized in accordance with ASTM A 123 Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
- J. The light standard and its accessories must be manufactured of material of like appearance.
- K. Provide in-line fusing at pole hand hole for all pole mounted luminaires.
- L. Provide removable component tray with separate connector in all pole mounted luminaires.
- M. Install underground wiring in conduit with watertight connections. Refer to Section 260533 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS.
- N. Luminaire Pole Bases: Size and construct as indicated on Contract Drawings. Project anchor bolts per luminaire Manufacturer and structural requirements of 2 inches minimum above base if not otherwise noted. Install poles on bases within 0.25 degrees of plumb; provide shims for adjustment. Provide structural grout around pole base.

2.3 FOUNDATIONS

- A. A foundation shall consist of the concrete, reinforcing steel, ground rods, conduit, connector bolts, anchor bolts (installed according to the Light Standard bolt plate template), nuts, and washers.
- B. The Contractor shall be required to construct a new foundation at each light standard location according to the lighting and electrical plans in the Contract Drawings, and structural details shall be per CDOT M-Standard Details M-613-1 Sheet 3 of 4.
- C. Foundations shall be cast-in-place or precast concrete, constructed to not less than minimum dimensions as designed by Engineer. The size and number of conduit bends shall be installed in each foundation as

indicated in Contract Drawings. The caged anchor bolt assembly shall be placed in the foundation so that it remains plumb, according to pole manufacturer's tolerances, and with the projection set as specified by the pole manufacturer. Anchor bolts shall be "caged" in a manner specified by the manufacturer and approved by the Engineer. The top elevation of the foundation shall be set accurately and leveled.

2.4 LIGHT SOURCES

A. GENERAL

1. Light sources shall only be installed and operated in luminaires designed to accommodate the specific light source.
2. Light sources shall be compatible with drivers supplied with luminaires in which they are to be installed.
3. All LED light sources shall be provided as integral components of the luminaire. All luminaires of the same shall have LED light sources by the same manufacturer, and product series.
4. Provide light sources as specified in SECTION 2.1 MANUFACTURERS
5. Provide light sources in wattages, lumen ratings and envelope sizes/configuration, color temperature and color rendering index as indicated in luminaire schedule.

B. Solid State Lighting / Light Emitting Diode (LED) Light Sources

1. All LED sources used in the LED luminaire shall be of proven quality from established and reputable LED manufacturers. Acceptable LED light source / module manufacturers unless otherwise noted are:
 - a. Osram Opto Semiconductors
 - b. General Electric
 - c. Philips Lighting
 - d. Luxeon
 - e. Cree, Inc.
 - f. Nichia Corporation
 - g. Xicato
 - h. Citizen
 - i. Bridgelux
 - j. Lumileds
 - k. Other LED manufacturers upon written approval of Lighting Designer
2. All LED components shall be mercury and lead-free.
3. LEDs shall comply with IESNA LM-80-08 – Measuring Lumen Maintenance of LED Light Sources.
4. CCT, CRI and Flux:
 - a. Correlated Color Temperature (CCT) – All LED light sources shall emit white light and have a CCT of 3000K nominal in accordance with ANSI C78.277.
 - b. Color Rendering Index (CRI) – All LED light sources shall have a minimum Color Rendering Index (CRI) of 80 per the LM79 test results.
 - c. Luminous Flux – LED light sources shall not exceed the junction temperature recommended by the LED manufacturer. Luminous flux differences between LEDs shall not exceed 10 percent.
5. LEDs shall have a minimum rated life of 100,000 hours per IES TM-21 at 40°C at the normal operating driver current for the specific luminaire. The lumen output shall be maintained at 70 percent of initial rated lumens (L70) or greater at the rated life of the luminaire.
6. LEDs shall be temperature rated for operation and storage within the range of -30°C to 40°C and shall withstand low and high frequency vibration (ANSI C136.31 Vibration Level 3G) over the rated life of the light source.
7. Cooling System
 - a. Mechanical design of protruding external surfaces (e.g., heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.
 - b. The cooling system must be passive utilizing heat sinks, convection, or conduction.
 - c. Fans, diaphragms, pumps, or liquids shall not be acceptable.

2.5 LED DRIVERS

- A. Driver shall operate from 60Hz input source of 120V with sustained variations of +/- 1% (voltage and frequency) with no damage to the Driver.
- B. Driver output shall be regulated to +/- 5% across published load range.
- C. Driver shall operate LEDs at a frequency of 60Hz.
- D. Driver shall have a Power Factor greater than 0.90 for primary application and shall allow for power factor correction.
- E. Driver input current shall have a Total Harmonic Distortion (THD) of less than 20%.
- F. Driver outputs shall have current limited protection.
- G. Driver shall have a Class A sound rating.
- H. Driver shall have a minimum operating temperature of minus 40 degrees Fahrenheit.
- I. Driver shall tolerate sustained open circuit and short circuit output conditions without damage and without need for external fuses or trip devices.
- J. Driver shall provide mis-wiring protection.
- K. Driver shall provide connections that are conduit-ready or clamp-style connections in the case of low-voltage wiring.
- L. Driver shall come with a housing that meets a minimum IP20 rating for dry location installation unless located in a damp or wet location.
- M. Driver shall not contain any Polychlorinated Biphenyl (PCB).
- N. Driver shall be UL listed for Class 1 or Class 2 wiring.
- O. Driver shall comply with ANSI C62.41 Category A for Transient protection.
- P. Driver shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 15, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).
- Q. Driver shall be manufactured in a factory certified to ISO 9002 Quality System Standards.
- R. Manufacturer shall have a fifteen (15) year history of producing electronic ballasts or drivers for the North American market.
- S. Dimmable drivers shall be controlled by a Class 2 low voltage 0-10VDC controller unless otherwise specified.
- T. Drivers shall be Restriction of Hazardous Substances (RoHS) compliant.
- U. All electronics of the power supply and the LEDs shall be protected from all electrical surges with an elevated electrical immunity rating, including but not limited to lightning strikes and stray current in rebar and concrete. Surge protection shall be integral to the LED power supply.

- V. Electrical immunity (including surge protection)
 - 1. Luminaire shall meet the “Elevated” requirements per IEEE C62.41.2 -2002. Manufacturer shall indicate whether failure of the electrical immunity system can possibly result in disconnect of power to luminaire.
- W. Electromagnetic interference: Shall comply with Federal Communications Commission (FCC) 47 Code of Federal Regulations (CFR) part 15 non-consumer radio frequency interference (RFI) and/or electromagnetic interference (EMI) standards.

2.6 LED Luminaires

- A. General:
 - 1. Luminaire manufacturer shall have a minimum of five (5) years’ experience in the manufacturer and design of LED products and systems and no less than one hundred (100) North American installations.
 - 2. Unless otherwise specified, all LED luminaires and power / data supplies shall be provided by a single manufacturer to ensure compatibility.
 - 3. Provide submittals as described in SECTION 1.7 SUBMITTALS above.
 - 4. Include all components necessary for a complete installation. Provide all power supplies, power feeds, connectors, synchronizers, data cables, and data terminators for a complete working system.
- B. Housing:
 - 1. Single piece, 0.100” seamless aluminum with integral rolled circumferential reveal and lower section aperture incorporating a returned flange stiffener.
 - 2. Finish: Architectural Class 1 anodizing, electrostatically applied TFIC polyester powdercoat or polyurethane.
 - a. Concealed surfaces: matte black.
 - b. Visible surfaces: color and texture as specified in SECTION 2.1 MANUFACTURERS.
 - c. Exterior Luminaire Finishes:
 - 1) Unless otherwise specified, all painted surfaces shall have an outdoor life expectancy of not less than 20 years. Surface shall be prepared, primed and material applied in accordance with manufacturer’s requirements.
 - 2) Color: Colors shall be as specified under SECTION 2.1 MANUFACTURERS.
 - 3. Replacement and Spares:
 - a. Manufacturer shall provide written guidance of the following:
 - 1) Manufacturer will keep record of original bin for each LED module and have replacement modules from the same bin available for three (3) years after date of installation.
 - 2) Manufacturer will keep an inventory of replacement parts (source assembly, power and control components).
 - 3) Manufacturer’s LED system will not become obsolete for ten (10) years. Manufacturer will provide exact replacement parts, or provide upgraded parts that are designed to fit into the original luminaire, provide equivalent distribution and lumen output to the original and consume equal or reduced energy, without any negative consequences.
 - b. All parts of the system shall be replaceable in the field. Manufacturer shall provide written guarantee of the following:
 - 1) Manufacturer has in place a written recycling and re-use program, and will accept returned product and/or components for recycling or re-use.
 - 2) Manufacturer will properly dispose of non-recyclable components that are deemed harmful to the environment.
 - c. System shall carry a full warranty for ten (10) years. Manufacturer shall be responsible for cost of labor not to exceed \$50 per individual part, and cost of shipping, to replace any component of the system that fails within 2 years of installation.

4. Products and Components – Performance

- a. LED luminaires and components shall be UL listed or UL classified.
- b. Luminaire assembly shall include a method of dissipating heat so as to not degrade life of source, electronic equipment, or lenses under ambient air temperatures up to 50 degrees Celsius, plus the heat generated under direct sunlight. LED luminaire housing shall be designed to transfer heat from the LED board to the outside environment. Luminaire housing shall have no negative impact on life of components.
- c. Manufacturer shall supply in writing a range of permissible operating temperatures in which system will perform optimally.
- d. LEDs shall be adequately protected from moisture or dust.
- e. For wet and damp use, LED-based luminaire itself shall be sealed, rated, and tested for appropriate environmental conditions, not accomplished by using an additional housing or enclosure. Such protection shall have no negative impact on rated life of source or components, or if so, such reductions shall be explicitly brought to the attention of the Lighting Designer.
- f. All hardwired connections to LED luminaires shall be reverse polarity protected and provide high voltage protection in the event connections are reversed or shorted during the installation process.
- g. The LED luminaire shall be operated at constant and carefully regulated current levels. LEDs shall not be overdriven beyond their specified nominal voltage and current.
- h. Manufacturer shall be able to provide supporting documentation of the product meeting third party regulatory compliance.
- i. Luminaire shall have an internal label per ANSI C136.22.
- j. All LED luminaires (100% of each lot) shall undergo a minimum of twenty-four (24) hour burn-in during manufacturing, prior to shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Notify Engineer about field conditions at variance with Contract Documents before commencing installation.
- B. Identify and locate all lighting and equipment installations per SECTION 1.4 GENERAL REQUIREMENTS.

3.2 SHIPPING AND STORAGE

- A. All luminaires received at the site shall be stored in clean and dry space until luminaires are installed.
- B. Manufacturer shall clearly mark each box with luminaire designation prior to shipping.
- C. All products and materials shall be inspected by Contractor upon delivery to identify any defects. Report all defects that will affect the installation to the Engineer. Contractor shall be held responsible for any existing defects which adversely affect the luminaire or its functioning.

3.3 INSTALLATION, GENERAL

- A. The installation shall be in accordance with all governing local ordinances and regulations, and the Contract Documents.

- B. Install lighting at locations and heights as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation," NEMA standards, and with recognized industry practices to ensure that lighting fulfills requirements.
- C. Fasten luminaries securely to structural supports and ensure that luminaries are plumb and level.
- D. All field drilled holes in light standards shall be de-burred and cold galvanized.
- E. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and 486B, and the National Electrical Code (NEC).
- F. Grounding:
 - 1. Provide ground rod(s) at each pole with grounding conductors.
 - 2. Provide equipment-grounding connections for lighting as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.
 - 3. All ground rod systems shall have an electrical resistance of 10 Ohms or less.
- G. Bond luminaires and metal accessories to branch circuit equipment grounding conductor No. 6 AWG copper minimum.
- H. Any luminaire, standard, foundation, or other lighting/electrical equipment damaged during construction shall be replaced at no cost to the Owner.
- I. Specified LED luminaires shall not be used as construction work lights.
- J. It shall be the Contractor's responsibility to replace and restore all surface materials in kind, equal to, or exceeding those disturbed by construction work. All excess materials shall be disposed of as directed by Contractor's Quality Department.

3.4 TESTING, CLEANING, AND CERTIFICATION

- A. Clean lighting of dirt and construction debris upon completion of installation. Clean fingerprints and smudges from lenses.
- B. Protect installed luminaries from damage during remainder of construction period.
- C. At Date of Final Completion, replace light sources or luminaries, which are observed to be noticeably dimmed after Contractor's use and testing, as judged by Engineer.
 - 1. Refer to Division 1 sections for the replacement/restoration of lamps in lighting where used for temporary lighting prior to Date of Final Completion.
- D. At Date of Final Completion, replace inoperative or noisy drivers in all luminaires, which are observed to cause flicker or dimming of the luminaire after Contractor's use and testing, as judged by the Engineer.
- E. All lighting circuits and equipment shall be given an initial operational test, consisting of having the entire system energized for seventy-two (72) consecutive hours without any failures of any type occurring anywhere in the system. All circuits shall test clear of faults, grounds and open circuits to the satisfaction of the Contractor's Quality Department.
- F. The Contractor shall demonstrate that the lighting controls, including photocell, time switch, and lighting contactors, are fully operational and comply with the Sequence of Operations.

- G. Perform ground resistance tests, according to IEEE 81 fall-of-potential method, at each service entrance switch or breaker enclosure ground terminal. If ground resistance exceeds 10 ohms, provide additional grounding either by increasing the length of the ground rod, or add more ground rods to the grounding system until the required resistance is achieved. Where multiple ground rods are installed, they shall not be less than 6ft apart.
- H. Upon completion of installation of lighting and after circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then re-test to demonstrate compliance; otherwise, remove and replace with new units and proceed with re-testing.
- I. After satisfactory completion of all tests required in these Specifications, the illumination system shall be placed in operation. Final acceptance by the Owner will not be made until the system has operated satisfactorily for a period of not less than fourteen (14) days, unless otherwise noted by Owner.
- J. The Contractor shall be fully responsible for the system during this period of operation and shall make any adjustment or repairs which may be required and remedy any defects or damages which may occur.
- K. The Contractor shall not be required to pay for electrical energy consumed by the system during the period of trial operation.

END OF SECTION 26 56 00

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**



**CONTRACTOR'S DESIGN/BID/BUILD (D/B/B) AGREEMENT
(STATE FORM SC-6.21)**

DEPARTMENT ID: _____

CONTRACT ID #: _____

PROJECT #: _____

PROJECT NAME: _____

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM

CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

TABLE OF CONTENTS.....Page

RECITALS.....	1
ARTICLE 1. PERFORMANCE OF THE WORK.....	1
ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS.....	1
ARTICLE 3. TIME OF COMPLETION.....	1
ARTICLE 4. ESSENTIAL CONDITIONS.....	2
ARTICLE 5. CONTRACT SUM.....	2
ARTICLE 6. CONTRACT DOCUMENTS.....	2
ARTICLE 7. OPTIONAL PROVISIONS AND ELECTIONS.....	2
1. MODIFICATION OF ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION.....	2
2. MODIFICATION OF ARTICLE 27. LABOR AND WAGES.....	2
3. MODIFICATION OF ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS.....	2
4. MODIFICATION OF ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES.....	2
5. NOTICE IDENTIFICATION.....	3
SIGNATURE APPROVALS.....	4

EXHIBITS:

- A. Contractor's Bid (Form SC-6.13)
- B. Performance Bond (Form SC-6.22)
- C. Labor and Material Payment Bond (Form SC-6.221)
- D. Insurance Certificates
- E. Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work)
- F. Building Code Compliance Policy: Coordination of Approved Building Codes, Plan Reviews and Building Inspections.

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD (D/B/B) AGREEMENT
(STATE FORM SC-6.21)**

Department ID: _____ Contract ID #: _____ Project #: _____

1. PARTIES. THIS AGREEMENT is entered into by and between the STATE OF COLORADO, acting by and through the (agency), hereinafter referred to as the Principal Representative, and (vendor name) having its offices at (vendor address) hereinafter referred to as the Contractor.

2. EFFECTIVE DATE AND NOTICE OF NONLIABILITY. This Agreement shall not be effective or enforceable until it is approved and signed by the State Controller or its designee (hereinafter called the "Effective Date"), but shall be effective and enforceable thereafter in accordance with its provisions. The State shall not be liable to pay or reimburse Contractor for any performance hereunder or be bound by any provision hereof prior to the Effective Date.

RECITALS:

WHEREAS, the Principal Representative intends to (project name) hereinafter called the Project; and

WHEREAS, authority exists in the Law and Funds have been budgeted, appropriated, and otherwise made available, and a sufficient unencumbered balance thereof remains available for payment In Fund Number _____, Account Number _____; and

WHEREAS, this is a phase one waived contract, waiver number 156 Contractors Agreement for Capital Construction Form SC6.21.

WITNESSETH, that the State of Colorado and the Contractor agree as follows:

ARTICLE 1. PERFORMANCE OF THE WORK

The Contractor shall perform all of the Work required for the complete and prompt execution of everything described or shown in, or reasonably implied from the Contract Documents for the above referenced Project.

ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS

The Contractor agrees to perform the Work to the highest industry standards and to the satisfaction of the State of Colorado and its Architect/Engineer in strict accordance with the provisions of the Contract Documents.

ARTICLE 3. TIME OF COMPLETION

The Contractor agrees to Substantially Complete the Project within _____ calendar days from the date of the Notice to Proceed, in addition, the Contractor agrees to finally complete the Project from Substantial Completion to Final Acceptance within _____ calendar days for a total time of completion of the entire Project of _____ calendar days. The Contractor shall perform the Work with due diligence to completion.

ARTICLE 4. ESSENTIAL CONDITION

Timely completion of the Project is an essential condition of this Agreement. The Contractor shall be subject to any liquidated damages described in Article 7.4 for failure to satisfactorily complete the Work within the time periods in Article 3 above.

ARTICLE 5. CONTRACT SUM

The Contractor shall be paid for the performance of this Agreement, subject to any additions and deductions as provided for in Articles 32, 34 and 35 of The General Conditions of the Construction Contract SC-6.23, the sum of _____ DOLLARS AND NO/100* (\$_____ *).

ARTICLE 6. CONTRACT DOCUMENTS

The Contract Documents, as enumerated in Article 1 of The General Conditions of the Contractor's Design/Bid/Build (D/B/B) Agreement SC-6.23, are all essential parts of this Agreement and are fully incorporated herein.

ARTICLE 7. OPTIONAL PROVISIONS AND ELECTIONS

The provisions of this Article 7 alter the Articles (The General Conditions of the Contractor's Design/Bid/Build Agreement SC-6.23) or enlarge upon them as indicated:

The Principal Representative and or the State Buildings Program shall mark boxes and initial where applicable.

1. MODIFICATION OF ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION

If the box below is marked the six month guarantee inspection is not required.

☐ _____ Principal Representative initial

2. MODIFICATION OF ARTICLE 27. LABOR AND WAGES

If the box is marked the Federal Davis-Bacon Act shall be applicable to the Project. The minimum wage rates to be paid on the Project shall be furnished by the Principal Representative and included in the Contract Documents.

☐ _____ Principal Representative initial

3. MODIFICATION OF ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS

If the box is marked, and initialed by the State as noted, the requirement to participate in facilitated negotiations shall be deleted from this Contract. Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, shall be deleted in its entirety and all references to the right to the same where ever they appear in the contract shall be similarly deleted.

The box may be marked only for projects with an estimated value of less than \$500,000.

☐ _____ Principal Representative initial

4. MODIFICATION OF ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

If an amount is indicated immediately below, liquidated damages shall be applicable to this Project as, and to, the extent shown below. Where an amount is indicated below, liquidated damages shall be assessed in accordance with and pursuant to the terms of The General Conditions of the Design/Bid/Build Agreement Article 46, Time of Completion And Liquidated Damages, in the amounts and as here indicated. The election of liquidated damages shall limit and control the parties right to damages only to the extent noted.

1. For the inability to use the Project, for each day after the number of calendar days specified in the Contractor's bid for the Project and the Agreement for achievement of Substantial Completion, until the day that the Project has achieved Substantial Completion and the Notice of Substantial Completion is issued, the Contractor agrees that an amount equal to _____ (\$ _____) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due, but amounts remaining are insufficient to cover the entire assessment.

2. For damages related to or arising from additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period, for each day in excess of the number of calendar days specified in the Contractor's bid for the Project and the Agreement to finally complete the Project as defined by the issuance of the Notice of Final Acceptance) after the issuance of the final Notice of Substantial Completion, the Contractor agrees that an amount equal to _____ (\$ _____) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due but amounts remaining are insufficient to cover the entire assessment.

5. NOTICE IDENTIFICATION

All Notices pertaining to General Conditions or otherwise required to be given shall be transmitted in writing, to the individuals at the addresses listed below, and shall be deemed duly given when received by the parties at their addresses below or any subsequent persons or addresses provided to the other party in writing.

Notice to Principal Representative:

With copies to (State Buildings Program (or Delegate) State of Colorado):

Notice to Contractor:

With copies to:

SIGNATURE APPROVALS:

THE PARTIES HERETO HAVE EXECUTED THIS CONTRACT

*Persons signing for Contractor hereby swear and affirm that they are authorized to act on Contractor's behalf and acknowledge that the State is relying on their representations to that effect. **Principal is not a recognized title and will not be accepted**

THE CONTRACTOR

STATE OF COLORADO, acting by and through:
(Insert Name & Title of Agency or IHE)

Legal Name of Contracting Entity

By: _____
(Insert Name & Title of Person Signing for Agency or IHE)

Date: _____

*Signature

APPROVED
DEPARTMENT OF PERSONNEL &
ADMINISTRATION
STATE BUILDINGS PROGRAM
State Architect (or authorized Delegate)

By _____
Name (print) Title

Date: _____

By: _____
(Insert Name of Authorized Individual)

Date: _____

ALL CONTRACTS MUST BE APPROVED BY THE STATE CONTROLLER:

CRS §24-30-202 requires the State Controller to approve all State Contracts. This Contract is not valid until signed and dated below by the State Controller or delegate. Contractor is not authorized to begin performance until such time. If Contractor begins performing prior thereto, the State of Colorado is not obligated to pay Contractor for such performance or for any goods and/or services provided hereunder.

APPROVED:
STATE OF COLORADO
STATE CONTROLLER'S OFFICE
State Controller (or authorized Delegate)

By: _____
(Insert Name & Title of Authorized Individual)

Date: _____

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT A

CONTRACTOR'S BID (Form SBP-6.13)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT B

PERFORMANCE BOND (Form SC-6.22)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT C

LABOR AND MATERIAL PAYMENT BOND (Form SC-6.221)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT D

INSURANCE CERTIFICATE(S) (attached)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT E

Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work) (UI-1, attached)

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)**

EXHIBIT F

Building Code Compliance Policy: Coordination of Approved Building Codes, Plan Reviews and Building Inspections

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**



**THE GENERAL CONDITIONS OF THE CONTRACTOR'S DESIGN/BID/BUILD (D/B/B)
AGREEMENT**
(STATE FORM SC-6.23)

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM

THE GENERAL CONDITIONS OF THE CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.23)

TABLE OF CONTENTS.....	Page
THE CONTRACT	
ARTICLE 1. DEFINITIONS.....	1
A. CONTRACT DOCUMENTS.....	1
B. DEFINITIONS OF WORDS AND TERMS USED.....	1
ARTICLE 2. EXECUTION, CORRELATIONS, INTENT OF DOCUMENTS, COMMUNICATIONS AND COOPERATION.....	4
A. EXECUTION.....	4
B. CORRELATION.....	4
C. INTENT OF DOCUMENTS.....	4
D. PARTNERING, COMMUNICATIONS AND COOPERATION.....	5
ARTICLE 3. COPIES FURNISHED.....	6
ARTICLE 4. OWNERSHIP OF DRAWINGS.....	6
THE ARCHITECT	
ARTICLE 5. ARCHITECT/ENGINEER'S STATUS.....	6
ARTICLE 6. ARCHITECT/ENGINEER DECISIONS AND JUDGMENTS.....	6
A. DECISIONS.....	6
B. JUDGMENTS.....	6
C. ACCESS TO WORK.....	7
D. INSPECTION.....	7
THE CONTRACTOR	
ARTICLE 7. CONTRACTOR'S SUPERINTENDENCE AND SUPERVISION.....	7
ARTICLE 8. MATERIALS AND EMPLOYEES.....	8
ARTICLE 9. SURVEYS, PERMITS, LAWS, TAXES AND REGULATIONS.....	8
A. SURVEYS.....	8
B. PERMITS AND LICENSES.....	8
C. TAXES.....	9
D. LAWS AND REGULATIONS.....	9
ARTICLE 10. PROTECTION OF WORK AND PROPERTY.....	9
A. GENERAL PROVISIONS.....	9
B. SAFETY PRECAUTIONS.....	10
C. EMERGENCIES.....	10
ARTICLE 11. DRAWINGS AND SPECIFICATIONS ON THE WORK.....	10
ARTICLE 12. REQUESTS FOR INFORMATION AND SCHEDULES.....	11
A. REQUESTS FOR INFORMATION.....	11
B. SCHEDULES.....	11
ARTICLE 13. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.....	13
A. SUBMITTAL PROCESS.....	13
B. FABRICATION AND ORDERING.....	13
C. DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS.....	14
D. CONTRACTOR REPRESENTATIONS.....	14
ARTICLE 14. SAMPLES AND TESTING.....	14
A. SAMPLES.....	14
B. TESTING – GENERAL.....	14
C. TESTING – CONCRETE AND SOILS.....	14

D. TESTING – OTHER.....	15
ARTICLE 15. SUBCONTRACTS.....	15
A. CONTRACT PERFORMANCE OUTSIDE THE UNITED STATES OR COLORADO.....	15
B. SUBCONTRACTOR LIST.....	15
C. SUBCONTRACTOR SUBSTITUTIONS.....	15
D. CONTRACTOR RESPONSIBILITIES.....	15
ARTICLE 16. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR.....	16
ARTICLE 17. MUTUAL RESPONSIBILITY OF CONTRACTORS.....	16
ARTICLE 18. SEPARATE CONTRACTS.....	16
ARTICLE 19. USE OF PREMISES.....	16
ARTICLE 20. CUTTING, FITTING OR PATCHING.....	17
ARTICLE 21. UTILITIES.....	17
A. TEMPORARY UTILITIES.....	17
B. PROTECTION OF EXISTING UTILITIES.....	17
C. CROSSING OF UTILITIES.....	17
ARTICLE 22. UNSUITABLE CONDITIONS.....	17
ARTICLE 23. TEMPORARY FACILITIES.....	17
A. OFFICE FACILITIES.....	17
B. TEMPORARY HEAT.....	17
C. WEATHER PROTECTION.....	18
D. DUST PARTITIONS.....	18
E. BENCH MARKS.....	18
F. SIGN.....	18
G. SANITARY PROVISION.....	18
ARTICLE 24. CLEANING UP.....	18
ARTICLE 25. INSURANCE.....	18
A. GENERAL.....	18
B. COMMERCIAL GENERAL LIABILITY INSURANCE (CGL).....	19
C. AUTOMOBILE INSURANCE.....	19
D. WORKERS COMPENSATIONS INSURANCE.....	19
E. UMBRELLA LIABILITY INSURANCE.....	20
F. BUILDER'S RISK INSURANCE.....	20
G. POLLUTION LIABILITY INSURANCE.....	21
H. ADDITIONAL MISCELLANEOUS INSURANCE PROVISIONS.....	21
ARTICLE 26. CONTRACTOR'S PERFORMANCE AND PAYMENT BONDS.....	21
ARTICLE 27. LABOR AND WAGES.....	22
ARTICLE 28. ROYALTIES AND PATENTS.....	22
ARTICLE 29. ASSIGNMENT.....	22
ARTICLE 30. CORRECTION OF WORK BEFORE ACCEPTANCE.....	22
 PAYMENT AND COMPENSATION	
ARTICLE 31. APPLICATIONS FOR PAYMENTS.....	23
A. CONTRACTOR'S SUBMITTALS.....	23
B. ARCHITECT/ENGINEER CERTIFICATION.....	24
C. RETAINAGE WITHHELD.....	24
D. RELEASE OF RETAINAGE.....	24
ARTICLE 32. CERTIFICATES FOR PAYMENTS.....	25
ARTICLE 33. PAYMENTS WITHHELD.....	25
ARTICLE 34. DEDUCTIONS FOR UNCORRECTED WORK.....	26
ARTICLE 35. CHANGES IN THE WORK.....	26
A. THE VALUE OF CHANGED WORK.....	26
B. DETAILED BREAKDOWN.....	27
C. HAZARDOUS MATERIALS.....	28
D. EMERGENCY FIELD CHANGE ORDERED WORK.....	29
E. APPROPRIATION LIMITATIONS – § 24-91-103.6, C.R.S., as amended.....	29
ARTICLE 36. CLAIMS.....	30

ARTICLE 37. DIFFERING SITE CONDITIONS.....	32
A. NOTICE IN WRITING.....	32
B. LIMITATIONS.....	32
ARTICLE 38. DELAYS AND EXTENSIONS OF TIME.....	32
ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS.....	33
COMPLETION	
ARTICLE 40. RIGHT OF OCCUPANCY.....	35
ARTICLE 41. COMPLETION, FINAL INSPECTION, ACCEPTANCE AND SETTLEMENT.....	35
A. NOTICE OF COMPLETION.....	35
B. FINAL INSPECTION.....	35
C. NOTICE OF SUBSTANTIAL COMPLETION.....	36
D. NOTICE OF ACCEPTANCE.....	37
E. SETTLEMENT.....	37
ARTICLE 42. GENERAL WARRANTY AND CORRECTION OF WORK AFTER ACCEPTANCE.....	38
ARTICLE 43. LIENS.....	38
ARTICLE 44. ONE-YEAR GUARANTEE AND SPECIAL GUARANTEES AND WARRANTIES.....	39
A. ONE-YEAR GUARANTEE OF THE WORK.....	39
B. SPECIAL GUARANTEES AND WARRANTIES.....	39
ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION.....	39
ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES.....	40
ARTICLE 47. DAMAGES.....	41
ARTICLE 48. STATE’S RIGHT TO DO THE WORK; TEMPORARY SUSPENSION OF WORK; DELAY DAMAGES.....	42
A. STATE’S RIGHT TO DO THE WORK.....	42
B. TEMPORARY SUSPENSION OF WORK.....	42
C. DELAY DAMAGES.....	43
ARTICLE 49. STATE’S RIGHT TO TERMINATE CONTRACT.....	43
A. GENERAL.....	43
B. CONDITIONS AND PROCEDURES.....	43
C. ADDITIONAL CONDITIONS.....	44
ARTICLE 50. TERMINATION FOR CONVENIENCE OF STATE.....	44
A. NOTICE OF TERMINATION.....	44
B. PROCEDURES.....	44
ARTICLE 51. CONTRACTOR’S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT.....	45
ARTICLE 52. SPECIAL PROVISIONS.....	46
A. CONTROLLER’S APPROVAL.....	46
B. FUND AVAILABILITY.....	46
C. GOVERNMENTAL IMMUNITY.....	46
D. INDEPENDENT CONTRACTOR.....	46
E. COMPLIANCE WITH LAW.....	46
F. CHOICE OF LAW.....	46
G. BINDING ARBITRATION PROHIBITED.....	47
H. SOFTWARE PIRACY PROHIBITION.....	47
I. EMPLOYEE FINANCIAL INTEREST/CONFLICT OF INTEREST.....	47
J. VENDOR OFFSET.....	47
K. PUBLIC CONTRACTS FOR SERVICES.....	47
L. PUBLIC CONTRACTS WITH NATURAL PERSONS.....	48
ARTICLE 53. MISCELLANEOUS PROVISIONS.....	48
A. CONSTRUCTION OF LANGUAGE.....	48
B. SEVERABILITY.....	48
C. SECTION HEADINGS.....	48
D. AUTHORITY.....	48
E. INTEGRATION OF UNDERSTANDING.....	48
F. VENUE.....	48
G. NO THIRD PARTY BENEFICIARIES.....	48

H. WAIVER..... 48

I. INDEMNIFICATION..... 49

J. STATEWIDE CONTRACT MANAGEMENT SYSTEM..... 49

K. CORA DISCLOSURE..... 49

**STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAM**

**THE GENERAL CONDITIONS OF THE CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.23)**

ARTICLE 1. DEFINITIONS

A. CONTRACT DOCUMENTS

The Contract Documents consist of the following some of which are procedural documents used in the administration and performance of the Agreement:

1. Contractor's Design/Bid/Build Agreement; (SC-6.21);
2. Performance Bond (SC-6.22) and Labor and Material Payment Bond (SC-6.221);
3. General Conditions of the Contractor's Design/Bid/Build Agreement (SC- 6.23) and if applicable, Supplementary General Conditions;
4. Detailed Specification Requirements, including all addenda issued prior to the opening of the bids; and,
5. Drawings, including all addenda issued prior to the opening of the bids.
6. Change Orders (SC-6.31) and Amendments (SC-6.0), if any, when properly executed.
7. Authorization to Bid (SBP-6.10)
8. Information for Bidders (SBP-6.12);
9. Bid (SBP-6.13);
10. Bid Bond (SBP-6.14);
11. Notice of Award (SBP-6.15);
12. Builder's risk insurance certificates of insurance (ACORD 25-S);
13. Liability and Workers' compensation certificates of insurance;
14. Notice to Proceed (Design/Bid/Build) (SBP-6.26);
15. Notice of Approval of Occupancy/Use (SBP-01);
16. Notice of Partial Substantial Completion (SBP-071);
17. Notice of Substantial Completion (SBP-07);
18. Notice of Partial Final Acceptance (SC-6.27);
19. Notice of Final Acceptance (SBP-6.271);
20. Notice of Partial Contractor's Settlement (SC-7.3);
21. Notice of Contractor's Settlement (SBP-7.31);
22. Application and Certificate for Contractor's Payment (SBP-7.2);
23. Other procedural and reporting documents or forms referred to in the General Conditions, the Supplementary General Conditions, the Specifications or required by the State Buildings Program or the Principal Representative, including but not necessarily limited to Pre-Acceptance Check List (SBP-05) and the Building Inspection Record (SBP-BIR). A list of the current standard State Buildings Program forms applicable to this Contract may be obtained from the Principal Representative on request.

B. DEFINITIONS OF WORDS AND TERMS USED

1. **AGREEMENT.** The term "Agreement" shall mean the written agreement entered into by the State of Colorado acting by and through the Principal Representative and the Contractor for the performance of the Work and payment therefore, on State Form SC-6.21. The term Agreement when used without reference to State Form SC-6.21 may also refer to the entirety of the parties' agreement to perform the Work described in the Contract Documents or reasonably inferable there from. The term "Contract" shall be interchangeable with this latter meaning of the term Agreement
2. **ARCHITECT/ENGINEER.** The term "Architect/Engineer" shall mean either the architect of record or the engineer of record under contract to the State of Colorado for the Project identified in the Contract Documents.

3. **CHANGE ORDER.** The term “Change Order” means a written order directing the Contractor to make changes in the Work, in accordance with Article 35A, The Value of Changed Work.
4. **COLORADO LABOR.** The term “Colorado labor”, as provided in C.R.S. § 8-17-101(2)(a), as amended, means any person who is a resident of the state of Colorado, at the time of the public Works project, without discrimination as to race, color, creed, sex, sexual orientation, marital status, national origin, ancestry, age, or religion except when sex or age is a bona fide occupational qualification. A resident of the state of Colorado is a person who can provide a valid Colorado driver’s license, a valid Colorado state-issued photo identification, or documentation that he or she has resided in Colorado for the last thirty days.
5. **CONTRACTOR.** The word “Contractor” shall mean the person, company, firm, corporation or other legal entity entering into a contract with the State of Colorado acting by and through the Principal Representative
6. **DAYS.** The term “days” whether singular or plural shall mean calendar days unless expressly stated otherwise. Where the term “business days” is used it shall mean business days of the State of Colorado.
7. **DRAWINGS.** The term “Drawings” shall mean all drawings approved by appropriate State officials which have been prepared by the Architect/Engineer showing the Work to be done, except that where a list of drawings is specifically enumerated in the Supplementary General Conditions or division 1 of the Specifications, the term shall mean the drawings so enumerated, including all addenda drawings.
8. **EMERGENCY FIELD CHANGE ORDER.** The term “Emergency Field Change Order” shall mean a written change order for extra Work or a change in the Work necessitated by an emergency as defined in Article 35C executed on State form SC 6.31 and identified as an Emergency Field Change Order. The use of such orders is limited to emergencies and to the amounts shown in Article 35C.
9. **FINAL ACCEPTANCE.** The terms “final acceptance” or “finally complete” mean the stage in the progress of the Work, after substantial completion, when all remaining items of Work have been completed, all requirements of the Contract Documents are satisfied and the Notice of Acceptance can be issued. Discrete physical portions of the Project may be separately and partially deemed finally complete at the discretion of the Principal Representative when that portion of the Project reaches such stage of completion and a partial Notice of Acceptance can be issued.
10. **FIXED LIMIT OF CONSTRUCTION COST.** The term “Fixed Limit of Construction Cost” shall set forth a dollar amount available for the total Construction Cost of all elements of the Work as specified by the Principal Representative.
11. **NOTICE.** The term “Notice” shall mean any communication in writing from either contracting party to the other by such means of delivery that receipt cannot properly be denied. Notice shall be provided to the person identified to receive it in Article 7.5 (Contractor’s Design/Bid/Build Agreement SC-6.21), Notice Identification, or to such other person as either party identifies in writing to receive Notice. Notice by facsimile transmission where proper transmission is evidence shall be adequate where facsimile numbers are included in Article 7.5 (Contractor’s Design/Bid/Build Agreement SC-6.21). Notwithstanding an email delivery or return receipt, email Notice shall not be adequate. Acknowledgment of receipt of a voice message shall not be deemed to waive the requirement that Notice, where required, shall be in writing.
12. **OCCUPANCY.** The term “Occupancy” means occupancy taken by the State as Owner after the Date of Substantial Completion at a time when a building or other discrete physical portion of the Project is used for the purpose intended. The Date of Occupancy shall be the date of such first use, but shall not be prior to the date of execution of the Notice of Approval of Occupancy/Use. Prior to the date of execution of a Notice of Approval of Occupancy/Use, the state shall have no right to occupy and the project may not be considered safe for occupancy for the intended use.

13. OWNER. The term "Owner" shall mean the Principal Representative.
14. PRINCIPAL REPRESENTATIVE. The term "Principal Representative " shall be defined, as provided in § 24-30-1301(11), C.R.S., as the governing board of a state department, institution, or agency; or if there is no governing board, then the executive head of a state department, institution, or agency, as designated by the governor or the general assembly and as specifically identified in the Contract Documents, or shall have such other meaning as the term may otherwise be given in § 24-30-1301(11), C.R.S., as amended. The Principal Representative may delegate authority. The Contractor shall have the right to inquire regarding the delegated authority of any of the Principal Representative's representatives on the project and shall be provided with a response in writing when requested.
15. PRODUCT DATA. The term "Product Data " shall mean all submittals in the form of printed manufacturer's literature, manufacturer's specifications, and catalog cuts.
16. PROJECT. The "Project" is the total construction of which the Work performed under the Contract Documents is a part, and may include construction by the Principal Representative or by separate contractors.
17. REASONABLY INFERABLE. The phrase "reasonably inferable" means that if an item or system is either shown or specified, all material and equipment normally furnished with such items or systems and needed to make a complete installation shall be provided whether mentioned or not, omitting only such parts as are specifically excepted, and shall include only components which the Contractor could reasonably anticipate based on his or her skill and knowledge using an objective, industry standard, not a subjective standard. This term takes into consideration the normal understanding that not every detail is to be given on the Drawings and Specifications. If there is a difference of opinion, the Principal Representative shall make the determination as to the standards of what reasonably inferable.
18. SAMPLES. The term "Samples" shall mean examples of materials or Work provided to establish the standard by which the Work will be judged.
19. SBP. The term "SBP" means "State Buildings", which is used in connection with labeling applicable State form documents (e.g., "SBP-01" is the form number for Notice of Approval of Occupancy/Use).
20. SC. The term "SC" means "State Contract" which is used in connection with labeling applicable State form documents (e.g. "SC 6.23" is the State form number for these General Conditions of the Contractor's Design/Bid/Build Agreement).
21. SCHEDULE OF VALUES. The term "Schedule of Values" is defined as the itemized listing of description of the Work by Division and Section of the Specifications. The format shall be the same as Form SC-7.2. Included shall be the material costs, and the labor and other costs plus the sum of both.
22. SHOP DRAWINGS. The term "Shop Drawings" shall mean any and all detailed drawings prepared and submitted by Contractor, Subcontractor at any tier, vendors or manufacturers providing the products and equipment specified on the Drawings or called for in the Specifications.
23. SPECIFICATIONS. The term "Specifications" shall mean the requirements of the CSI divisions of the project manual prepared by the Architect/Engineer describing the Work to be accomplished.
24. STATE BUILDINGS PROGRAM. Shall refer to the Office of the State Architect within the Department of Personnel & Administration of Colorado State government responsible for project administration, review, approval and coordination of plans, construction procurement policy, contractual procedures, and code compliance and inspection of all buildings, public Works and improvements erected for state purposes; except public roads and highways and projects under the supervision of the division of wildlife and the division of parks and outdoor recreation as provided in § 24-30-1301, *et seq*, C.R.S. The term State Buildings Program shall also mean that individual within a State Department agency or institution, including institutions of higher education, who has signed an agreement accepting delegation to perform all or part of the responsibilities and functions of State Buildings Program.
25. SUBCONTRACTOR. The term "Subcontractor" shall mean a person, firm or corporation supplying labor, materials, equipment and/or Services for Work at the site of the Project for, and under separate contract or agreement with the Contractor.

26. SUBMITTALS. The term "submittals" means drawings, lists, tables, documents and samples prepared by the Contractor to facilitate the progress of the Work as required by these General Conditions or the Drawings and Specifications. They consist of Shop Drawings, Product Data, Samples, and various administrative support documents including but not limited to lists of subcontractors, construction progress schedules, schedules of values, applications for payment, inspection and test results, requests for information, various document logs, and as-built drawings. Submittals are *required* by the Contract Documents, but except to the extent expressly specified otherwise are not themselves a part of the Contract Documents.
27. SUBSTANTIAL COMPLETION. The terms "substantial completion" or "substantially complete" mean the stage in the progress of the Work when the construction is sufficiently complete, in accordance with the Contract Documents as modified by any Change Orders, so that the Work, or at the discretion of the Principal Representative, any designated portion thereof, is available for its intended use by the Principal Representative and a Notice of Substantial Completion can be issued. Portions of the Project may, at the discretion of the Principal Representative, be designated as substantially complete.
28. SUPPLIER. The term "Supplier" shall mean any manufacturer, fabricator, distributor, material man or vendor.
29. SURETY. The term "Surety" shall mean the company providing the labor and material payment and performance bonds for the Contractor as obligor.
30. VALUE ENGINEERING. "Value Engineering" or "VE" is defined as an analysis and comparison of cost versus value of building materials, equipment, and systems. VE considers the initial cost of construction, coupled with the estimated cost of maintenance, energy use, life expectancy and replacement cost. VE related to this Project shall include the analysis and comparison of building elements in an effort to reduce overall Project costs, while maintaining or enhancing the quality of the design intent, whenever possible.
31. WORK. The term "Work" shall mean all or part of the labor, materials, equipment, and other services required by the Contract Documents or otherwise required to be provided by the Contractor to meet the Contractor's obligations under the Contract.

ARTICLE 2. EXECUTION, CORRELATION, INTENT OF DOCUMENTS, COMMUNICATION AND COOPERATION

A. EXECUTION

The Contractor, within ten (10) days from the date of Notice of Award, will be required to:

1. Execute the Agreement, State Form SC-6.21;
2. Furnish fully executed Performance and Labor and Material Payment Bonds on State Form s SC-6.22 and SC-6.221; and
3. Furnish certificates of insurance evidencing all required insurance on standard Acord forms designed for such purpose.
4. Furnish certified copies of any insurance policies requested by the Principal Representative.

B. CORRELATION

By execution of the Agreement the Contractor represents that the Contractor has visited the site, has become familiar with local conditions and local requirements under which the Work is to be performed, including the building code programs of the State Buildings Program as implemented by the Principal Representative, and has correlated personal observations with the requirements of the Contract Documents.

C. INTENT OF DOCUMENTS

The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all. The intention of the documents is to include all labor, materials, equipment and transportation necessary for the proper execution of the Work. Words describing materials or Work which have a well-known technical or trade meaning shall be held to refer to such recognized standards.

In any event, if any error exists, or appears to exist, in the requirements of the Drawings or Specifications, or if any disagreement exists as to such requirements, the Contractor shall have the

same explained or adjusted by the Architect/Engineer before proceeding with the Work in question. In the event of the Contractor's failure to give prior written Notice of any such errors or disagreements of which the Contractor or the Subcontractors at any tier are aware, the Contractor shall, at no additional cost to the Principal Representative, make good any damage to, or defect in, Work which is caused by such omission.

Where a conflict occurs between or within standards, Specifications or Drawings, which is not resolved by reference to the precedence between the Contract Documents, the more stringent or higher quality requirements shall apply so long as such more stringent or higher quality requirements are reasonably inferable. The Architect/Engineer shall decide which requirements will provide the best installation.

With the exception noted in the following paragraph, the precedence of the Contract Documents is in the following sequence:

1. The Agreement (SC-6.21);
2. The Supplementary General Conditions, if any;
3. The General Conditions (SC-6.23); and
4. Drawings and Specifications, all as modified by any addenda.

Change Orders and Amendments, if any, to the Contract Documents take precedence over the original Contract Documents.

Notwithstanding the foregoing order of precedence, the Special Provisions of Article 52 of the General Conditions, Special Provisions, shall take precedence, rule and control over all other provisions of the Contract Documents.

Unless the context otherwise requires, form numbers in this document are for convenience only. In the event of any conflict between the form required by name or context and the form required by number, the form required by name or context shall control. The Contractor may obtain State forms from the Principal Representative upon request.

D. PARTNERING, COMMUNICATIONS AND COOPERATION

In recognition of the fact that conflicts, disagreements and disputes often arise during the performance of construction contracts, the Contractor and the Principal Representative aspire to encourage a relationship of open communication and cooperation between the employees and personnel of both, in which the objectives of the Contract may be better achieved and issues resolved in a more fully informed atmosphere.

The Contractor and the Principal Representative each agree to assign an individual who shall be fully authorized to negotiate and implement a voluntary partnering plan for the purpose of facilitating open communications between them. Within thirty days (30) of the Notice to Proceed, the assigned individuals shall meet to discuss development of an informal agreement to accomplish these goals.

The assigned individuals shall endeavor to reach an informal agreement, but shall have no such obligation. Any plans these parties voluntarily agree to implement shall result in no change to the contract amount, and no costs associated with such plan or its development shall be recoverable under any contract clause. In addition, no plan developed to facilitate open communication and cooperation shall alter, amend or waive any of the rights or duties of either party under the Contract unless and except by written Amendment to the Contract, nor shall anything in this clause or any subsequently developed partnering plan be deemed to create fiduciary duties between the parties unless expressly agreed in a written Amendment to the Contract. It is also recognized that projects with relatively low contract values may not justify the expense or special efforts required. In the case of small projects with an initial Contract value under \$500,000, the requirements of the preceding paragraph shall not apply.

ARTICLE 3. COPIES FURNISHED

The Contractor will be furnished, free of charge, the number of copies of Drawings and Specifications as specified in the Contract Documents, or if no number is specified, all copies reasonably necessary for the execution of the Work.

ARTICLE 4. OWNERSHIP OF DRAWINGS

Drawings or Specifications, or copies of either, furnished by the Architect/Engineer, are not to be used on any other Work. At the completion of the Work, at the written request of the Architect/Engineer, the Contractor shall endeavor to return all Drawings and Specifications.

The Contractor may retain the Contractor's Contract Document set, copies of Drawings and Specifications used to contract with others for any portion of the Work and a marked up set of as-built drawings.

ARTICLE 5. ARCHITECT/ENGINEER'S STATUS

The Architect/Engineer is the representative of the Principal Representative for purposes of administration of the Contract, as provided in the Contract Documents and the Agreement. In case of termination of employment or the death of the Architect/Engineer, the Principal Representative will appoint a capable Architect/Engineer against whom the Contractor makes no reasonable objection, whose status under the Contract shall be the same as that of the former Architect/Engineer.

ARTICLE 6. ARCHITECT/ENGINEER DECISIONS AND JUDGMENTS, ACCESS TO WORK AND INSPECTION

A. DECISIONS

The Architect/Engineer shall, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work or the interpretation of the Contract Documents, and in the exercise of due diligence shall be reasonably available to the Contractor to timely interpret and make decisions with respect to questions relating to the design or concerning the Contract Documents.

B. JUDGMENTS

The Architect/Engineer is, in the first instance, the judge of the performance required by the Contract Documents as it relates to compliance with the Drawings and Specifications and quality of Workmanship and materials.

The Architect/Engineer shall make judgments regarding whether directed Work is extra or outside the scope of Work required by the Contract Documents at the time such direction is first given. If, in the Contractor's judgment, any performance directed by the Architect/Engineer is not required by the Contract Documents or if the Architect/Engineer does not make the judgment required, it shall be a condition precedent to the filing of any claim for additional cost related to such directed Work that the Contractor, before performing such Work, shall first obtain in writing, the Architect/Engineer's written decision that such directed Work is included in the performance required by the Contract Documents. If the Architect/Engineer's direction to perform the Work does not state that the Work is within the performance required by the Contract Documents, the Contractor shall, in writing, request the Architect/Engineer to advise in writing whether the directed Work will be considered extra Work or Work included in the performance required by the Contract Documents.

The Architect/Engineer shall respond to any such written request for such a decision within three (3) business days and if no response is provided, or if the Architect/Engineer's written decision is to the effect that the Work is included in the performance required by the Contract Documents, the Contractor may file with the Principal Representative and the Architect/Engineer a Notice of claim in accordance with Article 36, Claims. Whether or not a Notice of claim is filed, the Contractor shall proceed with the ordered Work. Disagreement with the decision of the Architect/Engineer shall not be grounds for the Contractor to refuse to perform the Work directed or to suspend or terminate performance.

C. ACCESS TO WORK

The Architect/Engineer, the Principal Representative and representatives of State Buildings Program shall at all times have access to the Work. The Contractor shall provide proper facilities for such access and for their observations or inspection of the Work.

D. INSPECTION

The Architect/Engineer has agreed to make, or that structural, mechanical, electrical engineers or other consultants will make, periodic visits to the site to generally observe the progress and quality of the Work to determine in general if the Work is proceeding in accordance with the Contract Documents. Observation may extend to all or any part of the Work and to the preparation, fabrication or manufacture of materials.

Without in any way meaning to be exclusive or to limit the responsibilities of the Architect/Engineer or the Contractor, the Architect/Engineer has agreed to observe, among other aspects of the Work, the following for compliance with the Contract Documents:

1. Compaction testing reports based upon the findings and recommendations of the Principal Representative's testing consultant;
2. Bearing surfaces of excavations before concrete is placed based upon the findings and recommendations of the Principal Representative's soils engineering consultant;
2. Reinforcing steel after installation and before concrete is poured;
3. Structural concrete;
4. Laboratory reports on all concrete testing based upon the findings and recommendations of the Principal Representative's testing consultant;
5. Structural steel during and after erection and prior to its being covered or enclosed;
6. Steel welding; Principal Representative will furnish steel welding inspection consultant/agency if required or necessary for the project;
7. Mechanical and plumbing Work following its installation and prior to its being covered or enclosed;
8. Electrical Work following its installation and prior to its being covered or enclosed; and
9. Any special or quality control testing required in the Contract Documents provided by the Principal Representative's testing consultant.

If the Specifications, the Architect/Engineer's instructions, laws, ordinances of any public authority require any Work to be specifically tested or approved, the Contractor shall give the Principal Representative, Architect/Engineer and appropriate testing agency (if necessary) timely notice of its readiness for observation by the Architect/Engineer or inspection by another authority, and if the inspection is by another authority, of the date fixed for such inspection, required certificates of inspection being secured by the Contractor. The Contractor shall give all required Notices to the Principal Representative or his or her designee for inspections required for the building inspection program. It shall be the responsibility of the Contractor to determine the Notice required by the State pursuant to Building Inspection Record for the Project, according to State form SBP-B.I.R., or the equivalent form required by the Principal Representative as approved by the State Buildings Program. If any such Work is covered up without approval or consent of the Architect/Engineer or prior to any building code inspection, it must, if required by the Architect/Engineer, the Principal Representative or the State Buildings Program, be uncovered for examination, at the Contractor's expense. If such Work is found to be not in accordance with the Contract Documents, the Contractor shall pay such costs, unless he or she shall show that the defect in the Work was caused by another contractor engaged by the Principal Representative. In addition, examination of questioned Work may be ordered, and if so ordered, the Work must be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the Contractor shall be reimbursed the cost of examination and replacement.

ARTICLE 7. CONTRACTOR'S SUPERINTENDENCE AND SUPERVISION

The Contractor shall employ, and keep present (as applicable) on the Project during its progress, a competent project manager as satisfactory to the Principal Representative. The project manager shall not be changed except with the consent of the Principal Representative, unless the project manager proves to

be unsatisfactory to the Contractor and ceases to be in his or her employ. The project manager shall represent the Contractor for the Project, and in the absence of the Contractor, all directions given to the project manager shall be as binding as if given to the Contractor. Directions received by the project manager shall be documented by the project manager and communicated in writing with the Contractor.

The Contractor shall employ, and keep present on the Project during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Architect/Engineer and the Principal Representative. The superintendent shall not be changed except with the consent of the Architect/Engineer and the Principal Representative, unless the superintendent proves to be unsatisfactory to the Project Manager/Contractor and ceases to be in his or her employ. The superintendent shall represent the Project Manager/Contractor in his or her absence and all directions given to the superintendent shall be as binding as if given to the Project Manager/Contractor. Directions received by the superintendent shall be documented by the superintendent and confirmed in writing with the Project Manager/Contractor.

The Contractor shall give efficient supervision to the Work, using his or her best skill and attention. He or she shall carefully study and compare all Drawings, Specifications and other written instructions and shall without delay report any error, inconsistency or omission which he or she may discover in writing to the Architect/Engineer. The Contractor shall not be liable to the Principal Representative for damage to the extent it results from errors or deficiencies in the Contract Documents or other instructions by the Architect/Engineer, unless the Contractor knew or had reason to know, that damage would result by proceeding and the Contractor fails to so advise the Architect/Engineer.

The superintendent shall see that the Work is carried out in accordance with the Contract Documents and in a uniform, thorough and first-class manner in every respect. The Contractor's superintendent shall establish all lines, levels, and marks necessary to facilitate the operations of all concerned in the Contractor's Work. The Contractor shall lay out all Work in a manner satisfactory to the Architect/Engineer, making permanent records of all lines and levels required for excavation, grading, foundations, and for all other parts of the Work.

ARTICLE 8. MATERIALS AND EMPLOYEES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the Work.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be first class and of uniform quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor is fully responsible for all acts and omissions of the Contractor's employees and shall at all times enforce strict discipline and good order among employees on the site. The Contractor shall not employ on the Work any person reasonably deemed unfit by the Principal Representative or anyone not skilled in the Work assigned to him.

ARTICLE 9. SURVEYS, PERMITS, LAWS, TAXES AND REGULATIONS

A. SURVEYS

The Principal Representative shall furnish all surveys, property lines and bench marks deemed necessary by the Architect/Engineer, unless otherwise specified.

B. PERMITS AND LICENSES

Permits and licenses necessary for the prosecution of the Work shall be secured and paid for by the Contractor. Unless otherwise specified in the Specifications, no local municipal or county building permit shall be required. However, State Buildings Program requires each Principal Representative to administer a building code inspection program, the implementation of which may vary at each agency or institution of the State. The Contractors' employees shall become personally familiar with these local conditions and requirements and shall fully comply with such requirements. State electrical and

plumbing permits are required, unless the requirement to obtain such permits is altered by State Building's Programs. The Contractor shall obtain and pay for such permits.

Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Principal Representative, unless otherwise specified.

C. TAXES

1. Refund of Sales and Use Taxes

The Contractor shall pay all local taxes required to be paid, including but not necessarily limited to all sales and use taxes. If requested by the Principal Representative prior to issuance of the Notice to Proceed or directed in the Supplementary General Conditions or the Specifications, the Contractor shall maintain records of such payments in respect to the Work, which shall be separate and distinct from all other records maintained by the Contractor, and the Contractor shall furnish such data as may be necessary to enable the State of Colorado, acting by and through the Principal Representative, to obtain any refunds of such taxes which may be available under the laws, ordinances, rules or regulations applicable to such taxes. When so requested or directed, the Contractor shall require Subcontractors at all tiers to pay all local sales and use taxes required to be paid and to maintain records and furnish the Contractor with such data as may be necessary to obtain refunds of the taxes paid by such Subcontractors. No State sales and use taxes are to be paid on material to be used in this Project. On application by the purchaser or seller, the Department of Revenue shall issue to a Contractor or to a Subcontractor at any tier, a certificate or certificates of exemption per § 39-26-114(1)(d), C.R.S., and § 39-26-203, C.R.S.

2. Federal Taxes

The Contractor shall exclude the amount of any applicable federal excise or manufacturers' taxes from the proposal. The Principal Representative will furnish the Contractor, on request exemption certificates.

D. LAWS AND REGULATIONS

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn or specified. If the Contractor observes that the Drawings or Specifications require Work which is at variance therewith, the Contractor shall without delay notify the Architect/Engineer in writing and any necessary changes shall be adjusted as provided in Article 35, Changes In The Work.

The Contractor shall bear all costs arising from the performance of Work required by the Drawings or Specifications that the Contractor knows to be contrary to such laws, ordinances, rules or regulations, if such Work is performed without giving Notice to the Architect/Engineer.

ARTICLE 10. PROTECTION OF WORK AND PROPERTY

A. GENERAL PROVISIONS

The Contractor shall continuously maintain adequate protection of all Work and materials, protect the property from injury or loss arising in connection with this Contract and adequately protect adjacent property as provided by law and the Contract Documents. The Contractor shall make good any damage, injury or loss, except to the extent:

1. Directly due to errors in the Contract Documents;
2. Caused by agents or employees of the Principal Representative; and,
3. Due to causes beyond the Contractor's control and not to fault or negligence; provided such damage, injury or loss would not be covered by the insurance required to be carried by the Contractor;

B. SAFETY PRECAUTIONS

The Contractor shall take all necessary precautions for the safety of employees on the Project, and shall comply with all applicable provisions of federal, State and municipal safety laws and building

codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. He or she shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of Workers and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials; and he or she shall designate a responsible member of his or her organization on the Project, whose duty shall be the prevention of accidents. The name and position of any person so designated shall be reported to the Architect/Engineer by the Contractor.

The Contractor shall provide all necessary bracing, shoring and tying of all structures, decks and framing to prevent any structural failure of any material which could result in damage to property or the injury or death of persons; take all precautions to insure that no part of any structure of any description is loaded beyond its carrying capacity with anything that will endanger its safety at any time during the execution of this Contract; and provide for the adequacy and safety of all scaffolding and hoisting equipment. The Contractor shall not permit open fires within the building enclosure. The Contractor shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations and floors, pits and trenches free of water. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work, except as otherwise noted.

The Contractor shall take due precautions when obstructing sidewalks, streets or other public ways in any manner, and shall provide, erect and maintain barricades, temporary walkways, roadways, trench covers, colored lights or danger signals and any other devices necessary or required to assure the safe passage of pedestrians and automobiles.

C. EMERGENCIES

In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor without special instruction or authorization from the Architect/Engineer or Principal Representative, is hereby permitted to act, at his or her discretion, to prevent such threatened loss or injury; and he or she shall so act, without appeal, if so authorized or instructed. Provided the Contractor has no responsibilities for the emergency, if the Contractor incurs additional cost not otherwise recoverable from insurance or others on account of any such emergency Work, the Contract sum shall be equitably adjusted in accordance with Article 35, Changes In The Work.

ARTICLE 11. DRAWINGS AND SPECIFICATIONS ON THE WORK

The Contractor shall keep on the job site one copy of the Contract Documents in good order, including current copies of all Drawings and Specifications for the Work, and any approved Shop Drawings, Product Data or Samples, and as-built drawings. As-built drawings shall be updated weekly by the Contractor and Subcontractors to reflect actual constructed conditions including dimensioned locations of underground Work and the Contractor's failure to maintain such updates may be grounds to withhold portions of payments otherwise due in accordance with Article 33, Payments Withheld. All such documents shall be available to the Architect/Engineer and representatives of the State. In addition, the Contractor shall keep on the job site one copy of all approved addenda, Change Orders and requests for information issued for the Work.

The Contractor shall develop procedures to insure the currency and accuracy of as-built drawings and shall maintain on a current basis a log of requests for information and responses thereto, a Shop Drawing and Product Data submittal log, and a Sample submittal log to record the status of all necessary and required submittals.

ARTICLE 12. REQUESTS FOR INFORMATION AND SCHEDULES

A. REQUESTS FOR INFORMATION

The Architect/Engineer shall furnish additional instructions with reasonable promptness, by means of drawings or otherwise, necessary for the proper execution of the Work. All such drawings and instructions shall be consistent with the Contract Documents and reasonably inferable there from. The

Architect/Engineer shall determine what additional instructions or drawings are necessary for the proper execution of the Work.

The Work shall be executed in conformity with such instructions and the Contractor shall do no Work without proper drawings, specifications or instructions. If the Contractor believes additional instructions, specifications or drawings are needed for the performance of any portion of the Work, the Contractor shall give Notice of such need in writing through a request for information furnished to the Architect/Engineer sufficiently in advance of the need for such additional instructions, specifications or drawings to avoid delay and to allow the Architect/Engineer a reasonable time to respond. The Contractor shall maintain a log of the requests for information and the responses provided.

B. SCHEDULES

1. Submittal Schedules

Prior to filing the Contractor's first application for payment, a schedule shall be prepared which may be preliminary to the extent required, fixing the dates for the submission and initial review of required Shop Drawings, Product Data and Samples for the beginning of manufacture and installation of materials, and for the completion of the various parts of the Work. It shall be prepared so as to cause no delay in the Work or in the Work of any other contractor. The schedule shall be subject to change from time to time in accordance with the progress of the Work, and it shall be subject to the review and approval by the Architect/Engineer. It shall fix the dates at which the various Shop Drawings Product Data and Samples will be required from the Architect/Engineer. The Architect/Engineer, after review and agreement as to the time provided for initial review, shall review and comment on the Shop Drawings, Product Data and Samples in accordance with that schedule. The schedule shall be finalized, prepared and submitted with respect to each of the elements of the Work in time to avoid delay, considering reasonable periods for review, manufacture or installation.

At the time the schedule is prepared, the Contractor, the Architect/Engineer and Principal Representative shall jointly identify the Shop Drawing, Product Data and Samples, if any, which the Principal Representative shall receive simultaneously with the Architect/Engineer for the purposes of owner coordination with existing facility standards and systems. The Contractor shall furnish a copy for the Principal Representative when so requested. Transmittal of Shop Drawings and Product Data copies to the Principal Representative shall be solely for the convenience of the Principal Representative and shall neither create nor imply responsibility or duty of review by the Principal Representative.

The Contractor may also, or at the direction of the Principal Representative at any time shall, prepare and maintain a schedule, which may also be preliminary and subject to change to the extent required, fixing the dates for the initial responses to requests for information or for detail drawings which will be required from the Architect/Engineer to allow the beginning of manufacture, installation of materials and for the completion of the various parts of the Work. The schedule shall be subject to review and approval by the Architect/Engineer. The Architect/Engineer shall, after review and agreement, furnish responses and detail drawings in accordance with that schedule. Any such schedule shall be prepared and approved in time to avoid delay, considering reasonable periods for review, manufacture or installation, but so long as the request for information schedule is being maintained, it shall not be deemed to transfer responsibility to the Contractor for errors or omissions in the Contract Documents where circumstances make timely review and performance impossible.

The Architect/Engineer shall not unreasonably withhold approval of the Contractor's schedules and shall inform the Contractor and the Principal Representative of the basis of any refusal to agree to the Contractor's schedules. The Principal Representative shall attempt to resolve any disagreements.

2. Schedule of Values

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and Principal Representative, for approval, and to the State Buildings Program when specifically requested, a complete itemized schedule of the values of the various parts of the Work, as estimated by the Contractor, aggregating the total price. The schedule of values shall be in such detail as the Architect/Engineer or the Principal Representative shall require, prepared on forms acceptable to the Principal Representative. It shall, at a minimum, identify on a separate line each division of the Specifications including the general conditions costs to be charged to the Project. The Contractor shall revise and resubmit the schedule of values for approval when, in the opinion of the Architect/Engineer or the Principal Representative, such resubmittal is required due to changes or modifications to the Contract Documents or the Contract sum.

The total cost of each line item so separately identified shall, when requested by the Architect/Engineer or the Principal Representative, be broken down into reasonable estimates of the value of:

- a. Material, which shall include the cost of material actually built into the Project plus any local sales or use tax paid thereon; and,
- b. Labor and other costs.

The cost of subcontracts shall be incorporated in the Contractor's schedule of values, and when requested by the Architect/Engineer or the Principal Representative, shall be separately shown as line items.

The Architect/Engineer shall review the proposed schedules and approve it after consultation with the Principal Representative, or advise the Contractor of any required revisions within ten (10) days of its receipt. In the event no action is taken on the submittal within ten days, the Contractor may utilize the schedule of values as its submittal for payment until it is approved or until revisions are requested.

When the Architect/Engineer deems it appropriate to facilitate certification of the amounts due to the Contractor, further breakdown of subcontracts, including breakdown by labor and materials, may be directed.

This schedule of values, when approved, will be used in preparing Contractor's applications for payment on State Form SC-7.2, Application for Payment.

3. Construction Schedules

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and the Principal Representative, and to the State Buildings Program when specifically requested, on a form acceptable to them, an overall timetable of the construction schedule for the Project. Unless the Supplementary General Conditions or the Specifications allow scheduling with bar charts or other less sophisticated scheduling tools, the Contractor's schedule shall be a critical-path method (CPM) construction schedule. The CPM schedule shall start with the date of the Notice to Proceed and include submittals activities, the various construction activities, change order Work (when applicable), close-out, testing, demonstration of equipment operation when called for in the Specifications, and acceptance. The CPM schedule shall at a minimum correlate to the schedule of values line items and shall be cost loaded if requested by the Architect/Engineer or Principal Representative. The completion time shall be the time specified in the Agreement and all Project scheduling shall allocate float utilizing the full period available for construction as specified in the Agreement on State Form SC 6.13, without indication of early completion, unless such earlier completion is approved in writing by the Principal Representative and State Building Programs.

The time shown between the starting and completion dates of the various elements within the construction schedule shall represent one hundred per cent (100%) completion of each element.

All other elements of the CPM schedule shall be as required by the Specifications. In addition, the Contractor shall submit monthly updates or more frequently, if required by the Principal Representative, updates of the construction schedule. These updates shall reflect the Contractor's "Work in place" progress.

When requested by the Architect/Engineer, the Principal Representative or the State Buildings Program, the Contractor shall revise the construction schedule to reflect changes in the schedule of values.

When the testing of materials is required by the Specifications, the Contractor shall also prepare and submit to the Architect/Engineer and the Principal Representative a schedule for testing in accordance with Article 14, Samples and Testing.

ARTICLE 13. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. SUBMITTAL PROCESS

The Contractor shall check and field verify all dimensions. The Contractor shall check, approve and submit to the Architect/Engineer in accordance with the schedule described in Article 12, Requests for Information and Schedules, all Shop Drawings, Product Data and Samples required by the specifications or required by the Contractor for the Work of the various trades. All Drawings and Product Data shall contain identifying nomenclature and each submittal shall be accompanied by a letter of transmittal identifying in detail all enclosures. The number of copies of Shop Drawings and Product Data to be submitted shall be as specified in the Specifications and if no number is specified then three copies shall be submitted.

The Architect/Engineer shall review and comment on the Shop Drawings and Product Data within the time provided in the agreed upon schedule for conformance with information given and the design concept expressed in, or reasonably inferred from, the Contract Documents. The nature of all corrections to be made to the Shop Drawings and Product Data, if any, shall be clearly noted, and the submittals shall be returned to the Contractor for such corrections. If a change in the scope of the Work is intended by revisions requested to any Shop Drawings and Product Data, the Contractor shall be requested to prepare a change proposal in accordance with Article 35, Changes In The Work. On resubmitted Shop Drawings, Product Data or Samples, the Contractor shall direct specific attention in writing on the transmittal cover to revisions other than those corrections requested by the Architect/Engineer on any previously checked submittal. The Architect/Engineer shall promptly review and comment on, and return, the resubmitted items.

The Contractor shall thereafter furnish such other copies in the form approved by the Architect/Engineer as may be needed for the prosecution of the Work.

B. FABRICATION AND ORDERING

Fabrication shall be started by the Contractor only after receiving approved Shop Drawings from the Architect/Engineer. Materials shall be ordered in accordance with approved Product Data. Work which is improperly fabricated, whether through incorrect Shop Drawings, faulty workmanship or materials, will not be acceptable.

C. **DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS**

The review and comments of the Architect/Engineer of Shop Drawings, Product Data or Samples shall not relieve the Contractor from responsibility for deviations from the Drawings or Specifications, unless he or she has in writing called the attention of the Architect/Engineer to such deviations at the time of submission, nor shall it relieve the Contractor from responsibility for errors of any sort in Shop Drawings or Product Data. Review and comments on Shop Drawings or Product Data containing identified deviations from the Contract Documents shall not be the basis for a Change Order or a claim based on a change in the scope of the Work unless Notice is given to the Architect/Engineer and Principal Representative of all additional costs, time and other impacts of the identified deviation by bring it to their attention in writing at the time the submittals are made, and any subsequent change in the Contract sum or the Contract time shall be limited to cost, time and impacts so identified.

D. **CONTRACTOR REPRESENTATIONS**

By preparing, approving, and/or submitting Shop Drawings, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto, and has checked and co-ordinated the information contained within each submittal with the requirements of the Work, the Project and the Contract Documents and prior reviews and approvals.

ARTICLE 14. SAMPLES AND TESTING

A. **SAMPLES**

The Contractor shall furnish for approval, with such promptness as to cause no delay in his or her Work or in that of any other Contractor, all Samples as directed by the Architect/Engineer. The Architect/Engineer shall check and approve such Samples, with reasonable promptness, but only for conformance with the design intent of the Contract Documents and the Project, and for compliance with any submission requirements given in the Contract Documents.

B. **TESTING - GENERAL**

The Contractor shall provide such equipment and facilities as the Architect/Engineer may require for conducting field tests and for collecting and forwarding samples to be tested. Samples themselves shall not be incorporated into the Work after approval without the permission of the Architect/Engineer.

All materials or equipment proposed to be used may be tested at any time during their preparation or use. The Contractor shall furnish the required samples without charge and shall give sufficient Notice of the placing of orders to permit the testing thereof. Products may be sampled either prior to shipment or after being received at the site of the Work.

Tests shall be made by an accredited testing laboratory. Except as otherwise provided in the Specifications, sampling and testing of all materials, and the laboratory methods and testing equipment, shall be in accordance with the latest standards and tentative methods of the American Society of Testing Materials (ASTM). The cost of testing which is in addition to the requirements of the Specifications shall be paid by the Contractor if so directed by the Architect/Engineer, and the Contract sum shall be adjusted accordingly by Change Order ; provided however, that whenever testing shows portions of the Work to be deficient, all costs of testing including that required to verify the adequacy of repair or replacement Work shall be the responsibility of the Contractor.

C. **TESTING - CONCRETE AND SOILS**

Unless otherwise specified or provided elsewhere in the Contract Documents, the Principal Representative will contract for and pay for the testing of concrete and for soils compaction testing through an independent laboratory or laboratories selected and approved by the Principal Representative. The Contractor shall assume the responsibility of arranging, scheduling and coordinating the concrete sample collection efforts and soils compaction efforts in an efficient and cost effective manner. Testing shall be performed in accordance with the requirements of the Specifications, and if no requirements are specified, the Contractor shall request instructions and testing shall be as directed by the Architect/Engineer or the soils engineer, as applicable, and in accordance with standard industry practices.

The Principal Representative and the Architect/Engineer shall be given reasonable advance notice of each concrete pour and reserve the right to either increase or decrease the number of cylinders or the frequency of tests.

Soil compaction testing shall be at random locations selected by the soils engineer. In general, soils compaction testing shall be as directed by the soils engineer and shall include all substrate prior to backfill or construction.

D. TESTING - OTHER

Additional testing required by the Specifications will be accomplished and paid for by the Principal Representative in a manner similar to that for concrete and soils unless noted otherwise in the Specifications. In any case, the Contractor will be responsible for arranging, scheduling and coordinating additional tests. Where the additional testing will be contracted and paid for by the Principal Representative the Contractor shall give the Principal Representative not less than one month advance written Notice of the date the first such test will be required.

ARTICLE 15. SUBCONTRACTS

A. CONTRACT PERFORMANCE OUTSIDE OF THE UNITED STATES OR COLORADO

After the contract is awarded, Contractor is required to provide written notice to the Principal Representative no later than twenty (20) days after deciding to perform services under this contract outside the United States or Colorado or to subcontract services under this contract to a subcontractor that will perform such services outside the United States or Colorado. The written notification must include, but need not be limited to, a statement of the type of services that will be performed at a location outside the United States or Colorado and the reason why it is necessary or advantageous to go outside the United States or Colorado to perform the services. All notices received by the State pursuant to outsourced services shall be posted on the Colorado Department of Personnel & Administration's website. If Contractor knowingly fails to notify the Principal Representative of any outsourced services as specified herein, the Principal Representative, at its discretion, may terminate this contract as provided in C.R.S. § 24-102-206 (4). (Does not apply to any project that receives federal moneys)

B. SUBCONTRACTOR LIST

Prior to the Notice to Proceed to commence construction, the Contractor shall submit to the Architect/Engineer, the Principal Representative and State Buildings Program a preliminary list of Subcontractors. It shall be as complete as possible at the time, showing all known Subcontractors planned for the Work. The list shall be supplemented as other Subcontractors are determined by the Contractor and any such supplemental list shall be submitted to the Architect/Engineer, the Principal Representative and State Buildings Program not less than ten (10) days before the Subcontractor commences Work.

C. SUBCONTRACTOR SUBSTITUTIONS

The Contractor's list shall include those Subcontractors, if any, which the Contractor indicated in its bid, would be employed for specific portions of the Work if such indication was requested in the bid documents issued by the State. The substitution of any Subcontractor listed in the Contractor's bid shall be justified in writing not less than ten (10) days after the date of the Notice to Proceed to commence construction, and shall be subject to the approval of the Principal Representative. For reasons such as the Subcontractor's refusal to perform as agreed, subsequent unavailability or later discovered bid errors, or other similar reasons, but not including the availability of a lower Subcontract price, such substitution may be approved. The Contractor shall bear any additional cost incurred by such substitutions.

D. CONTRACTOR RESPONSIBLE FOR SUBCONTRACTORS

The Contractor shall not employ any Subcontractor that the Architect/Engineer, within ten (10) days after the date of receipt of the Contractor's list of Subcontractors or any supplemental list, objects to in writing as being unacceptable to either the Architect/Engineer, the Principal Representative or State Buildings Program. If a Subcontractor is deemed unacceptable, the Contractor shall propose a

substitute Subcontractor and the Contract sum shall be adjusted by any demonstrated difference between the Subcontractor's bids, except where the Subcontractor has been debarred by the State or fails to meet qualifications of the Contract Documents to perform the Work proposed.

The Contractor shall be fully responsible to the Principal Representative for the acts and omissions of Subcontractors and of persons either directly or indirectly employed by them. All instructions or orders in respect to Work to be done by Subcontractors shall be given to the Contractor.

ARTICLE 16. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

The Contractor agrees to bind each Subcontractor to the terms of these General Conditions and to the requirements of the Drawings and Specifications, and any Addenda thereto, and also all the other Contract Documents, so far as applicable to the Work of such Subcontractor. The Contractor further agrees to bind each Subcontractor to those terms of the General Conditions which expressly require that Subcontractors also be bound, including without limitation, requirements that Subcontractors waive all rights of subrogation, provide adequate general commercial liability and property insurance, automobile insurance and workers' compensation insurance as provided in Article 25, Insurance.

Nothing contained in the Contract Documents shall be deemed to create any contractual relationship whatsoever between any Subcontractor and the State of Colorado acting by and through its Principal Representative.

ARTICLE 17. MUTUAL RESPONSIBILITY OF CONTRACTORS

Should the Contractor cause damage to any separate contractor on the Work, the Contractor agrees, upon due Notice, to settle with such contractor by agreement, if he or she will so settle. If such separate contractor sues the Principal Representative on account of any damage alleged to have been so sustained, the Principal Representative shall notify the Contractor, who shall defend such proceedings if requested to do so by Principal Representative. If any judgment against the Principal Representative arises there from, the Contractor shall pay or satisfy it and pay all costs and reasonable attorney fees incurred by the Principal Representative, in accordance with Article 52C, Indemnification, provided the Contractor was given due Notice of an opportunity to settle.

ARTICLE 18. SEPARATE CONTRACTS

The Principal Representative reserves the right to enter into other contracts in connection with the Project or the Contract. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate his or her Work with theirs. If any part of the Contractor's Work depends, for proper execution or results, upon the Work of any other contractor, the Contractor shall inspect and promptly report to the Architect/Engineer any defects in such Work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's Work as fit and proper for the reception of Work, except as to defects which may develop in the other Contractor's Work after the execution of the Contractor's Work.

To insure the proper execution of subsequent Work, the Contractor shall measure Work already in place and shall at once report to the Architect/Engineer any discrepancy between the executed Work and the Drawings.

ARTICLE 19. USE OF PREMISES

The Contractor shall confine apparatus, the storage of materials and the operations of workmen to limits indicated by law, ordinances, permits and any limits lines shown on the Drawings. The Contractor shall not unreasonably encumber the premises with materials.

The Contractor shall enforce all of the Architect/Engineer's instructions and prohibitions regarding, without limitation, such matters as signs, advertisements, fires and smoking.

ARTICLE 20. CUTTING, FITTING OR PATCHING

The Contractor shall do all cutting, fitting or patching of Work that may be required to make its several parts come together properly and fit it to receive or be received by Work of other Contractors shown upon, or reasonably inferred from, the Drawings and Specifications for the complete structure, and shall provide for such finishes to patched or fitted Work as the Architect/Engineer may direct. The Contractor shall not endanger any Work by cutting, excavating or otherwise altering the Work and shall not cut or alter the Work of any other Contractor save with the consent of the Architect/Engineer.

ARTICLE 21. UTILITIES

A. TEMPORARY UTILITIES

Unless otherwise specifically stated in the Specifications or on the Drawings, the Principal Representative shall be responsible for the locations of all utilities as shown on the Drawings or indicated elsewhere in the Specifications, subject to the Contractor's compliance with all statutory or regulatory requirements to call for utility locates. When actual conditions deviate from those shown the Contractor shall comply with the requirements of Article 37, Differing Site Conditions. The Contractor shall provide and pay for the installation of all temporary utilities required to supply all the power, light and water needed by him and other Contractors for their Work and shall install and maintain all such utilities in such manner as to protect the public and Workmen and conform with any applicable laws and regulations. Upon completion of the Work, he or she shall remove all such temporary utilities from the site. The Contractor shall pay for all consumption of power, light and water used by him or her and the other Contractors, without regard to whether such items are metered by temporary or permanent meters. The Superintendent shall have full authority over all trades and Subcontractors at any tier to prevent waste. The cut-off date on permanent meters shall be either the agreed date of the date of the Notice of Substantial Completion or the Notice of Approval of Occupancy/Use of the Project.

B. PROTECTION OF EXISTING UTILITIES

Where existing utilities, such as water mains, sanitary sewers, storm sewers and electrical conduits, are shown on the Drawings, the Contractor shall be responsible for the protection thereof, without regard to whether any such utilities are to be relocated or removed as a part of the Work. If any utilities are to be moved, the moving must be conducted in such manner as not to cause undue interruption or delay in the operation of the same.

C. CROSSING OF UTILITIES

When new construction crosses highways, railroads, streets, or utilities under the jurisdiction of State, city or other public agency, public utility or private entity, the Contractor shall secure proper written permission before executing such new construction. The Contractor will be required to furnish a proper release before final acceptance of the Work.

ARTICLE 22. UNSUITABLE CONDITIONS

The Contractor shall not Work at any time, or permit any Work to be done, under any conditions contrary to those recommended by manufacturers or industry standards which are otherwise proper, unsuited for proper execution, safety and performance. Any cost caused by ill-timed Work shall be borne by the Contractor unless the timing of such Work shall have been directed by the Architect/Engineer or the Principal Representative, after the award of the Contract, and the Contractor provided Notice of any additional cost.

ARTICLE 23. TEMPORARY FACILITIES

A. OFFICE FACILITIES

The Contractor shall provide and maintain without additional expense for the duration of the Project temporary office facilities, as required and as specified, for its own use and the use of the Architect/Engineer, representatives of the Principal Representative and State Buildings Program.

B. TEMPORARY HEAT

The Contractor shall furnish and pay for all the labor, facilities, equipment, fuel and power necessary to supply temporary heating, ventilating and air conditioning, except to the extent otherwise specified,

and shall be responsible for the installation, operation, maintenance and removal of such facilities and equipment. Unless otherwise specified, the permanent HVAC system shall not be used for temporary heat in whole or in part. If the Contractor desires to put the permanent system into use, in whole or in part, the Contractor shall set it into operation and furnish the necessary fuel and manpower to safely operate, protect and maintain that HVAC system. Any operation of all or any part of the permanent HVAC system including operation for testing purposes shall not constitute acceptance of the system, nor shall it relieve the Contractor of his or her one-year guarantee of the system from the date of the Notice of Substantial Completion of the entire Project, and if necessary due to prior operation, the Contractor shall provide manufacturers' extended warranties from the date of the Contractor's use prior to the date of the Notice of Substantial Completion.

C. WEATHER PROTECTION

The Contractor shall, at all times, provide protection against weather, so as to maintain all Work, materials, apparatus and fixtures free from injury or damages.

D. DUST PARTITIONS

If the Work involves Work in an occupied existing building, the Contractor shall erect and maintain during the progress of the Work, suitable dust-proof temporary partitions, or more permanent partitions as specified, to protect such building and the occupants thereof.

E. BENCH MARKS

The Contractor shall maintain any site bench marks provided by the Principal Representative and shall establish any additional benchmarks specified by the Architect/Engineer as necessary for the Contractor to layout the Work and ascertain all grades and levels as needed.

F. SIGN

The Contractor shall erect and permit one 4' x 8' sign only at the site to identify the Project as specified or directed by the Architect/Engineer which shall be maintained in good condition during the life of the Project.

G. SANITARY PROVISION

The Contractor shall provide and maintain suitable, clean, temporary sanitary toilet facilities for any and all workmen engaged on the Work, for the entire construction period, in strict compliance with the requirement of all applicable codes, regulations, laws and ordinances, and no other facilities, new or existing, may be used by any person on the Project. When the Project is complete the Contractor shall promptly remove them from the site, disinfect, and clean or treat the areas as required. If any new construction surfaces in the Project other than the toilet facilities provided for herein are soiled at any time, the entire areas so soiled shall be completely removed from the Project and rebuilt. In no event may present toilet facilities of any existing building at the site of the Work be used by employees of any contractor.

ARTICLE 24. CLEANING UP

The Contractor shall keep the building and premises free from all surplus material, waste material, dirt and rubbish caused by employees or Work, and at the completion of the Work shall remove all such surplus material, waste material, dirt, and rubbish, as well as all tools, equipment and scaffolding, and shall wash and clean all window glass and plumbing fixtures, perform cleanup and cleaning required by the Specifications and leave all of the Work clean unless more exact requirements are specified.

ARTICLE 25. INSURANCE

A. GENERAL

The Contractor shall procure and maintain all insurance requirements and limits as set forth below, at his or her own expense, for the length of time set forth in Contract requirements. The Contractor shall continue to provide evidence of such coverage to State of Colorado on an annual basis during the aforementioned period including all of the terms of the insurance and indemnification requirements of this agreement. All below insurance policies shall include a provision preventing cancellation without thirty (30) days' prior notice by certified mail. A completed Certificate of Insurance shall be filed with

the Principal Representative and State Buildings Program within ten (10) days after the date of the Notice of Award, said Certificate to specifically state the inclusion of the coverages and provisions set forth herein and shall state whether the coverage is "claims made" or "per occurrence".

B. COMMERCIAL GENERAL LIABILITY INSURANCE (CGL)

This insurance must protect the Contractor from all claims for bodily injury, including death and all claims for destruction of or damage to property (other than the Work itself), arising out of or in connection with any operations under this Contract, whether such operations be by the Contractor or by any Subcontractor under him or anyone directly or indirectly employed by the Contractor or by a Subcontractor. All such insurance shall be written with limits and coverages as specified below and shall be written on an occurrence form.

General Aggregate	\$2,000,000
Products – Completed Operations Aggregate	\$2,000,000
Each Occurrence	\$1,000,000
Personal Injury	\$1,000,000

The following coverages shall be included in the CGL:

1. Per project general aggregate (CG 25 03 or similar)
2. Additional Insured status in favor of the State of Colorado and any other parties as outlined in The Contract and must include both ONGOING Operations AND COMPLETED Operations per CG2010 10/01 and CG 2037 10/01 or equivalent as permitted by law.
3. The policy shall be endorsed to be **primary and non-contributory** with any insurance maintained by Additional Insureds.
4. A waiver of Subrogation in favor of all Additional Insured parties.
5. Personal Injury Liability
6. Contractual Liability coverage to support indemnification obligation per Article 53.I
7. Explosion, collapse and underground (xcu)

The following exclusionary endorsements are prohibited in the CGL policy:

1. Damage to Work performed by Subcontract/Vendor (CG 22-94 or similar)
2. Contractual Liability Coverage Exclusion modifying or deleting the definition of an "insured contract" from the unaltered SO CG 0001 1001 policy from (CG 24 26 or similar)
3. If applicable to the Work to be performed: Residential or multi-family
4. If applicable to the Work to be performed :Exterior insulation finish systems
5. If applicable to the Work to be performed: Subsidence or Earth Movement

The Contractor shall maintain general liability coverage including Products and Completed Operations insurance, and the Additional Insured with primary and non-contributory coverage as specified in this Contract for three (3) years after completion of the project.

C. AUTOMOBILE LIABILITY INSURANCE and business auto liability covering liability arising out of any auto (including owned, hired and non-owned autos).

Combined Bodily Injury and Property Damage Liability
(Combined Single Limit):

\$1,000,000 each accident

Coverages:

Specific waiver of subrogation

D. WORKERS' COMPENSATION INSURANCE

The Contractor shall procure and maintain Workers' Compensation Insurance at his or her own expense during the life of this Contract, including occupational disease provisions for all employees per statutory requirements. Policy shall contain a waiver of subrogation in favor of the State of Colorado.

The Contractor shall also require each Subcontractor to furnish Workers' Compensation Insurance, including occupational disease provisions for all of the latter's employees, and to the extent not furnished, the Contractor accepts full liability and responsibility for Subcontractor's employees.

In cases where any class of employees engaged in hazardous Work under this Contract at the site of the Project is not protected under the Workers' Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide, adequate and suitable insurance for the protection of employees not otherwise protected.

E. UMBRELLA LIABILITY INSURANCE (for construction projects exceeding \$10,000,000, provide the following coverage):

The Contractor shall maintain umbrella/excess liability insurance on an occurrence basis in excess of the underlying insurance described in Section B-D above. Coverage shall follow the terms of the underlying insurance, included the additional insured and waiver of subrogation provisions. The amounts of insurance required in Sections above may be satisfied by the Contractor purchasing coverage for the limits specified or by any combination of underlying and umbrella limits, so long as the total amount of insurance is not less than the limits specified in each section previously mentioned.

Each occurrence	\$5,000,000
Aggregate	\$5,000,000

F. BUILDER'S RISK INSURANCE

Unless otherwise expressly stated in the Supplementary General Conditions (e.g. where the State elects to provide for projects with a completed value of less than \$1,000,000), the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property, or the Date of Notice specified on the Notice of Acceptance, State Form SBP-6.27 or whichever is later.

This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project as named insureds.

All associated deductibles shall be the responsibility of the Contractor. Such policy may have a deductible clause but not to exceed ten thousand dollars (\$10,000.00).

Property insurance shall be on an "all risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, false Work, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

Contractor shall maintain Builders Risk coverage including partial use by Owner.

The Contractor shall waive all rights of subrogation as regards the State of Colorado and the Principal Representative, its officials, its officers, its agents and its employees, all while acting within the scope and course of their employment For damages caused by fire or thoeer causes of loss to the extent covered by property insurance obtained pursuant to this Section or other property insurance applicable to the Work. The Contractor shall require all Subcontractors at any tier to similarly waive all such rights of subrogation and shall expressly include such a waiver in all subcontracts.

Upon request, the amount of such insurance shall be increased to include the cost of any additional Work to be done on the Project, or materials or equipment to be incorporated in the Project, under other independent contracts let or to be let. In such event, the Contractor shall be reimbursed for this cost as his or her share of the insurance in the same ratio as the ratio of the insurance represented by such independent contracts let or to be let to the total insurance carried.

The Principal Representative, with approval of the State Controller, shall have the power to adjust and settle any loss. Unless it is agreed otherwise, all monies received shall be applied first on rebuilding or repairing the destroyed or injured Work.

G. POLLUTION LIABILITY INSURANCE

If Contractor is providing directly or indirectly Work with pollution/environmental hazards, the Contractor must provide or cause those conducting the Work to provide Pollution Liability Insurance coverage. Pollution Liability policy must include contractual liability coverage. State of Colorado must be included as additional insureds on the policy. The policy limits shall be in the amount of \$1,000,000 with maximum deductible of \$25,000 to be paid by the Subcontractor/Vendor.

H. ADDITIONAL MISCELLANEOUS INSURANCE PROVISIONS

Certificates of Insurance and/or insurance policies required under this Contract shall be subject to the following stipulations and additional requirements:

1. Any and all deductibles or self-insured retentions contained in any Insurance policy shall be assumed by and at the sole risk of the Contractor;
2. If any of the said policies shall fail at any time to meet the requirements of the Contract Documents as to form or substance, or if a company issuing any such policy shall be or at any time cease to be approved by the Division of Insurance of the State of Colorado, or be or cease to be in compliance with any stricter requirements of the Contract Documents, the Contractor shall promptly obtain a new policy, submit the same to the Principal Representative and State Building Programs for approval if requested, and submit a Certificate of Insurance as hereinbefore provided. Upon failure of the Contractor to furnish, deliver and maintain such insurance as provided herein, this Contract, in the sole discretion of the State of Colorado, may be immediately declared suspended, discontinued, or terminated. Failure of the Contractor in obtaining and/or maintaining any required insurance shall not relieve the Contractor from any liability under the Contract, nor shall the insurance requirements be construed to conflict with the obligations of the Contractor concerning indemnification;
3. All requisite insurance shall be obtained from financially responsible insurance companies, authorized to do business in the State of Colorado and acceptable to the Principal Representative;
4. Receipt, review or acceptance by the Principal Representative of any insurance policies or certificates of insurance required by this Contract shall not be construed as a waiver or relieve the Contractor from its obligation to meet the insurance requirements contained in these General Conditions.

ARTICLE 26. CONTRACTOR'S PERFORMANCE AND PAYMENT BONDS

The Contractor shall furnish a Performance Bond and a Labor and Material Payment Bond on State Forms SC-6.22, Performance Bond, and SC-6.221, Labor and Material Payment Bond, or such other forms as State Buildings Program may approve for the Project, executed by a corporate Surety authorized to do business in the State of Colorado and in the full amount of the Contract sum. The expense of these bonds shall be borne by the Contractor and the bonds shall be filed with State Buildings Program.

If, at any time, a Surety on such a bond is found to be, or ceases to be in strict compliance with any qualification requirements of the Contract Documents or the bid documents, or loses its right to do business in the State of Colorado, another Surety will be required, which the Contractor shall furnish to State Buildings Program within ten (10) days after receipt of Notice from the State or after the Contractor otherwise becomes aware of such conditions.

ARTICLE 27. LABOR AND WAGES

In accordance with laws of Colorado, C.R.S. § 8-17-101(1), as amended, Colorado labor shall be employed to perform at least eighty percent of the Work. If the Federal Davis-Bacon Act shall be applicable to the Project, as indicated in Article 6B (Design/Bid/Build Agreement SC-6.21), Modification of Article 27, the minimum wage rates to be paid on the Project will be specified in the Contract Documents.

ARTICLE 28. ROYALTIES AND PATENTS

The Contractor shall be responsible for assuring that all rights to use of products and systems have been properly arranged and shall take such action as may be necessary to avoid delay, at no additional charge to the Principal Representative, where such right is challenged during the course of the Work. The Contractor shall pay all royalties and license fees required to be paid and shall defend all suits or claims for infringement of any patent rights and shall save the State of Colorado harmless from loss on account thereof, in accordance with Article 52C, Indemnification; provided, however, the Contractor shall not be responsible for such loss or defense for any copyright violations contained in the Contract Documents prepared by the Architect/Engineer or the Principal Representative of which the Contractor is unaware, or for any patent violations based on specified processes that the Contractor is unaware are patented or that the Contractor should not have had reason to believe were patented.

ARTICLE 29. ASSIGNMENT

Except as otherwise provided hereafter the Contractor shall not assign the whole or any part of this Contract without the written consent of the Principal Representative. This provision shall not be construed to prohibit assignments of the right to payment to the extent permitted by C.R.S. § 4-9-406, et. seq., as amended, provided that written Notice of assignment adequate to identify the rights assigned is received by the Principal Representative and the controller for the agency, department, or institution executing this Contract (as distinguished from the State Controller). Such assignment of the right to payment shall not be deemed valid until receipt by the Principal Representative and such controller and the Contractor assumes the risk that such written Notice of assignment is received by the Principal Representative and the controller for the agency, department, or institution involved. In case the Contractor assigns all or part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to all claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract, whether said service or materials were supplied prior to or after the assignment. Nothing in this Article shall be deemed a waiver of any other defenses available to the State against the Contractor or the assignee.

ARTICLE 30. CORRECTION OF WORK BEFORE ACCEPTANCE

The Contractor shall promptly remove from the premises all Work or materials condemned or declared irreparably defective as failing to conform to the Contract Documents on receipt of written Notice from the Architect/Engineer or the Principal Representative, whether incorporated in the Work or not. If such materials shall have been incorporated in the Work, or if any unsatisfactory Work is discovered, the Contractor shall promptly replace and re-execute his or her Work in accordance with the requirements of the Contract Documents without expense to the Principal Representative, and shall also bear the expense of making good all Work of other contractors destroyed or damaged by the removal or replacement of such defective material or Work.

Should any defective Work or material be discovered during the process of construction, or should reasonable doubt arise as to whether certain material or Work is in accordance with the Contract Documents, the value of such defective or questionable material or Work shall not be included in any

application for payment, or if previously included, shall be deducted by the Architect/Engineer from the next application submitted by the Contractor.

If the Contractor does not perform repair, correction and replacement of defective Work, in lieu of proceeding by issuance of a Notice of intent to remove condemned Work as outlined above, the Principal Representative may, not less than seven (7) days after giving the original written Notice of the need to repair, correct, or replace defective Work, deduct all costs and expenses of replacement or correction as instructed by the Architect/Engineer from the Contractor's next application for payment in addition to the value of the defective Work or material. The Principal Representative may also make an equitable deduction from the Contract sum by unilateral Change Order, in accordance with Article 33, Payments Withheld and Article 35, Changes In The Work.

If the Contractor does not remove such condemned or irreparably defective Work or material within a reasonable time, the Principal Representative may, after giving a second seven (7) day advance Notice to the Contractor and the Surety, remove them and may store the material at the Contractor's expense. The Principal Representative may accomplish the removal and replacement with its own forces or with another Contractor. If the Contractor does not pay the expense of such removal and pay all storage charges within ten (10) days thereafter, the Principal Representative may, upon ten (10) days' written Notice, sell such material at auction or at private sale and account for the net proceeds thereof, after deducting all costs and expenses which should have been borne by the Contractor. If the Contractor shall commence and diligently pursue such removal and replacement before the expiration of the seven day period, or if the Contractor shall show good cause in conjunction with submittal of a revised CPM schedule showing when the Work will be performed and why such removal of condemned Work should be scheduled for a later date, the Principal Representative shall not proceed to remove or replace the condemned Work.

If the Contractor disagrees with the Notice to remove Work or materials condemned or declared irreparably defective, the Contractor may request facilitated negotiation of the issue and the Principal Representative's right to proceed with removal and to deduct costs and expenses of repair shall be suspended and tolled until such time as the parties meet and negotiate the issue

During construction, whenever the Architect/Engineer has advised the Contractor in writing, in the Specifications, by reference to Article 6, Architect/Engineer Decisions And Judgments, of these General Conditions or elsewhere in the Contract Documents of a need to observe materials in place prior to their being permanently covered up, it shall be the Contractor's responsibility to notify the Architect/Engineer at least forty-eight (48) hours in advance of such covering operation. If the Contractor fails to provide such notification, Contractor shall, at his or her expense, uncover such portions of the Work as required by the Architect/Engineer for observation, and reinstall such covering after observation. When a covering operation is continued from day to day, notification of the commencement of a single continuing covering operation shall suffice for the activity specified so long as it proceeds regularly and without interruption from day to day, in which event the Contractor shall coordinate with the Architect/Engineer regarding the continuing covering operation.

ARTICLE 31. APPLICATIONS FOR PAYMENTS

A. CONTRACTOR'S SUBMITTALS

On or before the first day of each month and no more than five days prior thereto, the Contractor may submit applications for payment for the Work performed during such month covering the portion of the Work completed as of the date indicated, and payments on account of this Contract shall be due per § 24-30-202(24) (correct notice of amount due), within forty-five (45) days of receipt by the Principal Representative of application for payments that have been certified by the Architect/Engineer. The Contractor shall submit the application for payment to the Architect/Engineer on State forms SBP-7.2, Certificate for Contractor's Payment, or such other format as the State Buildings Program shall approve, in an itemized format in accordance with the schedule of values or a cost loaded CPM schedule when required, supported to the extent reasonably required by the Architect/Engineer or the Principal Representative by receipts or other vouchers, showing payments for materials and labor, prior payments and payments to be made to Subcontractors and such other evidence of the Contractor's right to payments as the Architect/Engineer or Principal Representative may direct.

If payments are made on account of materials not incorporated in the Work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedure as will establish the Principal Representative's title to such material or otherwise adequately protect the Principal Representative's interests, and shall provide proof of insurance whenever requested by the Principal Representative or the Architect/Engineer, and shall be subject to the right to inspect the materials at the request of either the Architect/Engineer or the Principal Representative.

All applications for payment, except the final application, and the payments there under, shall be subject to correction in the next application rendered following the discovery of any error.

B. ARCHITECT/ENGINEER CERTIFICATION

In accordance with the Architect/Engineer's agreement with the Principal Representative, the Architect/Engineer after appropriate observation of the progress of the Work shall certify to the Principal Representative the amount that the Contractor is entitled to, and forward the application to the Principal Representative. If the Architect/Engineer certifies an amount different from the amount requested or otherwise alters the Contractor's application for payment, a copy shall be forwarded to the Contractor.

If the Architect/Engineer is unable to certify all or portions of the amount requested due to the absence or lack of required supporting evidence, the Architect/Engineer shall advise the Contractor of the deficiency. If the deficiency is not corrected at the end of ten (10) days, the Architect/Engineer may either certify the remaining amounts properly supported to which the Contractor is entitled, or return the application for payment to the Contractor for revision with a written explanation as to why it could not be certified.

C. RETAINAGE WITHHELD

Unless otherwise provided in the Supplementary General Conditions, an amount equivalent to five percent (5%) of the amount shown to be due the Contractor on each application for payment shall be withheld until the Work required by the Contract has been performed. The withheld percentage of the contract price of any such Work, improvement, or construction shall be administered according to § 24-91-101, et seq., C.R.S., as amended, and except as provided in § 24-91-103, C.R.S., as amended, and Article 31D, shall be retained until the Work or discrete portions of the Work, have been completed satisfactorily, finally or partially accepted, and advertised for final settlement as further provided in Article 41.

D. RELEASE OF RETAINAGE

The Contractor may, for satisfactory and substantial reasons shown to the Principal Representative's satisfaction, make a written request to the Principal Representative and the Architect/Engineer for release of part or all of the withheld percentage applicable to the Work of a Subcontractor which has completed the subcontracted Work in a manner finally acceptable to the Architect/Engineer, the Contractor, and the Principal Representative. Any such request shall be supported by a written approval from the Surety furnishing the Contractor's bonds and any surety that has provided a bond for the Subcontractor. The release of any such withheld percentage shall be further supported by such other evidence as the Architect/Engineer or the Principal Representative may require, including but not limited to, evidence of prior payments made to the Subcontractor, copies of the Subcontractor's contract with the Contractor, any applicable warranties, as-built information, maintenance manuals and other customary close-out documentation. Neither the Principal Representative nor the Architect Engineer shall be obligated to review such documentation nor shall they be deemed to assume any obligations to third parties by any review undertaken.

The Contractor's obligation under these General Conditions to guarantee Work for one year from the date of the Notice of Substantial Completion or the date of any Notice of Partial Substantial Completion of the applicable portion or phase of the Project, shall be unaffected by such partial

release; unless a Notice of Partial Substantial Completion is issued for the Work subject to the release of retainage.

Any rights of the Principal Representative which might be terminated by or from the date of any final acceptance of the Work, whether at common law or by the terms of this Contract, shall not be affected by such partial release of retainage prior to any final acceptance of the entire Project.

The Contractor remains fully responsible for the Subcontractor's Work and assumes any risk that might arise by virtue of the partial release to the Subcontractor of the withheld percentage, including the risk that the Subcontractor may not have fully paid for all materials, labor and equipment furnished to the Project.

If the Principal Representative considers the Contractor's request for such release satisfactory and supported by substantial reasons, the Architect/Engineer shall make a "final inspection" of the applicable portion of the Project to determine whether the Subcontractor's Work has been completed in accordance with the Contract Documents. A final punch list shall be made for the Subcontractor's Work and the procedures of Article 41, Completion, Final Inspection, Acceptance and Settlement, shall be followed for that portion of the Work, except that advertisement of the intent to make final payment to the Subcontractor shall be required only if the Principal Representative has reason to believe that a supplier or Subcontractor to the Subcontractor for which the request is made, may not have been fully paid for all labor and materials furnished to the Project.

ARTICLE 32. CERTIFICATES FOR PAYMENTS

State Form SBP-7.2, Certificate For Contractor's Payment, and its continuation detail sheets, when submitted, shall constitute the Certificate of Contractor's Application for Payment, and shall be a representation by the Contractor to the Principal Representative that the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and materials for which payment is requested have been incorporated into the Project except as noted in the application. If requested by the Principal Representative the Certificate of Contractor's Application for Payment shall be sworn under oath and notarized.

ARTICLE 33. PAYMENTS WITHHELD

The Architect/Engineer, the Principal Representative or State Buildings Program may withhold, or on account of subsequently discovered evidence nullify, the whole or any part of any application on account of, but not limited to any of the following:

1. Defective Work not remedied;
2. Claims filed or reasonable evidence indicating probable filing of claims;
3. Failure of the Contractor to make payments to Subcontractors for material or labor;
4. A reasonable doubt that the Contract can be completed for the balance of the contract price then unpaid;
5. Damage or injury to another contractor or any other person, persons or property except to the extent of coverage by a policy of insurance;
6. Failure to obtain necessary permits or licenses or to comply with applicable laws, ordinances, codes, rules or regulations or the directions of the Architect/Engineer;
7. Failure to submit a monthly construction schedule;
8. Failure of the Contractor to keep Work progressing in accordance with the time schedule;
9. Failure to keep a superintendent on the Work;
10. Failure to maintain as built drawings of the Work in progress;
11. Unauthorized deviations by the Contractor from the Contract Documents; or
12. On account of liquidated damages.

In addition, the Architect Engineer, Principal Representative or State Buildings Program may withhold or nullify the whole or any part of any application for any reason noted elsewhere in these General Conditions of the Contractor's Design/Bid/Build Agreement. Nullification shall mean reduction of amounts shown as previously paid on the application. The amount withheld or nullified may be in such amount as the

Architect/Engineer or the Principal Representative estimates to be required to allow the State to accomplish the Work, cure the failure and cover any damages or injuries, including an allowance for attorneys fees and costs where appropriate. When the grounds for such withholding or nullifying are removed, payment shall be made for the amounts thus withheld or nullified on such grounds.

ARTICLE 34. DEDUCTIONS FOR UNCORRECTED WORK

If the Architect/Engineer and the Principal Representative deem it inexpedient to correct Work damaged or not performed in accordance with the Contract Documents, the Principal Representative may, after consultation with the Architect/Engineer and ten (10) days' Notice to the Contractor of intent to do so, make reasonable reductions from the amounts otherwise due the Contractor on the next application for payment. Notice shall specify the amount or terms of any contemplated reduction. The Contractor may during this period correct or perform the Work. If the Contractor does not correct or perform the Work, an equitable deduction from the Contract sum shall be made by Change Order, in accordance with Article 35, Changes In The Work, unilaterally if necessary. If either party elects facilitation of this issue after Notice is given, the ten-day (10) notice period shall be extended and tolled until facilitation has occurred.

ARTICLE 35. CHANGES IN THE WORK

The Principal Representative may designate, without invalidating the Agreement, and with the approval of State Buildings Program and the State Controller, may order extra Work or make changes with or without the consent of the Contractor as hereafter provided, by altering, adding to or deducting from the Work, the Contract sum being adjusted accordingly. All such changes in the Work shall be within the general scope of and be executed under the conditions of the Contract, except that any claim for extension of time made necessary due to the change or any claim of other delay or other impacts caused by or resulting from the change in the Work shall be presented by the Contractor and adjusted by Change Order to the extent known at the time such change is ordered and before proceeding with the extra or changed Work. Any claims for extension of time or of delay or other impacts, and any costs associated with extension of time, delay or other impacts, which are not presented before proceeding with the change in the Work, and which are not adjusted by Change Order to the extent known, shall be waived.

The Architect/Engineer shall have authority to make minor changes in the Work, not involving extra cost, and not inconsistent with the intent of the Contract Documents, but otherwise, except in an emergency endangering life or property, no extra Work or change in the Contract Documents shall be made unless by 1) a written Change Order, approved by the Principal Representative, State Buildings Program, and the State Controller prior to proceeding with the changed Work; or 2) by an Emergency Field Change Order approved by the Principal Representative and State Buildings Program as hereafter provided in Article 35C, Emergency Field Ordered Changed Work; or 3) by an allocation in writing of any allowance already provided in the encumbered contract amount, the Contract sum being later adjusted to decrease the Contract sum by any unallocated or unexpended amounts remaining in such allowance. No change to the Contract sum shall be valid unless so ordered.

A. THE VALUE OF CHANGED WORK

1. The value of any extra Work or changes in the Work shall be determined by agreement in one or more of the following ways:
 - a. By estimate and acceptance of a lump-sum amount;
 - b. By unit prices specified in the Agreement, or subsequently agreed upon, that are extended by specific quantities;
 - c. By actual cost plus a fixed fee in a lump sum amount for profit, overhead and all indirect and off-site home office costs, the latter amount agreed upon in writing prior to starting the extra or changed Work.
2. Where the Contractor and the Principal Representative cannot agree on the value of extra Work, the Principal Representative may order the Contractor to perform the changes in the Work and a Change Order may be unilaterally issued based on an estimate of the change in the Work prepared by the Architect/Engineer. The value of the change in the Work shall be the Principal Representative's determination of the amount of equitable adjustment attributable to

the extra Work or change. The Principal Representative's determination shall be subject to appeal by the Contractor pursuant to the claims process in Article 36, Claims.

3. Except as otherwise provided in Article 35B, Detailed Breakdown, below, the Cost Principles of the Colorado Procurement Rules in effect on the date of this Contract, pursuant to § 24-107-101, C.R.S., as amended, shall govern all Contract changes.

B. DETAILED BREAKDOWN

In all cases where the value of the extra or changed Work is not known based on unit prices in the Contractor's bid or the Agreement, a detailed change proposal shall be submitted by the Contractor on a Change Order Proposal (SC-6.312), or in such other format as the State Buildings Program approves, with which the Principal Representative may require an itemized list of materials, equipment and labor, indicating quantities, time and cost for completion of the changed Work.

Such detailed change proposals shall be stated in lump sum amounts and shall be supported by a separate breakdown, which shall include estimates of all or part of the following when requested by the Architect/Engineer or the Principal Representative:

1. Materials, indicating quantities and unit prices including taxes and delivery costs if any (separated where appropriate into general, mechanical and electrical and/or other Subcontractors' Work; and the Principal Representative may require in its discretion any significant subcontract costs to be similarly and separately broken down).
2. Labor costs, indicating hourly rates and time and labor burden to include Social Security and other payroll taxes such as unemployment, benefits and other customary burdens.
3. Costs of project management time and superintendence time of personnel stationed at the site, and other field supervision time, but only where a time extension, other than a weather delay, is approved as part of the Change Order, and only where such project management time and superintendence time is directly attributable to and required by the change; provided however that additional cost of on-site superintendence shall be allowable whenever in the opinion of the Architect/Engineer the impact of multiple change requests to be concurrently performed will result in inadequate levels of supervision to assure a proper result unless additional superintendence is provided.
4. Construction equipment (including small tools). Expenses for equipment and fuel shall be based on customary commercially reasonable rental rates and schedules. Equipment and hand tool costs shall not include the cost of items customarily owned by workers.
5. Workers' compensation costs, if not included in labor burden.
6. The cost of commercial general liability and property damage insurance premiums but only to the extent charged the Contractor as a result of the changed Work.
7. Overhead and profit, as hereafter specified.
8. Builder's risk insurance premium costs.
9. Bond premium costs.
10. Testing costs not otherwise excluded by these General Conditions.
11. Subcontract costs.

Unless modified in the Supplementary General Conditions, overhead and profit shall not exceed the percentages set forth in the table below.

	OVERHEAD	PROFIT	COMMISSION
To the Contractor or to Subcontractors for the portion of Work performed with their own forces:	10%	5%	0%
To the Contractor or to Subcontractors for Work performed by others at a tier immediately below either of them:	5%	0%	5%

Overhead shall include: a) insurance premium for policies not purchased for the Project and itemized above, b) home office costs for office management, administrative and supervisory personnel and assistants, c) estimating and change order preparation costs, d) incidental job burdens, e) legal costs, f) data processing costs, g) interest costs on capital, h) general office expenses except those attributable to increased rental expenses for temporary facilities, and all other indirect costs, but shall not include the Social Security tax and other direct labor burdens. The term "Work" as used in the proceeding table shall include labor, materials and equipment and the "Commission" shall include all costs and profit for carrying the subcontracted Work at the tiers below except direct costs as listed in items 1 through 11 above if any.

On proposals for Work involving both additions and credits in the amount of the Contract sum, the overhead and profit will be allowed on the net increase only. On proposals resulting in a net deduct to the amount of the Contract sum, profit on the deducted amount shall be returned to the Principal Representative at fifty percent (50%) of the rate specified. The inadequacy of the profit specified shall not be a basis for refusal to submit a proposal.

Except in the case of Change Orders or Emergency Field Change Orders agreed to on the basis of a lump sum amount or unit prices as described in paragraphs 35A1 and 35A2 above, The Value of Changed Work, the Contractor shall keep and present a correct and fully auditable account of the several items of cost, together with vouchers, receipts, time cards and other proof of costs incurred, summarized on a Change Order form (SC-6.31) using such format for supporting documentation as the Principal Representative and State Buildings Program approve. This requirement applies equally to Work done by Subcontractors. Only auditable costs shall be reimbursable on Change Orders where the value is determined on the basis of actual cost plus a fixed fee pursuant to paragraph 35A3 above, or where unilaterally determined by the Principal Representative on the basis of an equitable adjustment in accordance with the Procurement Rules, as described above in Article 35A, The Value Of Changed Work.

Except for proposals for Work involving both additions and credits, changed Work shall be adjusted and considered separately for Work either added or omitted. The amount of adjustment for Work omitted shall be estimated at the time it is directed to be omitted, and when reasonable to do so, the agreed adjustment shall be reflected on the schedule of values used for the next Contractor's application for payment.

The Principal Representative reserves the right to contract with any person or firm other than the Contractor for any or all extra Work; however, unless specifically required in the Contract Documents, the Contractor shall have no responsibility without additional compensation to supervise or coordinate the Work of persons or firms separately contracted by the Principal Representative.

C. HAZARDOUS MATERIALS

1. The Principal Representative represents that it has undertaken an examination of the site of the Work and has determined that there are no hazardous substances, as defined below, which the Contractor could reasonably encounter in its performance of the Work. In the event the Principal Representative so discovers hazardous substances, the Principal Representative shall render harmless such hazards before the Contractor commences the Work.
2. In the event the Contractor encounters any materials reasonably believed to be hazardous substances which have not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Principal Representative, in writing. For purposes of this Agreement, "hazardous substances" shall include asbestos, lead, polychlorinated biphenyl (PCB) and any or all of those substances defined as "hazardous substance", "hazardous waste", or "dangerous or extremely hazardous wastes" as those terms are used in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), and shall also include materials regulated by the Toxic Substances Control Act (TSCA), the Clean Air Act, the Air

Quality Act, the Clean Water Act, and the Occupational Safety and Health Act. The Work in the affected area shall not therefore be resumed except by written agreement of the Principal Representative and the Contractor, if in fact materials that are hazardous substances have not been rendered harmless. The Work in the affected area shall be resumed only in the absence of the hazardous substances or when it has been rendered harmless or by written agreement of the Principal Representative and the Contractor.

3. **The contractor shall not be required to perform Work without consent in any areas where it reasonably believes hazardous substances that have not been rendered harmless are present.**

D. EMERGENCY FIELD CHANGE ORDERED WORK

The Principal Representative, without invalidating the Agreement, and with the approval of State Buildings Program and without the approval of the State Controller, may order extra Work or make changes in the case of an emergency that is a threat to life or property or where the likelihood of delays in processing a normal Change Order will result in substantial delays and or significant cost increases for the Project. Emergency Field Orders are not to be used solely to expedite normal Change Order processing absent a clear showing of a high potential for significant and substantial cost or delay. Such changes in the Work may be directed through issuance of an Emergency Field Change Order signed by the Contractor, the Principal Representative (or by a designee specifically appointed to do so in writing), and approved by the Director of State Buildings Program or his or her delegate. The change shall be directed using an Emergency Field Change Order form (SC-6.31E).

If the amount of the adjustment of the Contract price and time for completion can be determined at the time of issuance of the Emergency Field Change Order, those adjustments shall be reflected on the face of the Emergency Field Change Order. Otherwise, the Emergency Field Change Order shall reflect a not to exceed (NTE) amount for any schedule adjustment (increasing or decreasing the time for completion) and an NTE amount for any adjustment to Contract sum, which NTE amount shall represent the maximum amount of adjustment to which the Contractor will be entitled, including direct and indirect costs of changed Work, as well as any direct or indirect costs attributable to delays, inefficiencies or other impacts arising out of the change. Emergency Field Change Orders directed in accordance with this provision need not bear the approval signatures of the State Controller.

On Emergency Field Change Orders where the price and schedule have not been finally determined, the Contractor shall submit final costs for adjustment as soon as practicable. No later than seven (7) days after issuance, except as otherwise permitted, and every seven days thereafter, the Contractor shall report all costs to the Principal Representative and the Architect/Engineer. The final adjustment of the Emergency Field Change Order amount and the adjustment to the Project time for completion shall be prepared on a normal Change Order from (SC-6.31) in accordance with the procedures described in Article 35A, The Value of Changed Work, and B, Detailed Breakdown, above. Unless otherwise provided in writing signed by the Director of State Buildings Program to the Principal Representative and the Contractor, describing the extent and limits of any greater authority, individual Emergency Field Change Orders shall not be issued for more than \$25,000, nor shall the cumulative value of Emergency Field Change Orders exceed an amount of \$100,000.

E. APPROPRIATION LIMITATIONS - § 24-91-103.6, C.R.S., as amended

The amount of money appropriated, as shown on the Contractor's Design/Bid/Build Agreement (SC 6.21), is equal to or in excess of the Contract amount. No Change Order, Emergency Field Change Order, or other type of order or directive shall be issued by the Principal Representative, or any agent acting on his or her behalf, which directs additional compensable Work to be performed, which Work causes the aggregate amount payable under the Contract to exceed the amount appropriated for the original Contract, as shown on the Agreement (SC-6.21), unless one of the following occurs: (1) the Contractor is provided written assurance from the Principal Representative that sufficient additional lawful appropriations exist to cover the cost of the additional Work; or (2) the Work is covered by a contractor remedy provision under the Contract, such as a claim for extra cost. By way of example only, no assurance is required for any order, directive or instruction by the Architect/Engineer or the Prin

Principal Representative to perform Work which is determined to be within the performance required by the Contract Documents; the Contractor's remedy shall be as described elsewhere in these General Conditions.

Written assurance shall be in the form of an Amendment to the Contract reciting the source and amount of such appropriation available for the Project. No remedy granting provision of this Contract shall obligate the Principal Representative to seek appropriations to cover costs in excess of the amounts recited as available to pay for the Work to be performed.

ARTICLE 36. CLAIMS

It is the intent of these General Conditions to provide procedures for speedy and timely resolution of disagreements and disputes at the lowest level possible. In the spirit of on the job resolution of job site issues, the parties are encouraged to use the partnering processes of Article 2D, Partnering, Communications and Cooperation, before turning to the more formal claims processes described in this Article 36, Claims. The use of non-binding dispute resolution, whether through the formal processes described in Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, or through less formal alternative processes developed as part of a partnering plan, are also encouraged. Where such process cannot resolve the issues in dispute, the claims process that follows is intended to cause the issues to be presented, decided and where necessary, documented in close proximity to the events from which the issues arise. To that end, and in summary of the remedy granting process that follows commencing with the next paragraph of this Article 36, Claims, the Contractor shall 1) first, seek a decision by the Architect/Engineer, and 2) shall second, informally present the claim to Principal Representative as described hereafter, and 3) failing resolution in the field, give Notice of intent to exercise statutory rights of review of a formal contract controversy, and 4) seek resolution outside the Contract as provided by the Procurement Code.

If the Contractor claims that any instructions, by detailed drawings, or otherwise, or any other act or omission of the Architect/Engineer or Principal Representative affecting the scope of the Contractor's Work, involve extra cost, extra time or changes in the scope of the Work under this Contract, the Contractor shall have the right to assert a claim for such costs or time, provided that before either proceeding to execute such Work (except in an emergency endangering life or property), or filing a Notice of claim, the Contractor shall have obtained or requested a written decision of the Architect/Engineer following the procedures as provided in Article 6A and B, Architect/Engineer Decisions and Judgments, respectively; provided, however, that in the case of a directed change in the Work pursuant to Article 36A4, no written judgment or decision of the Architect/Engineer is required. If the Contractor is delayed by the lack of a response to a request for a decision by the Architect/Engineer, the Contractor shall give Notice in accordance with Article 38, Delays and Extensions of Time.

Unless it is the Architect/Engineer's judgment and determination that the Work is not included in the performance required by the Contract Documents, the Contractor shall proceed with the Work as originally directed. Where the Contractor's claim involves a dispute concerning the value of Work unilaterally directed pursuant to Article 35A3 the Contractor shall also proceed with the Work as originally directed while his or her claim is being considered.

The Contractor shall give the Principal Representative and the Architect/Engineer Notice of any claim promptly after the receipt of the Architect/Engineer's decision, but in no case later than three (3) business days after receipt of the Architect/Engineer's decision (or no later than ten (10) days from the date of the Contractor's request for a decision when the Architect/Engineer fails to decide as provided in Article 6). The Notice of claim shall state the grounds for the claim and the amount of the claim to the extent known in accordance with the procedures of Article 35, Changes In The Work. The period in which Notice must be given may be extended by the Principal Representative if requested in writing by the Contractor with good cause shown, but any such extension to be effective shall be in writing.

The Principal Representative shall respond in writing, with a copy to the Architect/Engineer, within a reasonable time, and except where a request for facilitation of negotiation has been made as hereafter provided, in no case later than seven (7) business days (or at such other time as the Contractor and

Principal Representative agree) after receipt of the Contractor's Notice of claim regarding such instructions or alleged act or omission. If no response to the Contractor's claim is received within seven (7) business days of Contractor's Notice (or at such other time as the Contractor and Principal Representative agree) and the instructions have not been retracted, it shall be deemed that the Principal Representative has denied the claim.

The Principal Representative may grant or deny the claim in whole or in part, and a Change Order shall be issued if the claim is granted. To the extent any portion of claim is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the Work be determined by any method allowed in Article 35A, The Value of Changed Work. Except in the case of a deemed denial, the Principal Representative shall provide a written explanation regarding any portion of the Contractor's claim that is denied.

If the Contractor disagrees with the Principal Representative's judgment and determination on the claim and seeks an equitable adjustment of the Contract sum or time for performance, he or she shall give Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy within ten (10) days of receipt of the Principal Representative's decision denying the claim. A "contract controversy," as such term is used in the Colorado Procurement Code, § 24-109-106, C.R.S., shall not arise until the initial claim process described above in this Article 36 has been properly exhausted by the Contractor. The Contractor's failure to proceed with Work directed by the Architect/Engineer or to exhaust the claim process provided above in this Article 36, shall constitute an abandonment of the claim by the Contractor and a waiver of the right to contest the decision in any forum.

At the time of filing the Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy, the Contractor may request that the Principal Representative defer a decision on the contract controversy until a later date or until the end of the Project. If the Principal Representative agrees, he or she shall so advise the Contractor in writing. If no such request is made, or if the Principal Representative does not agree to such a request, the Principal Representative shall render a written decision within twenty (20) business days and advise the Contractor of the reasons for any denial. Unless the claim has been decided by the Principal Representative (as opposed to delegates of the Principal Representative), the person who renders the decision on this statutory contract controversy shall not be the same person who decided the claim. To the extent any portion of the contract controversy is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the Work be determined by any method allowed in Article 35A, The Value of Changed Work. In the event of a denial the Principal Representative shall give Notice to the Contractor of his or her right to administrative and judicial reviews as provided in the Colorado Procurement Code, § 24-109-201 *et seq*, C.R.S., as amended. If no decision regarding the contract controversy is issued within twenty (20) business days of the Contractor's giving Notice (or such other date as the Contractor and Principal Representative have agreed), and the instructions have not been retracted or the alleged act or omission have not been corrected, it shall be deemed that the Principal Representative has ruled by denial on the contract controversy. Except in the case of a deemed denial, the Principal Representative shall provide an explanation regarding any portion of the contract controversy that involves denial of the Contractor's claim.

Either the Contractor or the Principal Representative may request facilitation of negotiations concerning the claim or the contract controversy, and if requested, the parties shall consult and negotiate before the Principal Representative decides the issue. Any request for facilitation by the Contractor shall be made at the time of the giving of Notice of the claim or Notice of the contract controversy. Facilitation shall extend the time for the Principal Representative to respond by commencing the applicable period at the completion of the facilitated negotiation, which shall be the last day of the parties' meeting, unless otherwise agreed in writing.

Disagreement with the decision of the Architect Engineer, or the decision of the Principal Representative to deny any claim or denying the contract controversy, shall not be grounds for the Contractor to refuse to perform the Work directed or to suspend or terminate performance. During the period that any claim or contract controversy decision is pending under this Article 36, Claims, the Contractor shall proceed diligently with the Work directed.

In all cases where the Contractor proceeds with the Work and seeks equitable adjustment by filing a claim and or statutory appeal, the Contractor shall keep a correct account of the extra cost, in accordance with Article 35B, Detailed Breakdown supported by receipts. The Principal Representative shall be entitled to reject any claim or contract controversy whenever the foregoing procedures are not followed and such accounts and receipts are not presented.

The payments to the Contractor in respect of such extra costs shall be limited to reimbursement for the current additional expenditure by the Contractor made necessary by the change in the Work, plus a reasonable amount for overhead and profit, determined in accordance with Article 35B, Detailed Breakdown, determined solely with reference to the additional Work, if any, required by the change.

ARTICLE 37. DIFFERING SITE CONDITIONS

A. NOTICE IN WRITING

The Contractor shall promptly, and where possible before conditions are disturbed, give the Architect/Engineer and the Principal Representative Notice in writing of:

1. subsurface or latent physical conditions at the site differing materially from those indicated in or reasonably assumed from the information provided in the Contract Documents; and,
2. unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

The Architect/Engineer shall promptly investigate the conditions, and if it is found that such conditions do materially so differ and cause an increase or decrease in the Contractor 's costs of performance of any part of the Work required by the Contract Documents, whether or not such Work is changed as a result of such conditions, an equitable adjustment shall be made and the Contract sum shall be modified in accordance with Article 35, Changes In The Work.

If the time required for completion of the Work affected by such materially differing conditions will extend the Work on the critical path as indicated on the CPM schedule, the time for completion shall also be equitably adjusted.

B. LIMITATIONS

No claim of the Contractor under this clause shall be allowed unless the Contractor has given the Notice required in Article 37A, Notice In Writing, above. The time prescribed for presentation and adjustment in Articles 36, Claims and 38, Delays And Extensions Of Time, shall be reasonably extended by the State to the extent required by the nature of the differing conditions; provided, however, that even when so extended no claim by the Contractor for an equitable adjustment hereunder shall be allowed if not quantified and presented prior to the date the Contractor requests a final inspection pursuant to Article 41A, Notice Of Completion.

ARTICLE 38. DELAYS AND EXTENSIONS OF TIME

If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the State of Colorado or the Architect/Engineer, or of any employee or agent of either, or by any separately employed Contractor or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or any other causes beyond the Contractor's control, including weather delays as defined below, the time of Completion of the Work shall be extended for a period equal to such portion of the period of delays directly affecting the completion of the Work as the Contractor shall be able to show he or she could not have avoided by the exercise of due diligence.

The Contractor shall provide Notice in writing to the Architect/Engineer, the Principal Representative and State Buildings Program within three (3) business days from the beginning of such delay and shall file a written claim for an extension of time within seven (7) business days after the period of such delay has ceased, otherwise, any claim for an extension of time is waived.

Provided that the Contractor has submitted reasonable schedules for approval when required by Article 12, Requests for Information and Schedules, if no schedule is agreed to fixing the dates on which the responses to requests for information or detail drawings will be needed, or Shop Drawings, Product Data or Samples are to be reviewed as required or allowed by Article 12B, Schedules, no extension of time will be allowed for the Architect/ Engineer's failure to furnish such detail drawings as needed, or for the failure to initially review Shop Drawings, Product Data or Samples, except in respect of that part of any delay in furnishing detail drawings or instructions extending beyond a reasonable period after written demand for such detailed drawings or instructions is received by the Architect/Engineer. In any event, any claim for an extension of time for such cause will be recognized only to the extent of delay directly caused by failure to furnish detail drawings or instructions or to review Shop Drawings, Product Data or Samples pursuant to schedule, after such demand.

All claims for extension of time due to a delay claimed to arise or result from ordered changes in the scope of the Work, or due to instructions claimed to increase the scope of the Work, shall be presented to the Architect/Engineer, the Principal Representative and State Buildings Program as part of a claim for extra cost, if any, in accordance with Article 36, Claims, and in accordance with the Change Order procedures required by Article 35, Changes In The Work.

Except as otherwise provided in this paragraph, no extension of time shall be granted when the Contractor has failed to utilize a CPM schedule or otherwise identify the Project's critical path as specified in Article 12, Requests for Information and Schedules, or has elected not to do so when allowed by the Supplementary General Conditions or the Specifications to use less sophisticated scheduling tools, or has failed to maintain such a schedule. Delay directly affecting the completion of the Work shall result in an extension of time only to the extent that completion of the Work was affected by impacts to the critical path shown on Contractor's CPM schedule. Where the circumstances make it indisputable in the opinion of the Architect/Engineer that the delay affected the completion of the Work so directly that the additional notice of the schedule impact by reference to a CPM schedule was unnecessary, a reasonable extension of time may be granted.

Extension of the time for completion of the Work will be granted for delays due to weather conditions only when the Contractor demonstrates that such conditions were more severe and extended than those reflected by the ten-year average for the month, as evidenced by the Climatological Data, U. S. Department of Commerce, for the Project area.

Extensions of the time for completion of the Work due to weather will be granted on the basis of one and three tenths (1.3) calendar days for every day that the Contractor would have Worked but was unable to Work, with each separate extension figured to the nearest whole calendar day.

For weather delays and delays caused by events, acts or omissions not within the control of the Principal Representative or any person acting on the Principal Representative's behalf, the Contractor shall be entitled to an extension of time only and shall not be entitled to recovery of additional cost due to or resulting from such delays. This Article does not, however, preclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS

The Contractor and Principal Representative agree to designate one or more mutually acceptable persons willing and able to facilitate negotiations and communications for the resolution of conflicts, disagreements or disputes between them at the specific request of either party with regard to any Project decision of either of them or any decision of the Architect/Engineer. The designation of such person(s) shall not carry any obligation to use their services except that each party agrees that if the other party requests the intervention of such person(s) with respect to any such conflict, dispute or disagreement, the non-requesting party shall participate in good faith attempts to negotiate a resolution of the issue in dispute. If the parties cannot agree on a mutually acceptable person to serve in this capacity one shall be so appointed; provided, however, that either party may request the director of State Buildings Program to appoint such a person, who, if appointed, shall be accepted for this purpose by both the Contractor and the Principal Representative.

The cost, if any, of the facilitative services of the person(s) so designated shall be shared if the parties so agree in any partnering plan; or in the absence of agreement the cost shall be borne by the party requesting the facilitation of negotiation.

Any dispute, claim, question or disagreement arising from or relating to the Contract or an alleged breach of the Contract may be subject to a request by either party for facilitated negotiation subject to the limitations hereafter listed, and the parties shall participate by consultation and negotiation with each other, as guided by the facilitator and with recognition of their mutual interests, in an attempt to reach an equitable solution satisfactory to both parties.

The obligation to participate in facilitated negotiations shall be as described above and elsewhere in these General Conditions, as by way of example in Article 36, Claims, or Article 34, Deductions for Uncorrected Work and to the extent not more particularly described or limited elsewhere, each party's obligations shall be as follows:

1. a party shall not initiate communication with the facilitator regarding the issues in dispute; except that any request for facilitation shall be made in writing with copies sent, faxed or delivered to the other party;
2. a party shall prepare a brief written description of its position if so requested by the facilitator (who may elect to first discuss the parties' positions with each party separately in the interest of time and expense);
3. a party shall respond to any reasonable request for copies of documents requested by the facilitator, but such requests, if voluminous, may consist of an offer to allow the facilitator access to the parties' documents;
4. a party shall review any meeting agenda proposed by a facilitator and endeavor to be informed on the subjects to be discussed;
5. a party shall meet with the other party and the facilitator at a mutually acceptable place and time, or, if none can be agreed to, at the time and place designated by the facilitator for a period not to exceed four hours unless the parties agree to a longer period;
6. a party shall endeavor to assure that any facilitation meeting shall be attended by any other persons in their employ that the facilitator requests be present, if reasonably available, including the Architect/Engineer;
7. each party shall participate in such facilitated face-to-face negotiations of the issues in dispute through persons fully authorized to resolve the issue in dispute;
8. each party shall be obligated to participate in negotiations requested by the other party and to perform the specific obligations described in paragraphs (1) through (10) this Article 39, Facilitated Negotiation, no more than three times during the course of the Project;
9. neither party shall be under any obligation to resolve any issue by facilitated negotiation, but each agrees to participate in good faith and the Principal Representative shall direct the Architect/Engineer to appropriately document any resolution or agreement reached and to execute any Amendment or Change Order to the Contract necessary to implement their agreement; and,
10. any discussions and documents prepared exclusively for use in the negotiations shall be deemed to be matters pertaining to settlement negotiations and shall not be subsequently available in further proceedings except to the extent of any documented agreement.

In accordance with State Fiscal Rules and Article 52F, Choice of Law; No Arbitration, nothing in this Article 39 shall be deemed to call for arbitration or otherwise obligate the State to participate in any form of binding alternative dispute resolution.

A partnering plan developed as described in Article 2D, Communications and Cooperation, may modify or expand the requirements of this Article but may not reduce the obligation to participate in facilitated negotiations when applicable. In the case of small projects estimated to be valued under \$500,000, the requirements of this Article may be deleted from this Contract, by modification in Article 7 (Contractor's Agreement SC-6.21), Optional Provisions And Elections. When so modified, the references to the parties' right to elect facilitated negotiation elsewhere in these General Conditions shall be deleted.

ARTICLE 40. RIGHT OF OCCUPANCY

The Principal Representative shall have the right to take possession of and to use any completed or partially completed portions of the Work, even if the time for completing the entire Work or portions of the Work has not expired and even if the Work has not been finally accepted, and the Contractor shall fully cooperate with the Principal Representative to allow such possession and use. Such possession and use shall not constitute an acceptance of such portions of the Work.

Prior to any occupancy of the Project, an inspection shall be made by the Principal Representative, State Buildings Program and the Contractor. Such inspection shall be made for the purpose of ensuring that the building is secure, protected by operation safety systems as designed, operable exits, power, lighting and HVAC systems, and otherwise ready for the occupancy intended and the Notice of Substantial Completion has been issued for the occupancy intended. The inspection shall also document existing finish conditions to allow assessment of any damage by occupants. The Contractor shall assist the Principal Representative in completing and executing State Form SBP-01, Approval of Occupancy/Use, prior to the Principal Representative's possession and use. Any and all areas so occupied will be subject to a final inspection when the Contractor complies with Article 41, Completion, Final Inspection, Acceptance and Settlement.

ARTICLE 41. COMPLETION, FINAL INSPECTION, ACCEPTANCE AND SETTLEMENT

A. NOTICE OF COMPLETION

When the Work, or a discrete physical portion of the Work (as hereafter described) which the Principal Representative has agreed to accept separately, is substantially complete and ready for final inspection, the Contractor shall file a written Notice with the Architect/Engineer that the Work, or such discrete physical portion, in the opinion of the Contractor, is substantially complete under the terms of the Contract. The Contractor shall prepare and submit with such Notice a comprehensive list of items to be completed or corrected prior to final payment, which shall be subject to review and additions as the Architect/Engineer or the Principal Representative shall determine after inspection. If the Architect/Engineer or the Principal Representative believe that any of the items on the list of items submitted, or any other item of Work to be corrected or completed, or the cumulative number of items of Work to be corrected or completed, will prevent a determination that the Work is substantially complete, those items shall be completed by the Contractor and the Notice shall then be resubmitted.

B. FINAL INSPECTION

Within ten (10) days after the Contractor files written Notice that the Work is substantially complete, the Architect/Engineer, the Principal Representative, and the Contractor shall make a "final inspection" of the Project to determine whether the Work is substantially complete and has been completed in accordance with the Contract Documents. State Buildings Program shall be notified of the inspection not less than three (3) business days in advance of the inspection. The Contractor shall provide the Principal Representative and the Architect/Engineer an updated punch list in sufficient detail to fully outline the following:

1. Work to be completed, if any; and
2. Work not in compliance with the Drawings or Specifications, if any.

A final punch list shall be made by the Architect/Engineer in sufficient detail to fully outline to the Contractor:

1. Work to be completed, if any;
2. Work not in compliance with the Drawings or Specifications, if any; and
3. unsatisfactory Work for any reason, if any.

The required number of copies of the final punch list will be countersigned by the authorized representative of the Principal Representative and will then be transmitted by the Architect/Engineer to the Contractor, the Principal Representative, and State Buildings Program. The Architect/Engineer's final punch list shall control over the Contractor's preliminary punch list.

C. NOTICE OF SUBSTANTIAL COMPLETION

Notice of Substantial Completion shall establish the date of substantial completion of the Project. The Contractor acknowledges and agrees that because the departments, agencies and institutions of the State of Colorado are generally involved with the business of the public at large, greater care must be taken in establishing the date of substantial completion than might otherwise be the case to ensure that a project or building or discrete physical portion of the Work is fully usable and safe for public use, and that such care necessarily raises the standard by which the concept of substantial completion is applied for a public building.

The Notice of Substantial Completion shall not be issued until the following have been fully established:

1. All required building code inspections have been called for and the appropriate code officials have affixed their signatures to the Building Inspection Record indicating successful completion of all required code inspections;
2. All required corrections noted on the Building Inspection Record shall have been completed unless the Architect/Engineer, the Principal Representative and State Buildings Program, in their complete and absolute discretion, all concur that the condition requiring the remaining correction is not in any way life threatening, does not otherwise endanger persons or property, and does not result in any undue inconvenience or hardship to the Principal Representative or the public;
3. The building, structure or Project can be fully and comfortably used by the Principal Representative and the public without undue interference by the Contractor's employees and Workers during the completion of the final punch list taking into consideration the nature of the public uses intended and taking into consideration any stage or level of completion of HVAC system commissioning or other system testing required by the Specifications to be completed prior to issuance of the Notice of Substantial Completion;
4. The Project has been fully cleaned as required by these General Conditions, and as required by any stricter requirements of the Specifications, and the overall state of completion is appropriate for presentation to the public; and
5. The Contractor has provided a schedule for the completion of each and every item identified on the punch list which specifies the Subcontractor or trade responsible for the Work, and the dates the completion or correction of the item will be commenced and finished; such schedule will show completion of all remaining final punch list items within the period indicated in the Contract for final punch list completion prior to Final Acceptance, with the exception of only those items which are beyond the control of the Contractor despite due diligence. The schedule shall provide for a reasonable punch list inspection process. Unless liquidated damages have been specified in Article 7.4 of the Contractor's Design/Bid/Build Agreement SC-6.21), the cost to the Principal Representative, if any, for re-inspections due to failure to adhere to the Contractor's proposed punch-list completion schedule shall be the responsibility of the Contractor and may be deducted by the Principal Representative from final amounts due to the Contractor.

Substantial completion of the entire Project shall not be conclusively established by a decision by the Principal Representative to take possession and use of a portion, or all of the Project, where portions of the Project cannot meet all the criteria noted above. Notice of Substantial Completion for the entire Project shall, however, only be withheld for substantial reasons when the Principal Representative has taken possession and uses all of the Project in accordance with the terms of Article 40, Right Of Occupancy. Failure to furnish the required completion schedule shall constitute a substantial reason for withholding the issuance of any Notice of Substantial Completion.

The Contractor shall have the right to request a final inspection of any discrete physical portion of the Project when in the opinion of the Principal Representative, The Architect/Engineer and State Buildings Program a final punch list can be reasonably prepared, without confusion as to which portions of the Project are referred to in any subsequent Notice of Partial Final Settlement which might be issued after such portion is finally accepted. Discrete physical portions of the Project may be, but

shall not necessarily be limited to, such portions of the Project as separate buildings where a Project consists of multiple buildings. Similarly, an addition to an existing building where the Project also calls for renovation or remodeling of the existing building may constitute a discrete physical portion of the Project. In such circumstances, when in the opinion of the Principal Representative, the Architect/Engineer and State Buildings Program, the requirements for issuance of a Notice of Substantial Completion can be satisfied with respect to the discrete portion of the Project, a partial Notice of Substantial Completion may be issued for such discrete physical portion of the Project.

D. NOTICE OF ACCEPTANCE

The Notice of Acceptance shall establish the completion date of the Project. It shall not be authorized until the Contractor shall have performed all of the Work to allow completion and approval of the Pre-Acceptance Checklist (SBP-05).

Where partial Notices of Substantial Completion have been issued, partial Notices of Final Acceptance may be similarly issued when appropriate for that portion of the Work. Partial Notice of Final Acceptance may also be issued to exclude the Work described in Change Orders executed during late stages of the Project where a later completion date for the Change Ordered Work is expressly provided for in the Contract as amended by the Change Order, provided the Work can be adequately described to allow partial advertisement of any Notice of Partial Final Settlement to be issued without confusion as to the Work included for which final payment will be made.

E. SETTLEMENT

Final payment and settlement shall be made on the date fixed and published for such payment except as hereafter provided. The Principal Representative shall not authorize final payment until all items on the Pre-Acceptance check list (SBP-05) have been completed, the Notice of Acceptance issued, and the Notice of Contractors Settlement published. If the Work shall be substantially completed, but Final Acceptance and completion thereof shall be prevented through delay in correction of minor defects, or unavailability of materials or other causes beyond the control of the Contractor, the Principal Representative in his or her discretion may release all amounts due to the Contractor except such amounts as may be in excess of three times the cost of completing the unfinished Work or the cost of correcting the defective Work, as estimated by the Architect/Engineer and approved by State Buildings Program. Before the Principal Representative may issue the Notice of Contractor's Settlement and advertise the Project for final payment, the Contractor shall have corrected all items on the punch list except those items for which delayed performance is expressly permitted, subject to withholding for the cost thereof, and shall have:

1. Delivered to the Principal Representative:
 - a. All guarantees and warranties;
 - b. All statements to support local sales tax refunds, if any;
 - c. Three (3) complete bound sets of required operating maintenance instructions; and,
 - d. One (1) set of hard copy as-built Contract Documents, and one (1) electronic copy showing all job changes.
2. Demonstrated to the operating personnel of the Principal Representative the proper operation and maintenance of all equipment.
3. Delivered to the State of Colorado Department of Personnel & Administration in accordance with C.R.S. § 24-103-210:
 - a. A written disclosure of the five most costly goods incorporated into the project, including iron, steel, or related manufactured goods and the total cost and country of origin of those five goods and whether the project was subject to any existing domestic content preferences.

Upon completion of the foregoing the Project shall be advertised in accordance with the Notice of Contractor's Settlement by two publications of Notice, the last publication appearing at least ten (10) days prior to the time of final settlement. Publication and final settlement should not be postponed or delayed solely by virtue of unresolved claims against the Project or the Contractor from Subcontractors, suppliers or materialmen based on good faith disputes; the resolution of the question of payment in such cases being directed by statute.

Except as hereafter provided, on the date of final settlement thus advertised, provided the Contractor has submitted a written Notice to the Architect/Engineer that no claims have been filed, and further provided the Principal Representative shall have received no claims, final payments and settlement shall be made in full. If any unpaid claim for labor, materials, rental machinery, tools, supplies or equipment is filed before payment in full of all sums due the Contractor, the Principal Representative and the State Controller shall withhold from the Contractor on the date established for final settlement, sufficient funds to insure the payment of such claim, until the same shall have been paid or withdrawn, such payment or withdrawal to be evidenced by filing a receipt in full or an order for withdrawal signed by the claimant or his or her duly authorized agent or assignee. The amount so withheld may be in the amount of 125% of the claims or such other amount as the Principal Representative reasonably deems necessary to cover expected legal expenses. Such withheld amounts shall be in addition to any amount withheld based on the cost to compete unfinished Work or the cost to repair defective Work. However, as provided by statute, such funds shall not be withheld longer than ninety (90) days following the date fixed for final settlement with the Contractor, as set forth in the published Notice of Contractor's Settlement, unless an action at law shall be commenced within that time to enforce such unpaid claim and a Notice of such action at law shall have been filed with the Principal Representative and the State Controller. At the expiration of the ninety (90) day period, the Principal Representative shall authorize the State Controller to release to the Contractor all other money not the subject of such action at law or withheld based on the cost to compete unfinished Work or the cost to repair defective Work.

Notices of Partial Final Settlement may be similarly advertised, provided all conditions precedent have been satisfied as though that portion of the Work affected stood alone, a Notice of Partial Acceptance has been issued, and the consent of surety to the partial final settlement has been obtained in writing. Thereafter, partial final payments may be made to the Contractor subject to the same conditions regarding unpaid claims.

ARTICLE 42. GENERAL WARRANTY AND CORRECTION OF WORK AFTER ACCEPTANCE

The Contractor warrants that the materials used and the equipment furnished shall be new and of good quality unless specified to the contrary. The Contractor further warrants that the Work shall, in all respects, be free from material defects not permitted by the Specifications and shall be in accordance with the requirements of the Contract Documents. Neither the final certificate for payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for defects or faulty materials or Workmanship. The Contractor shall be responsible to the Principal Representative for such warranties for the longest period permitted by any applicable statute of limitations.

In addition to these general warranties, and without limitation of these general warranties, for a period of one year after the date of any Notice of Substantial Completion, or any Notice of Partial Substantial Completion if applicable, the Contractor shall remedy defects, and faulty Workmanship or materials, and Work not in accordance with the Contract Documents which was not accepted at the time of the Notice of Final Acceptance, all in accordance with the provisions of Article 44, One-Year Guarantee And Special Guarantees And Warranties.

ARTICLE 43. LIENS

Colorado statutes do not provide for any right of lien against public buildings. In lieu thereof, § 38-26-107, C.R.S., provides adequate relief for any claimant having furnished labor, materials, rental machinery, tools, equipment, or services toward construction of the particular public Work in that final payment may not be made to a Contractor until all such creditors have been put on Notice by publication in the public press of

such pending payment and given opportunity for a period of up to ninety (90) days to stop payment to the Contractor in the amount of such claims.

ARTICLE 44. ONE-YEAR GUARANTEE AND SPECIAL GUARANTEES AND WARRANTIES

C. A. ONE-YEAR GUARANTEE OF THE WORK

The Contractor shall guarantee to remedy defects and repair or replace the Work for a period of one year from the date of the Notice of Substantial Completion or from the dates of any partial Notices of Substantial Completion issued for discrete physical portions of the Work. The Contractor shall remedy any defects due to faulty materials or Workmanship and shall pay for, repair and replace any damage to other Work resulting there from, which shall appear within a period of one year from the date of such Notice(s) of Substantial Completion. The Contractor shall also remedy any deviation from the requirements of the Contract Documents which shall later be discovered within a period of one year from the date of the Notice of Substantial Completion; provided, however, that the Contractor shall not be required to remedy deviations from the requirements of the Contract Documents where such deviations were obvious, apparent and accepted by the Architect/Engineer or the Principal Representative at the time of the Notice of Final Acceptance. The Principal Representative shall give Notice of observed defects or other Work requiring correction with reasonable promptness. Such Notice shall be in writing to the Architect/Engineer and the Contractor.

The one year guarantee of the Contractor's Work may run separately for discrete physical portions of the Work for which partial Notices of Substantial Completion have been issued, however, it shall run from the last Notice of Substantial Completion with respect to all or any systems common to the Work to which more than one Notice of Substantial Completion may apply.

This one-year guarantee shall not be construed to limit the Contractor's general warranty described in Article 42, General Warranty and Correction of Work After Acceptance, that all materials and equipment are new and of good quality, unless specified to the contrary, and that the Work shall in all respects be free from material defects not permitted by the Specifications and in accordance with the requirements of the Contract Documents.

B. SPECIAL GUARANTEES AND WARRANTIES

In case of Work performed for which product, manufacturers or other special warranties are required by the Specifications, the Contractor shall secure the required warranties and deliver copies thereof to the Principal Representative through the Architect/Engineer upon completion of the Work.

These product, manufacturers or other special warranties, as such, do not in any way lessen the Contractor's responsibilities under the Contract. Whenever guarantees or warranties are required by the Specifications for a longer period than one year, such longer period shall govern.

ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION

The Architect/Engineer, the Principal Representative and the Contractor together shall make at least two (2) complete inspections of the Work after the Work has been determined to be substantially complete and accepted. One such inspection, the "Six-Month Guarantee Inspection," shall be made approximately six (6) months after date of the Notice of Substantial Completion, unless in the case of smaller projects valued under \$500,000 this inspection is declined in Article 7A (Contractor's Agreement SC-6.21), Modification of Article 45, in which case the inspection to occur at six months shall not be required. Another such inspection, the "Eleven-Month Guaranty Inspection" shall be made approximately eleven (11) months after the date of the Notice of Substantial Completion. The Contractor shall schedule and so notify all parties concerned, and the Principal Representative shall so notify State Buildings Program, of these inspections. If more than one Notice of Substantial Completion has been issued at the reasonable discretion of the Principal Representative separate eleven month inspections may be required where the one year guarantees do not run reasonably concurrent.

Written punch lists and reports of these inspections shall be made by the Architect/Engineer and forwarded to the Contractor, the Principal Representative, State Buildings Program, and all other participants within ten (10) days after the completion of the inspections. The punch list shall itemize all guarantee items, prior

punch list items still to be corrected or completed and any other requirements of the Contract Documents to be completed which were not waived by final acceptance because they were not obvious or could not reasonably have been previously observed. The Contractor shall immediately initiate such remedial Work as may be necessary to correct any deficiencies or defective Work shown by this report, and shall promptly complete all such remedial Work in a manner satisfactory to the Architect/Engineer, the Principal Representative and State Buildings Program.

If the Contractor fails to promptly correct all deficiencies and defects shown by this report, the Principal Representative may do so, after giving the Contractor ten (10) days written Notice of intention to do so.

The State of Colorado, acting by and through the Principal Representative, shall be entitled to collect from the Contractor all costs and expenses incurred by it in correcting such deficiencies and defects, as well as all damages resulting from such deficiencies and defects.

ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

It is hereby understood and mutually agreed, by and between the parties hereto, that the date of beginning, rate of progress, and the time for completion of the Work to be done hereunder are ESSENTIAL CONDITIONS of this Agreement, and it is understood and agreed that the Work embraced in this Contract shall be commenced at the time specified in the Notice to Proceed (SC-6.26).

It is further agreed that time is of the essence of each and every portion of this Contract, and of any portion of the Work described on the Drawings or Specifications, wherein a definite and certain length of time is fixed for the performance of any act whatsoever. The parties further agree that where under the Contract additional time is allowed for the completion of the Work or any identified portion of the Work, the new time limit or limits fixed by such extension of the time for completion shall be of the essence of this Agreement.

The Contractor acknowledges that subject to any limitations in the Advertisement for Bids, issued for the Project, the Contractor's bid is consistent with and considers the number of days to substantially complete the Project and the number of days to finally complete the Project to which the parties may have stipulated in the Agreement, which stipulation was based on the Contractor's bid. The Contractor agrees that Work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure the Project will be substantially complete, and fully and finally complete, as recognized by the issuance of all required Notices of Substantial Completion and Notices of Final Acceptance, within any times stipulated and specified in the Agreement, as the same may be amended by Change Order or other written modification, and that the Principal Representative will be damaged if the times of completion are delayed.

It is expressly understood and agreed, by and between the parties hereto, that the times for the Substantial Completion of the Work or for the final acceptance of the Work as may be stipulated in the Agreement, and as applied here and in Article 7.4 of the Contractor's Design/Bid/Build Agreement SC-6.21), Modifications of Article 46, are reasonable times for these stages of completion of the Work, taking into such consideration all factors, including the average climatic range and usual industrial conditions prevailing in the locality of the building operations.

If the Contractor shall neglect, fail or refuse to complete the Work within the times specified in the Agreement, such failure shall constitute a breach of the terms of the Contract and the State of Colorado, acting by and through the Principal Representative, shall be entitled to liquidated damages for such neglect, failure or refusal, as specified in Article 7.4 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46.

The Contractor and the Contractor's Surety shall be jointly liable for and shall pay the Principal Representative, or the Principal Representative may withhold, the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the entire Project is 1) substantially completed, and the Notice (or all Notices) of Substantial Completion are issued, 2) finally complete and accepted and the Notice (or all Notices) of Acceptance are issued, or 3) both. Delay in substantial completion shall be measured from the Date of the Notice to Proceed and delay in final completion and acceptance shall be measured from the Date of the Notice of Substantial Completion.

In the first instance, specified in Article 7.4.1 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46, liquidated damages, if any, shall be the amount specified therein, for each calendar day of delay beginning after the stipulated number of days for Substantial Completion from the date of the Notice to Proceed, until the date of the Notice of Substantial Completion. Unless otherwise specified in any Supplementary General Conditions, in the event of any partial Notice of Substantial Completion, liquidated damages shall accrue until all required Notices of Substantial Completion are issued.

In the second instance, specified in Article 7.4.2 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46, liquidated damages, if any, shall be the amount specified in Article 7.4.2 of the Contractor's Design/Bid/Build Agreement SC-6.21, Modification of Article 46, for each calendar day in excess of the number of calendar days specified in the Contractor's bid for the Project and stipulated in the Agreement to finally complete the Project (as defined by the issuance of the Notice of Acceptance) after the final Notice of Substantial Completion has been issued.

In the third instance, when so specified in both Articles 7.4.1 and 7.4.2 of the Contractor's Agreement SC-6.21, both types of liquidated damages shall be separately assessed where those delays have occurred.

The parties expressly agree that said amounts are a reasonable estimate of the presumed actual damages that would result from any of the breaches listed, and that any liquidated damages that are assessed have been agreed to in light of the difficulty of ascertaining the actual damages that would be caused by any of these breaches at the time this Contract was formed; the liquidated damages in the first instance representing an estimate of damages due to the inability to use the Project; the liquidated damages in the second instance representing an estimate of damages due to the additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period including delivery of any or all guarantees and warranties, the submittals of sales and use tax payment forms, the calling for the final inspection and the completion of the final punch list.

The parties also agree and understand that the liquidated damages to be assessed in each instance are separate and distinct, although potentially cumulative, damages for the separate and distinct breaches of delayed substantial completion or final acceptance. Such liquidated damages shall not be avoided by virtue of the fact of concurrent delay caused by the Principal Representative, or anyone acting on behalf of the Principal Representative, but in such event the period of delay for which liquidated damages are assessed shall be equitably adjusted in accordance with Article 38, Delays And Extensions Of Time.

ARTICLE 47. DAMAGES

If either party to this Contract shall suffer damage under this Contract in any manner because of any wrongful act or neglect of the other party or of anyone employed by either of them, then the party suffering damage shall be reimbursed by the other party for such damage. Except to the extent of damages liquidated for the Contractor's failure to achieve timely completion as set forth in Article 46, Time of Completion and Liquidated Damages, the Principal Representative shall be responsible for, and at his or her option may insure against, loss of use of any existing property not included in the Work, due to fire or otherwise, however caused. Notwithstanding the foregoing, or any other provision of this Contract, to the contrary, no term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions of the Colorado Governmental Immunity Act, Section 24-10-101, *et seq.*, CRS, as now or hereafter amended. The parties understand and agree that liability for claims for injuries to persons arising out of negligence of the State of Colorado, its departments, institutions, agencies, boards, officials and employees is controlled and limited by the provisions of Section 24-101-101, *et seq.*, CRS, as now or hereafter amended and the risk management statutes, Section 24-30-1501, *et seq.*, CRS, as now or hereafter amended.

Notice of intent to file a claim under this clause shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except that in the case of claims by the Principal Representative involving warranties against faulty Work or materials Notice shall be required only to the extent stipulated elsewhere in these General Conditions. Claims made to the Principal Representative involving extra cost or extra time arising by virtue of instructions to the Contractor to which Article 36, Claims, applies shall be made in accordance with Article

36. Other claims arising under the Contract involving extra cost or extra time which are made to the Principal Representative under this clause shall also be made in accordance with the procedures of Article 36, whether or not arising by virtue of instructions to the Contractor; provided however that it shall not be necessary to first obtain or request a written judgment of the Architect/Engineer.

Provided written Notice of intent to file a claim is provided as required in the preceding paragraph, nothing in this Article shall limit or restrict the rights of either party to bring an action at law or to seek other relief to which either party may be entitled, including consequential damages, if any, and shall not be construed to limit the time during which any action might be brought. Nothing in these General Conditions shall be deemed to limit the period of time during which any action may be brought as a matter of contract, tort, warranty or otherwise, it being the intent of the parties to allow any and all actions at law or in equity for such periods as the law permits. All such rights shall, however be subject to the obligation to assert claims and to appeal denials pursuant to Article 36, Claims, where applicable.

ARTICLE 48. STATE'S RIGHT TO DO THE WORK; TEMPORARY SUSPENSION OF WORK; DELAY DAMAGES

A. STATE'S RIGHT TO DO THE WORK

If after receipt of Notice to do so, the Contractor should neglect to prosecute the Work properly or fail to perform any provision of the Contract, the Principal Representative, after a second seven (7) days' advance written Notice to the Contractor and the Surety may, without prejudice to any other remedy the Principal Representative may have, take control of all or a portion of the Work, as the Principal Representative deems necessary and make good such deficiencies deducting the cost thereof from the payment then or thereafter due the Contractor, as provided in Article 30, Correction Of Work Before Acceptance and Article 33, Payments Withheld, provided, however, that the Architect/Engineer shall approve the amount charged to the Contractor by approval of the Change Order.

B. TEMPORARY SUSPENSION OF WORK

The State, acting for itself or by and through the Architect/Engineer, shall have the authority to suspend the Work, either wholly or in part, for such period or periods as may be deemed necessary due to:

1. Unsuitable weather;
2. Faulty Workmanship;
3. Improper superintendence or project management;
4. Contractor's failure to carry out orders or to perform any provision of the Contract Documents;
5. Loss of, or restrictions to, appropriations;
6. Conditions, which may be considered unfavorable for the prosecution of the Work.

If it should become necessary to stop Work for an indefinite period, the Contractor shall store materials in such manner that they will not become an obstruction or become damaged in any way; and he or she shall take every precaution to prevent damage to or deterioration of the Work, provide suitable drainage and erect temporary structures where necessary.

Notice of suspension of Work shall be provided to the Contractor in writing stating the reasons therefore. The Contractor shall again proceed with the Work when so notified in writing.

The Contractor understands and agrees that the State of Colorado cannot predict with certainty future revenues and could ultimately lack the revenue to fund the appropriations applicable to this Contract. The Contractor further acknowledges and agrees that in such event that State may, upon Notice to the Contractor, suspend the Work in anticipation of a termination of the Contract for the convenience of the State, pursuant to Article 50, Termination For Convenience of State. If the Contract is not so terminated the Contract sum and the Contract time shall be equitably adjusted at the time the Principal Representative directs the Work to be recommenced and gives Notice that the revenue to fund the appropriation is available.

C. DELAY DAMAGES

The Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of any claim for extra costs, extra compensation or damages occasioned by hindrances or delays encountered in the Work only when and to the limited extent that such hindrance or delay is caused by an act or omission within the control of the Principal Representative, the Architect/Engineer or other persons or entities acting on behalf of the Principal Representative. Further, the Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of such a claim only if the Contractor has provided required Notice of the delay or impact, or has presented its claim for an extension of time or claim of other delay or other impact due to changes ordered in the Work before proceeding with the changed Work. Except as otherwise provided, claims for extension of time shall be Noticed and filed in accordance with Article 38, Delays and Extensions of Time, within three (3) business days of the beginning of the delay with any claim filed within seven (7) days after the delay has ceased, or such claim is waived. Claims for extension of time or for other delay or other impact resulting from changes ordered in the Work shall be presented and adjusted as provided in Article 35, Changes in the Work.

ARTICLE 49. STATE'S RIGHTS TO TERMINATE CONTRACT

A. GENERAL

If the Contractor should be adjudged bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed to take over his affairs, or if he or she should fail to prosecute his or her Work with due diligence and carry the Work forward in accordance with the construction schedule and the time limits set forth in the Contract Documents, or if he or she should fail to subsequently perform one or more of the provisions of the Contract Documents to be performed by him, the Principal Representative may serve written Notice on the Contractor and the Surety on performance and payment bonds, stating his or her intention to exercise one of the remedies hereinafter set forth and the grounds upon which the Principal Representative bases his or her right to exercise such remedy.

In such event, unless the matter complained of is satisfactorily cleared within ten (10) days after delivery of such Notice, the Principal Representative may, without prejudice to any other right or remedy, exercise one of such remedies at once, having first obtained the concurrence of the Architect/Engineer in writing that sufficient cause exists to justify such action.

B. CONDITIONS AND PROCEDURES

1. The Principal Representative may terminate the services of the Contractor, which termination shall take effect immediately upon service of Notice thereof on the Contractor and his or her Surety, whereupon the Surety shall have the right to take over and perform the Contract. If the Surety does not provide Notice to the Principal Representative of its intent to commence performance of the Contract within ten (10) days after delivery of the Notice of termination, the Principal Representative may take over the Work, take possession of and use all materials, tools, equipment and appliances on the premises and prosecute the Work to completion by such means as he or she shall deem best. In the event of such termination of his or her service, the Contractor shall not be entitled to any further payment under the Contract until the Work is completed and accepted. If the Principal Representative takes over the Work and if the unpaid balance of the contract price exceeds the cost of completing the Work, including compensation for any damages or expenses incurred by the Principal Representative through the default of the Contractor, such excess shall be paid to the Contractor. If, however, the cost, expenses and damages as certified by the Architect/Engineer exceed such unpaid balance of the contract price, the Contractor and his or her Surety shall pay the difference to the Principal Representative.
2. The Principal Representative may require the Surety on the Contractor's bond to take control of the Work and see to it that all the deficiencies of the Contractor are made good, with due diligence within ten (10) days of delivery of Notice to the Surety to do so. As between the Principal Representative and the Surety, the cost of making good such deficiencies shall all be borne by the Surety. If the Surety takes over the Work, either by election upon termination of the services of the Contractor pursuant to Section B(1) of this Article 49, State's Right To

Terminate Contract, or upon instructions from the Principal Representative to do so, the provisions of the Contract Documents shall govern the Work to be done by the Surety, the Surety being substituted for the Contractor as to such provisions, including provisions as to payment for the Work, the times of completion and provisions of this Article as to the right of the Principal Representative to do the Work or to take control of all or a portion of the Work.

3. The Principal Representative may take control of all or a portion of the Work and make good the deficiencies of the Contractor, or the Surety if the Surety has been substituted for the Contractor, with or without terminating the Contract, employing such additional help as the Principal Representative deems advisable in accordance with the provisions of Article 48A, State's Right To Do The Work; Temporary Suspension Of Work; Delay Damages. In such event, the Principal Representative shall be entitled to collect from the Contractor and his or her Surety, or to deduct from any payment then or thereafter due the Contractor, the costs incurred in having such deficiencies made good and any damages or expenses incurred through the default of Contractor, provided the Architect/Engineer approves the amount thus charged to the Contractor. If the Contract is not terminated, a Change Order to the Contract shall be executed, unilaterally if necessary, in accordance with the procedures of Article 35, Changes In The Work.

C. **ADDITIONAL CONDITIONS**

If any termination by the Principal Representative for cause is later determined to have been improper, the termination shall be automatically converted to and deemed to be a termination by the Principal Representative for convenience and the Contractor shall be limited in recovery to the compensation provided for in Article 50, Termination For Convenience Of State. Termination by the Contractor shall not be subject to such conversion.

ARTICLE 50. TERMINATION FOR CONVENIENCE OF STATE

A. **NOTICE OF TERMINATION**

The performance of Work under this Contract may be terminated, in whole or from time to time in part, by the State whenever for any reason the Principal Representative shall determine that such termination is in the best interest of State. Termination of Work hereunder shall be effected by delivery to the Contractor of a Notice of such termination specifying the extent to which the performance of Work under the Contract is terminated and the date upon which such termination becomes effective.

B. **PROCEDURES**

After receipt of the Notice of termination, the Contractor shall, to the extent appropriate to the termination, cancel outstanding commitments hereunder covering the procurement of materials, supplies, equipment and miscellaneous items. In addition, the Contractor shall exercise all reasonable diligence to accomplish the cancellation or diversion of all applicable outstanding commitments covering personal performance of any Work terminated by the Notice. With respect to such canceled commitments, the Contractor agrees to:

1. settle all outstanding liabilities and all claims arising out of such cancellation of commitments, with approval or ratification of the Principal Representative, to the extent he or she may require, which approval or ratification shall be final for all purposes of this clause; and,
2. assign to the State, in the manner, at the time, and to the extent directed by the Principal Representative, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the State shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.

The Contractor shall submit his or her termination claim to the Principal Representative promptly after receipt of a Notice of termination, but in no event later than three (3) months from the effective date thereof, unless one or more extensions in writing are granted by the Principal Representative upon written request of the Contractor within such three month period or authorized extension thereof. Upon failure of the Contractor to submit his or her termination claim within the time allowed, the Principal Representative may determine, on the basis of information available to him, the amount, if

any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

Costs claimed, agreed to, or determined pursuant to the preceding and following paragraph shall be in accordance with the provisions of § 24-107-101, C.R.S., as amended and associated Cost Principles of the Colorado Procurement Rules as in effect on the date of this Contract.

Subject to the preceding provisions, the Contractor and the Principal Representative may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the termination under this clause, which amount or amounts may include any reasonable cancellation charges thereby incurred by the Contractor and any reasonable loss upon outstanding commitments for personal services which he or she is unable to cancel; provided, however, that in connection with any outstanding commitments for personal services which the Contractor is unable to cancel, the Contractor shall have exercised reasonable diligence to divert such commitments to other activities and operations. Any such agreement shall be embodied in an Amendment to this Contract and the Contractor shall be paid the agreed amount.

The State may from time to time, under such terms and conditions as it may prescribe, make partial payments against costs incurred by the Contractor in connection with the termination portion of this Contract, whenever, in the opinion of the Principal Representative, the aggregate of such payments is within the amount to which the Contractor will be entitled hereunder.

The Contractor agrees to transfer title and deliver to the State, in the manner, at the time, and to the extent, if any, directed by the Principal Representative, such information and items which, if the Contract had been completed, would have been required to be furnished to the State, including:

- a. completed or partially completed plans, Drawings and information; and,
- b. materials or equipment produced or in process or acquired in connection with the performance of the Work terminated by the Notice.

Other than the above, any termination inventory resulting from the termination of the Contract may, with written approval of the Principal Representative, be sold or acquired by the Contractor under the conditions prescribed by and at a price or prices approved by the Principal Representative. The proceeds of any such disposition shall be applied in reduction of any payments to be made by the State to the Contractor under this Contract or shall otherwise be credited to the price or cost of Work covered by this Contract or paid in such other manners as the Principal Representative may direct. Pending final disposition of property arising from the termination, the Contractor agrees to take such action as may be necessary, or as the Principal Representative may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the State has or may acquire an interest.

Any disputes as to questions of fact, which may arise hereunder, shall be subject to the Remedies provisions of the Colorado Procurement Code, §§ 24-109-101, et seq., C.R.S., as amended.

ARTICLE 51. CONTRACTOR'S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT

If the Work shall be stopped under an order of any court or other public authority for a period of three (3) months through no act or fault of the Contractor or of any one employed by him, then the Contractor may on seven (7) days' written Notice to the Principal Representative and the Architect/Engineer stop Work or terminate this Contract and recover from the Principal Representative payment for all Work executed, any losses sustained on any plant or material, and a reasonable profit only for the Work completed. If the Architect/Engineer shall fail to issue or otherwise act in writing upon any certificate for payment within ten (10) days after it is presented and received by the Architect/Engineer, as provided in Article 31, Applications For Payments, or if the Principal Representative shall fail to pay the Contractor any sum certified that is not disputed in whole or in part by the Principal Representative in writing to the Contractor and the Architect/Engineer within thirty (30) days after the Architect/Engineer's certification, then the Contractor may

on ten (10) days' written Notice to the Principal Representative and the Architect/Engineer stop Work and/or give written Notice of intention to terminate this Contract.

If the Principal Representative shall thereafter fail to pay the Contractor any amount certified by the Architect/Engineer and not disputed in writing by the Principal Representative within ten (10) days after receipt of such Notice, then the Contractor may terminate this Contract and recover from the Principal Representative payment for all Work executed, any losses sustained upon any plant or materials, and a reasonable profit only for the Work completed. The Principal Representative's right to dispute an amount certified by the Architect/Engineer shall not relieve the Principal Representative of the obligation to pay amounts not in dispute as certified by the Architect/Engineer.

ARTICLE 52. SPECIAL PROVISIONS

A. CONTROLLER'S APPROVAL CRS 24-30-202(1)

This Contract shall not be deemed valid until it has been approved by the Colorado State Controller or designee.

B. FUND AVAILABILITY CRS 24-30-202(5.5)

Financial obligations of the State payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available

C. GOVERNMENTAL IMMUNITY

No term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protections, or other provisions, of the Colorado Governmental Immunity Act, CRS §24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. §§1346(b) and 2671 et seq., as applicable now or hereafter amended.

D. INDEPENDENT CONTRACTOR 4 CCR 801-2

Contractor shall perform its duties hereunder as an independent contractor and not as an employee. Neither Contractor nor any agent or employee of Contractor shall be deemed to be an agent or employee of the State. Contractor and its employees and agents are not entitled to unemployment insurance or workers compensation benefits through the State and the State shall not pay for or otherwise provide such coverage for Contractor or any of its agents or employees. Unemployment insurance benefits will be available to Contractor and its employees and agents only if such coverage is made available by Contractor or a third party. Contractor shall pay when due all applicable employment taxes and income taxes and local head taxes incurred pursuant to this contract. Contractor shall not have authorization, express or implied, to bind the State to any agreement, liability or understanding, except as expressly set forth herein. Contractor shall (a) provide and keep in force workers' compensation and unemployment compensation insurance in the amounts required by law, (b) provide proof thereof when requested by the State, and (c) be solely responsible for its acts and those of its employees and agents.

E. COMPLIANCE WITH LAW

Contractor shall strictly comply with all applicable federal and State laws, rules, and regulations in effect or hereafter established, including, without limitation, laws applicable to discrimination and unfair employment practices.

F. CHOICE OF LAW

Colorado law, and rules and regulations issued pursuant thereto, shall be applied in the interpretation, execution, and enforcement of this contract. Any provision included or incorporated herein by reference which conflicts with said laws, rules, and regulations shall be null and void. Any provision incorporated herein by reference which purports to negate this or any other Special Provision in whole or in part shall not be valid or enforceable or available in any action at law, whether by way of complaint, defense, or otherwise. Any provision rendered null and void by the operation of this provision shall not invalidate the remainder of this contract, to the extent capable of execution.

G. BINDING ARBITRATION PROHIBITED

The State of Colorado does not agree to binding arbitration by any extra-judicial body or person. Any provision to the contrary in this contract or incorporated herein by reference shall be null and void.

H. SOFTWARE PIRACY PROHIBITION. Governor's Executive Order D 002 00

State or other public funds payable under this contract shall not be used for the acquisition, operation, or maintenance of computer software in violation of federal copyright laws or applicable licensing restrictions. Contractor hereby certifies and warrants that, during the term of this contract and any extensions, Contractor has and shall maintain in place appropriate systems and controls to prevent such improper use of public funds. If the State determines that Contractor is in violation of this provision, the State may exercise any remedy available at law or in equity or under this contract, including, without limitation, immediate termination of this contract and any remedy consistent with federal copyright laws or applicable licensing restrictions.

I. EMPLOYEE FINANCIAL INTEREST/CONFLICT OF INTEREST CRS 24-18-201 & CRS 24-50-507

The signatories aver that to their knowledge, no employee of the State has any personal or beneficial interest whatsoever in the service or property described in this contract. Contractor has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance of Contractor's services and Contractor shall not employ any person having such known interests.

J. VENDOR OFFSET CRS 24-30-202(1) & CRS 24-30-202.4

Subject to CRS §24-30-202.4 (3.5), the State Controller may withhold payment under the State's vendor offset intercept system for debts owed to State agencies for: **(a)** unpaid child support debts or child support arrearages; **(b)** unpaid balances of tax, accrued interest, or other charges specified in CRS §39-21-101, et seq.; **(c)** unpaid loans due to the Student Loan Division of the Department of Higher Education; **(d)** amounts required to be paid to the Unemployment Compensation Fund; and **(e)** other unpaid debts owing to the State as a result of final agency determination or judicial action.

K. PUBLIC CONTRACTS FOR SERVICES. CRS §8-17.5-101.

[Not Applicable to agreements relating to the offer, issuance, or sale of securities, investment advisory services or fund management services, sponsored projects, intergovernmental agreements, or information technology services or products and services] Contractor certifies, warrants, and agrees that it does not knowingly employ or contract with an illegal alien who will perform Work under this contract and will confirm the employment eligibility of all employees who are newly hired for employment in the United States to perform Work under this contract, through participation in the E-Verify Program or the Department program established pursuant to CRS §8-17.5-102(5)(c), Contractor shall not knowingly employ or contract with an illegal alien to perform Work under this contract or enter into a contract with a subcontractor that fails to certify to Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform Work under this contract. Contractor **(a)** shall not use E-Verify Program or Department program procedures to undertake pre-employment screening of job applicants while this contract is being performed, **(b)** shall notify the subcontractor and the contracting State agency within three days if Contractor has actual knowledge that a subcontractor is employing or contracting with an illegal alien for Work under this contract, **(c)** shall terminate the subcontract if a subcontractor does not stop employing or contracting with the illegal alien within three days of receiving the notice, and **(d)** shall comply with reasonable requests made in the course of an investigation, undertaken pursuant to CRS §8-17.5-102(5), by the Colorado Department of Labor and Employment. If Contractor participates in the Department program, Contractor shall deliver to the contracting State agency, Institution of Higher Education or political subdivision a written, notarized affirmation, affirming that Contractor has examined the legal Work status of such employee, and shall comply with all of the other requirements of the Department program. If Contractor fails to comply with any requirement of this provision or CRS §8-17.5-101 et seq., the contracting State agency, institution of higher education or political subdivision may terminate this contract for breach and, if so terminated, Contractor shall be liable for damages.

- L. PUBLIC CONTRACTS WITH NATURAL PERSONS. CRS §24-76.5-101.
Contractor, if a natural person eighteen (18) years of age or older, hereby swears and affirms under penalty of perjury that he or she (a) is a citizen or otherwise lawfully present in the United States pursuant to federal law, (b) shall comply with the provisions of CRS §24-76.5-101 et seq., and (c) has produced one form of identification required by CRS §24-76.5-103 prior to the effective date of this contract.

ARTICLE 53. MISCELLANEOUS PROVISIONS

- A. CONSTRUCTION OF LANGUAGE
The language used in these General Conditions shall be construed as a whole according to its plain meaning, and not strictly for or against any party. Such construction shall, however, construe language to interpret the intent of the parties giving due consideration to the order of precedence noted in Article 2C, Intent of Documents.
- B. SEVERABILITY
Provided this Agreement can be executed and performance of the obligations of the Parties accomplished within its intent, the provisions hereof are severable and any provision that is declared invalid or becomes inoperable for any reason shall not affect the validity of any other provision hereof, provided that the Parties can continue to perform their obligations under this Agreement in accordance with its intent.
- C. SECTION HEADINGS
The captions and headings in this Agreement are for convenience of reference only, and shall not be used to interpret, define, or limit its provisions.
- D. AUTHORITY
Each person executing the Agreement and its Exhibits in a representative capacity expressly represents and warrants that he or she has been duly authorized by one of the parties to execute the Agreement and has authority to bind said party to the terms and conditions hereof.
- E. INTEGRATION OF UNDERSTANDING
This Contract is intended as the complete integration of all understandings between the parties and supersedes all prior negotiations, representations, or agreements, whether written or oral. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or affect whatsoever, unless embodied herein in writing. No subsequent novation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written Change Order or Amendment to this Contract.
- F. VENUE
All suits or actions related to this Agreement shall be filed and proceedings held in the State of Colorado and exclusive venue shall be in the City and County of Denver.
- G. NO THIRD PARTY BENEFICIARIES
Enforcement of this Agreement and all rights and obligations hereunder are reserved solely to the Parties. Any services or benefits which third parties receive as a result of this Contract are incidental to the Contract, and do not create any rights for such third parties.
- H. WAIVER
Waiver of any breach under a term, provision, or requirement of this Agreement, or any right or remedy hereunder, whether explicitly or by lack of enforcement, shall not be construed or deemed as a waiver of any subsequent breach of such term, provision or requirement, or of any other term, provision, or requirement.

I. INDEMNIFICATION

Contractor shall indemnify, save, and hold harmless the State, its employees and agents, against any and all claims, damages, liability and court awards including costs, expenses, and attorney fees, to the extent such claims are caused by any negligent act or omission of the Contractor, its employees, agents, subcontractors or assignees pursuant to the terms of this Contract, but not to the extent such claims are caused by any negligent act or omission of, or breach of contract by, the State, its employees, agents, other contractors or assignees, or other parties not under control of or responsible to the Contractor.

J. STATEWIDE CONTRACT MANAGEMENT SYSTEM

If the maximum amount payable to Contractor under this Contract is \$100,000 or greater, either on the Effective Date or at anytime thereafter, this section shall apply.

Contractor agrees to be governed, and to abide, by the provisions of CRS 24-102-205, 24-102-206, 24-103-601, 24-103.5-101, 24-105-101, and 24-105-102 concerning the monitoring of vendor performance on state contracts and inclusion of contract performance information in a statewide contract management system.

Contractor's performance shall be subject to Evaluation and Review in accordance with the terms and conditions of this Contract, State law, including C.R.S 24-103.5-101, and State Fiscal Rules, Policies and Guidance. Evaluation and Review of Contractor's performance shall be part of the normal contract administration process and Contractor's performance will be systematically recorded in the statewide Contract Management System. Areas of Evaluation and Review shall include, but shall not be limited to quality, cost and timeliness. Collection of information relevant to the performance of Contractor's obligations under this Contract shall be determined by the specific requirements of such obligations and shall include factors tailored to match the requirements of Contractor's obligations. Such performance information shall be entered into the statewide Contract Management System at intervals established herein and a final Evaluation, Review and Rating shall be rendered within 30 days of the end of the Contract term. Contractor shall be notified following each performance Evaluation and Review, and shall address or correct any identified problem in a timely manner and maintain Work progress.

Should the final performance Evaluation and Review determine that Contractor demonstrated a gross failure to meet the performance measures established hereunder, the Executive Director of the Colorado Department of Personnel and Administration (Executive Director), upon request by the Principal Representative, and showing of good cause, may debar Contractor and prohibit Contractor from bidding on future contracts. Contractor may contest the final Evaluation, Review and Rating by: (a) filing rebuttal statements, which may result in either removal or correction of the evaluation (CRS 24-105-102(6)), or (b) under CRS 24-105-102(6), exercising the debarment protest and appeal rights provided in CRS 24-109-106, 107, 201 or 202, which may result in the reversal of the debarment and reinstatement of Contractor, by the Executive Director, upon a showing of good cause.

K. CORA DISCLOSURE

To the extent not prohibited by federal law, this Agreement and the performance measures and standards under CRS §24-103.5-101, if any, are subject to public release through the Colorado Open Records Act, CRS §24-72-101, et seq.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

PERFORMANCE BOND

Institution/Agency: _____
Project No./Name: _____

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____
_____ are held and firmly bound unto **the STATE OF COLORADO**
acting by and through _____
(AGENCY OR INSTITUTION)

hereinafter called the "Principal Representative", in the sum of _____
_____ Dollars (\$ _____)

for the payment whereof the Principal and Surety bind themselves, their heirs, executors,
administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative
have entered into a certain Contract, hereinafter called "Contract," dated _____, 20
_____, for the construction of a PROJECT described as

which Contract is hereby by reference made a part hereof;

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION, is such that, if the Principal shall promptly, fully and faithfully perform all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract any extensions thereof that may be granted by the Principal Representative with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

AND THE SAID SURETY, for value received hereby stipulates and agrees that whenever the Principal shall be, and declared by the Principal Representative to be in default under said Contract, the State of Colorado having performed its obligations thereunder, the Surety may promptly remedy the default or shall promptly (1) Complete the Contract in accordance with its terms and conditions, or (2) Obtain a bid or bids for submittal to the Principal Representative for completing the Contract in accordance with its terms and conditions, and upon determination by the Principal Representative and Surety of the lowest responsible bidder, arrange for a contract between such bidder and the State of Colorado acting by and through the Principal Representative and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion, less the balance of the contract price but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount hereinbefore set forth. The term "balance of the contract price" as herein used shall mean the total amount payable to the Principal under the Contract and any amendments thereto, less the amount properly paid by the State of Colorado to the Contractor.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the State of Colorado.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of ,
A.D., _____ 20____.

(Corporate Seal)

THE PRINCIPAL

ATTEST:

By: _____

Title: _____

Secretary

(Corporate Seal)

SURETY

By: _____
Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful payment for all labor and material of the contract.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

LABOR AND MATERIAL BOND

Institution/Agency: _____
Project No./Name: _____

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____ are held and firmly bound unto the STATE OF COLORADO acting by and through _____ (agency or institution)

hereinafter called "Principal Representative," and to all subcontractors and any others who have supplied or furnished or shall supply or furnish materials, rental machinery, tools, or equipment actually used in the performance of the hereinafter identified Contract, or who have performed or shall perform labor in the performance of or in connection with said Contract, hereinafter called "Obligees" in the sum of _____ Dollars (\$ _____)

together with interest at the rate of eight per cent (8%) per annum on all payments becoming due in accordance with said Contract, from the time such payments shall become due until such payment shall be made, for the payment of which, well and truly made to the Obligees, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called "Contract," dated _____, 20__ for the construction of a PROJECT described as

which Contract is hereby by reference made a part hereof;

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal and the Surety shall fully indemnify and save harmless the State of Colorado and the Principal Representative from and against any and all costs and damages, including patent infringements, which either may suffer by reason of any failure or failures of the Principal promptly and faithfully to perform all terms and conditions of said Contract and shall fully reimburse and repay the State of Colorado and the Principal Representative all outlay and expense which the State of Colorado and the Principal Representative may incur in making good any such failure or failures, and further, if the Principal and his subcontractors shall duly and promptly pay for any and all labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools, or equipment and other supplies which have been or shall be used or consumed by said Principal or his subcontractors in the performance of the work of said Contract , and it said Principal shall duly and promptly pay all his subcontractors the sums due them for any and all materials, rental machinery, tools, or equipment and labor that have been or shall be furnished, supplied, performed or used in connection with performance of said Contract, and shall also fully indemnify and save harmless the State of Colorado and the Principal Representative to the extent of any and all expenditures which either or both of them may be required to make by reason of any failures or defaults by the Principal or any subcontractor in connection with such payments; then this obligation shall be null and void, otherwise it shall remain in full force and effect.

It is expressly understood and agreed that any alterations which may be made in the terms of said Contract or in the work to be done under said Contract, or any extension(s) of time for the performance of the Contract, or any forbearance on the part of either the State of Colorado or the Principal to any of the others, shall not in any way release the Principal and the Surety, or either of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety of any such alteration, extension or forbearance being hereby waived.

IN WITNESS WHEREOF, the Principal and the Surety have executed this Bond, this _____ day of _____, A.D., 20_____.

(Corporate Seal)

THE PRINCIPAL

ATTEST:

By: _____

Title: _____

Secretary

(Corporate Seal)

SURETY

By: _____

Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful performance of the contract.



STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CERTIFICATION AND AFFIDAVIT REGARDING UNAUTHORIZED IMMIGRANTS

Institution/Agency: _____

Project No./Name: _____

A. CERTIFICATION STATEMENT CRS 8-17.5-101 & 102 (HB 06-1343, SB 08-193)

The Vendor, whose name and signature appear below, certifies and agrees as follows:

1. The Vendor shall comply with the provisions of CRS 8-17.5-101 et seq. The Vendor shall not knowingly employ or contract with an unauthorized immigrant to perform work for the State or enter into a contract with a subcontractor that knowingly employs or contracts with an unauthorized immigrant.
2. The Vendor certifies that it does not now knowing employ or contract with and unauthorized immigrant who will perform work under this contract, and that it will participate in either (i) the "E-Verify Program", jointly administered by the United States Department of Homeland Security and the Social Security Administration, or (ii) the "Department Program" administered by the Colorado Department of Labor and Employment in order to confirm the employment eligibility of all employees who are newly hired to perform work under this contract.
3. The Vendor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Vendor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate work for breach and the Vendor shall be liable for damages to the State.

B. AFFIDAVIT CRS 24-76.5-101 (HB 06S-1023)

1. If the Vendor is a **sole proprietor**, the undersigned hereby swears or affirms under penalty of perjury under the laws of the State of Colorado that (check one):

- ☐ I am a United States citizen, or
- ☐ I am a Permanent Resident of the United States, or
- ☐ I am lawfully present in the United States pursuant to Federal law.

I understand that this sworn statement is required by law because I am a sole proprietor entering into a contract to perform work for the State of Colorado. I understand that state law requires me to provide proof that I am lawfully present in the United States prior to starting work for the State. I further acknowledge that I will comply with the requirements of CRS 24-76.5-101 et seq. and will produce the required form of identification prior to starting work. I acknowledge that making a false, fictitious, or fraudulent statement or representation in this sworn affidavit is punishable under the criminal laws of Colorado as perjury in the second degree under CRS 18-8-503 and it shall constitute a separate criminal offense each time a public benefit is fraudulently received.

CERTIFIED and AGREED to this _____ day of _____, 20____.

VENDOR:

Vendor Full Legal Name

BY: _____

Signature of Authorized Representative

Title