GENERAL REQUIREMENTS
OF THE
STIPULATED SUM CONTRACT FOR CONSTRUCTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes the following general administrative and procedural requirements for substitutions.

B. Related Sections include the following:

1. Section 01 60 00 “Product Requirements” for requirements for submitting comparable product submittals for products by listed manufacturers.

1.03 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.

1.04 SUBMITTALS

A. Substitution Requests: Submit 4 copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include specification Section number and title and Drawing numbers and titles. Include the name, address, and telephone number of the manufacturer of the proposed substitute product.

1. Substitution Request Form: Use form provided at end of Section.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why the substitution is offered including why the specified material or product cannot be provided or the benefits to Owner and the Work of the proposed substitution

b. A description of aspects of the Contract Documents affected by the proposed substitution. Include annotated copy of applicable Specification Section.

c. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and

Separate Contractors that will be necessary to accommodate proposed substitution.

d. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Description shall include the comparative advantages and disadvantages. Include deviations, if any, from the Work specified.

e. Product Data, including test data, performance and reference standards, manufacturers catalogs, brochures, drawings and descriptions of products, fabrication, installation and operating procedures, and warranties. Provide complete data substantiating compliance with requirements of the Contract Documents.

f. Samples, where applicable or requested.

g. Certificates and qualification data, where applicable.

h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

i. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

j. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time and any impact to the critical path. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

k. Cost information, including a proposal of change, if any, in the GMP or Contract Sum and if requested by Owner, a specific analysis of the cost-effectiveness and performance capabilities of any building system or component specified for the Work.

l. Estimated cost of any engineering, design or agency fees required for Work of all trades directly or indirectly affected by the proposed substitution.

m. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated. Include any recommendations regarding Project Site logistics and any other studies that are required to complete the Work successfully.

n. 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.

o. Name and address of similar projects in the general location of this Project on which the proposed substitute product was used, with names and addresses of architects and owners. Provide approximate date product was installed.

3. Owner's Action: If necessary, Owner or Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Owner will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

   a. Form of Acceptance: Change Order or Architect's Supplemental Instructions for minor changes in the Work.

   b. Use product specified if Owner cannot make a decision on use of a proposed substitution within time allocated.

1.05 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.

1.06 PROCEDURES

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

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Following commencement of construction or such other time indicated in the Contract, substitutions requested by Contractor will be considered only when one or more of the following conditions are met and documented by Contractor:

   1. Specified item fails to comply with regulatory requirements; or

   2. Specified item has been discontinued by the manufacturer or the manufacturer has ceased operations; or

   3. Specified item, through no fault of Contractor, is unavailable in the time frame required to meet the critical path of the Project Schedule; or

   4. Specified item, through subsequent information disclosure, will not perform properly or fit in designated space; or

   5. Manufacturer declares specified product to be unsuitable for intended use or refuses to warrant installation of product.

B. Timing: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

C. Conditions: Owner and Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Owner will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities that Owner must assume. Owner's additional responsibilities may include compensation to Owner for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Requested substitution provides sustainable design characteristics that specified product provided for achieving LEED prerequisites and credits, if applicable.
5. Substitution request is fully documented and properly submitted. No incomplete request for substitution will be considered, and products for which insufficient information is submitted will be disapproved for lack of substantiating data.
6. Requested substitution will not adversely affect Contractor's Construction Schedule.
7. Requested substitution has received necessary approvals of authorities having jurisdiction.
8. Requested substitution is compatible with other portions of the Work.
9. Requested substitution has been coordinated with other portions of the Work.
10. Requested substitution provides specified warranty.
11. 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.

D. Owner will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly, including, but not limited to, awarding subcontracts, investigating lead times, and ordering materials sufficiently in advance to ensure delivery in time to meet the construction schedule.

PART 3 - EXECUTION (NOT USED)

FORMS ATTACHED:

Substitution Request

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Knowledge for Creating and Sustaining the Built Environment

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Phone: _____

Address: _____

Trade Name: _____ Model No.: _____

Installer: _____ Phone: _____

Address: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product:

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

.

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution: _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

Form Version: June 2004
CSI Form 13.1A

SUBSTITUTION REQUEST
(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: ☐

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ Other:

Form Version: June 2004
CSI Form 13.1A

END OF SECTION 01 25 00

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.01 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.

B. Refer to General Requirements Section 01 32 23 for use of e-Builder Project Management Information Systems (PMIS).

C. Refer to General Requirements Section 01 31 19 for Project Meetings.

1.02 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).

B. Contractor shall participate in coordination requirements.

1.03 DEFINITIONS

A. RFI: Request from Contractor seeking clarification of the Contract Documents.

1.04 COORDINATION DRAWINGS

A. 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, elevations, 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 contractors 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, mechanical, 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 dampers, valves, and other 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 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. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.

2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.

3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.

4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.

5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

6. Mechanical and Plumbing Work: Show the following:

a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.

b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.

c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:

a. Runs of vertical and horizontal conduit 2 inches in diameter and larger.

b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.

c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.

d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:

a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Owner or Architect 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 Owner or Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Owner or Architect will so inform Contractor, who shall correct deficiencies and resubmit.

10. Revit Linked Model File Incorporation: For projects being designed and constructed using Revit Linked Models, develop and incorporate coordination drawing files into Revit Linked Models through linking AutoCAD files and utilizing shared coordinates.

a. Parametric links shall be maintained within the models to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views.

b. All Revit files should have USC Shared Parameters properly assigned by categories with parameter values input for the appropriate phase of development.

c. All elements shall be modeled to AIA standard minimum LOD 300 by the appropriate design disciplines. Clearances and access zones should be modeled on separate layers, one layer per system.

d. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.

1.05 REQUEST FOR INFORMATION (RFI)

A. General: Immediately upon discovery of the need for clarification of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Owner will return RFIs submitted to Owner directly 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.

3. RFIs shall be submitted and responded to via e-Builder Project Management Information Systems (PMIS).

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
   1. Specification Section number and title and related paragraphs, as appropriate.
   2. Drawing number and detail references, as appropriate.
   3. Field dimensions and conditions, as appropriate.
   4. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   5. 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, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
   6. References to previous RFIs (by number) that relate to the RFI or ask a similar question for a different location.

C. RFI Forms: Refer to General Requirements Section 01 32 23 for use of e-Builder Project Information Management Software.

D. Owner or Architect's Action: Owner or Architect will review each RFI, determine action required, and respond. Owner or Architect shall answer all RFIs in writing in accordance with the time frames established in the General Conditions and shall prepare, reproduce and distribute supplemental details, Drawings, Specifications and interpretations (as is necessary), with reasonable promptness so as not to delay the orderly progress of the work. Interpretations and decisions of Owner and Architect shall be consistent with the intent reasonably inferable from the Contract Documents. Owner or Architect shall issue revised Drawings and Specifications, Bulletins or Architect Supplemental Instructions (ASI) as may be necessary to reflect answers to RFIs, details and sketches prepared to address field conditions, Proposal Requests, Construction Work Directives and Change Orders and shall distribute copies of the updated Drawings and Specifications to Contractor so it can maintain up-to-date Record Drawings.
   1. The following Contractor-generated RFIs will be returned without action, other than noting one or more of the following reasons for non-review:
      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 Architect's actions on submittals.

g. Incomplete RFIs or inaccurately prepared RFIs.

h. RFIs that address more than one issue.

2. If Owner or Architect requests additional information regarding the RFI, the time for response will start from date of receipt of additional information.

3. If Contractor believes that the response to any RFI results in a change to the Contract Time, the Contract Sum or has caused any other change, Contractor may submit a Change Order Proposal in accordance with Article GC-7.6 of the General Conditions.

   a. The receipt of the RFI response shall be considered the Event for the purposes of the timing requirements in Article GC-7.6.5.

E. Generate RFI log via e-Builder Project Management Information Systems (PMIS) on an on-going basis. Review RFI log on a weekly basis during Weekly Coordination meetings. Submitter or responder updates shall be distributed / notified via e-Builder Project Management Information Systems (PMIS). Submit log weekly. Include not less than the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect/Owner response was received.

1.06 PROJECT MEETINGS

A. Conduct weekly coordination meetings, monthly progress meetings and other meetings in accordance with Section 01 31 19, Project Meetings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 31 00

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.01 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.

1.02 DESCRIPTION

A. The Work specified in this Section requires Contractor, his Project Manager or Superintendent, Safety Engineer, and other Key Personnel as required, to attend meetings with Owner for collection and dissemination of information related to Contract.

B. Contractor will prepare minutes of each meeting and distribute them to each of the participants in accordance with paragraph 3.01(D) of this Section 01 31 19.

C. The purpose of the project meetings is to review safety and security, project status, outstanding action(s) by the Parties, analyze and resolve problems that might arise relative to execution of the Work and discuss potential impact Contractor's operations may have on Owner's operations. To the maximum extent practicable, Contractor shall advise Owner and Architect at least 24 hours in advance of the project meeting regarding items Contractor wishes to have added to the agenda.

D. Persons designated by Contractor to attend and participate in project meetings shall have the authority to require Contractor to commit to the resolution of problems as agreed upon in the project meetings.

E. Subcontractors, materials suppliers, and others may be invited to attend project meetings when their aspects of the Work are involved but Contractor shall remain wholly responsible for its obligations under the contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. General: Schedule and conduct meetings and conferences at Project Site unless otherwise indicated. Refer to General and Supplementary Conditions of the Contract for use of e-Builder Project Management Information Systems (PMIS). Contractor shall be responsible for generating agenda and meeting minutes.

B. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.

C. Agenda: Prepare the meeting agenda. Distribute the agenda in advance to all invited attendees.

D. Minutes: Except where stated that minutes are to be prepared by others, record significant discussions, agreements, disagreements and Action Items. Distribute the draft meeting minutes to everyone concerned, including Owner and Architect, within two (2) days of the meeting. Owner and Architect shall have the right to comment on the minutes provided. Issue amended minutes addressing issues and incorporating comments submitted in writing by attendees before the next meeting for weekly meetings, or within two (2) days of receiving comments from Owner or Architect for less frequent meetings, using Owner's Project Management Information System ("**PMIS**").

E. All meetings as part of the completion of the Work will begin with a Safety Moment. Safety issues will then be the first item of substance discussed as part of each meeting's agenda. Introductions of attendees and review/acceptance of the minutes of previous meetings may be conducted between the Safety Moment and the discussion of safety issues.

1. Safety Moment: A Safety Moment is defined as a short story or anecdote, which highlights a safety issue or tip. The topic may be related to work, home or other activities.

3.02 NOT USED.

3.03 PROJECT COORDINATION MEETINGS

A. Weekly construction coordination meetings led by Contractor will be held starting on a date and time mutually agreed by Owner and Contractor. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.

1. Attendees: In addition to representatives of Owner**,** Contractor, Subcontractors, suppliers, and other entities concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

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

a. Prior to the weekly construction meeting Contractor shall prepare for presentation at the meeting a "four week rolling" bar chart schedule required in Section 01 32 13.

1) Review progress since the last coordination meeting and work scheduled during the next three week period, as well as upcoming Milestones. Determine

whether each activity is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction that is 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.

2) Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with minutes of each meeting.

b. Construction safety.

d. Design status.

e. Review present and future needs of Contractor and each Subcontractor present, including the following:

1) Interface requirements.

2) Sequence of operations.

3) Resolution of Revit Linked Model component conflicts.

4) Submittal status, with emphasis on those submittals required over the next 30 day period.

5) Deliveries.

6) Off-site fabrication.

7) Access.

8) Site utilization.

9) Temporary facilities and controls.

10) Work hours.

11) Hazards and risks.

12) Progress cleaning.

13) Quality and work standards.

14) Change Orders.

15) Corrective action requests and non-conformance reports.

16) RFI status, with emphasis on RFI's critical to upcoming work.

17) Status of pending claims and disputes.

18) LEED documentation status update, if applicable.

3.04 MONTHLY PROGRESS REPORT AND MEETINGS

A. Progress and Pencil Copy Meeting: Conduct monthly status meetings.

1. Coordinate dates of meetings with submittal and review of Pencil Copy draft Application for Payment as described in the Payment provisions of the Agreement.
2. Attendees: In addition to representatives of Owner, Architect and Contractor, Subcontractor, supplier and other entity concerned with current progress or involved in planning, coordination, or performance of future activities may be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review Pencil Copy draft Application for Payment (submitted to Owner in advance of the meeting) and agree on all start and completion dates of schedule activities and percent complete. For projects that require a cost-loaded schedule, agree on the earned value of cost-loaded activities to be included in Contractor's Application for Payment.
4. Pencil Copy Application for Payment: Provide Owner with Pencil Copy Application for Payment in advance of meeting, as required by the Payment provisions in the Agreement.
5. Minutes: Incorporate Owner comments into Application for Payment, Construction Schedule update and Monthly Progress Report. Separate meeting minutes are not required.

B. Field Progress Review and Schedule: Conduct a monthly field progress review and schedule meeting attended by Contractor and Owner (and Architect, if applicable).
   1. Preliminary Construction Schedule update: at least ten (10) days prior to the meeting, provide Owner with the preliminary monthly updated Construction Schedule and narrative forecasting project status and containing actual start and finish dates for activities in progress or completed, remaining durations of activities in progress, Milestones achieved, logic changes, new or deleted activities, and new Change Orders. Incorporate Owner's comments into the updated Construction Schedule Submittal for the month.
   2. Field Progress Review Meeting: Discuss the preliminary Construction Schedule update required by Section 01 32 13, Paragraph 2.01(A)(4) of these General Requirements including any logic changes, resolution of Owner's review comments, schedule impact mitigation, schedule recovery strategies and/or any other items of significance that could impact progress. At the completion of the field progress review, Contractor and Owner will finalize and agree on the schedule logic. Contractor shall incorporate agreements into the Construction Schedule and submit to Owner via the PMIS within two working days.

C. Monthly Report: Contractor shall submit an overall progress report for the Project and present it at a monthly meeting. The Monthly Progress Report shall be submitted at least four (4) days prior to the meeting and shall include:
   1. An executive summary, items of concern, project photos, cost reports with COP and Alternate status, document control with logs, master and look ahead schedules.

2. A financial status report including overall status, Subcontractor status and DBE/ SBE and Labor Compliance program status (if applicable).
3. Contractor's Construction Schedule: Review progress since the last report. Identify whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Explain 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.
   a. Review schedule for next period.
   b. Include a summary schedule narrative as described in Section 01 32 13.
4. Master List of Submittals status report.
5. Safety and security report.
6. QC Report, including status of correction of deficient items.
7. RFI status report.
8. Change Order Proposal Requests and COPs status report.
9. Status of pending agency reviews and/or approvals, as well as corrective action plan in instances where agency coordination work or approvals are behind schedule.
10. Status of record documentation.
11. Pending claims and disputes.
12. Updated copies of LEED materials tracking spreadsheet (if applicable).

D. The Monthly Progress Meetings will be held within seven (7) days after the end of the month.
   1. Attendees: In addition to representatives of Owner, Architect and Contractor, major Subcontractor and suppliers may be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Review Contractor's Monthly Progress Report, discuss items of significance that could affect progress or Project administration. Include topics for discussion as appropriate to status of Project.

3.05 CONSTRUCTION KICK-OFF MEETING

A. Schedule and conduct the initial construction Kick-Off Meeting before starting construction, at a time convenient to Owner and Architect, but no later than seven (7) days after Notice to Proceed for the GMP Amendment or Notice to Proceed for any portion of the construction work. The agenda for this meeting will include Safety, Quality, Design, Communications and the Construction Schedule.
   1. Conduct the conference to review responsibilities and personnel assignments.

2. Attendees: Authorized representatives of Owner; Contractor and its superintendent; major Subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: The development of the agenda should be coordinated with Owner. Discuss items of significance that could affect progress, including the following:

   a. Tentative construction schedule and phasing including critical work sequencing and long-lead items.

   b. Designation of key personnel and their duties.

   c. Lines of communications.

   d. Procedures for RFIs.

   e. Procedures for processing field decisions and Change Orders.

   f. Procedures for requesting changes to the scope of Work.

   g. Procedures for testing and inspecting.

   h. Procedures for processing Applications for Payment.

   i. Distribution of the Contract Documents.

   j. Submittal procedures.

   k. LEED requirements, if any.

   l. Preparation of record documents.

   m. Use of the premises and existing building.

   n. Owner's occupancy requirements.

   o. Work restrictions and working hours.

   p. Responsibility for temporary facilities and controls.

   q. Procedures for moisture and mold control.

   r. Procedures for disruptions and shutdowns.

   s. Construction waste management and recycling.

   t Parking availability.

   u. Office, work, and storage areas.

   v. Equipment deliveries and priorities.

   w. First aid.

   x. Security.

   y. Progress cleaning.

   z. SBE, DBE and Labor Compliance Programs, if any.

3.06 PRE-INSTALLATION CONFERENCES:

A. Conduct a pre-installation conference at Project Site before each construction activity that requires coordination with other construction.
   1. Distribute written notice of agenda, meeting time and location a minimum of four (4) calendar days in advance.
   2. 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 Owner and Architect of scheduled meeting dates.
   3. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
      a. Contract Documents.
      b. Options.
      c. Related RFIs.
      d. Related Change Orders.
      e. Purchases.
      f. Deliveries.
      g. Submittals.
      h. Review of mockups.
      i. Possible conflicts.
      j. Compatibility requirements.
      k. Time schedules.
      l. Weather limitations.
      m. Manufacturer's written instructions/recommendations.
      n. Warranty requirements.
      o. Compatibility of materials.
      p. Acceptability of substrates.
      q. Temporary facilities and controls.
      r. Space and access limitations.
      s. Regulations of authorities having jurisdiction.
      t. Testing and inspecting requirements.
      u. Installation procedures.
      v. Coordination with other work.
      w. Required performance results.
      x. Protection of adjacent work.

y. Protection of construction and personnel.

z. LEED requirements, if any.

4. 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.

3.08. PROJECT CLOSEOUT CONFERENCE:

A. Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion for the project or any phase.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.

2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major Subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of record documents.

b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.

c. Submittal of written warranties.

d. Requirements for preparing operations and maintenance data.

e. Requirements for delivery of material samples, attic stock, and spare parts.

f. Requirements for demonstration and training.

g. Preparation of Contractor's punch list.

h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.

i. Submittal procedures.

j. Coordination of separate contracts.

k. Owner's partial occupancy requirements.

l. Installation of Owner's furniture, fixtures, and equipment.

m. Responsibility for removing temporary facilities and controls.

n. LEED documentation, if any

END OF SECTION 01 31 19

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for routine reporting requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Daily Construction Reports.
   2. 4 Week Rolling Schedule.
   3. Monthly Progress reports.
   4. Material location reports.

B. Related Requirements:
   1. Section 01 32 13 “Cost Loaded Critical Path Schedule” for submittal of schedules and related reports
   2. Section 01 32 33 “Photographic Documentation” for requirements for photo documentation of construction progress.
   3. 01 33 00 “Submittal Procedures” for submittal requirements.

PART 2 - PRODUCTS

2.01 REPORTS

A. Daily Construction Report: Prepare a daily construction report recording the following information concerning events at Project Site. This Daily Construction Report shall be signed by Contactor’s Superintendent, submitted within twenty-four (24) hours (next working day) to Owner through the PMIS (e-builder). At a minimum the report shall include the following:
   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.
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 Order work implemented.
15. Construction Work Directives received.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. 4 Week Rolling Schedule: Submit in accordance with Section 01 32 13.

C. Monthly Updated Construction Schedule Submittals and Written Narrative: Submit in accordance with Section 01 32 13.

C. Monthly Progress Report: Submit in accordance with Section 01 31 19.

D. Material Location Report: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project Site and at off-site locations. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project Site. Indicate the following categories for stored materials:
   1. Material stored prior to previous report and remaining in storage.
   2. Material stored prior to previous report and since removed from storage and installed.
   3. Material stored following previous report and remaining in storage.

E. Field Condition Reports: Immediately upon discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.02 SPECIAL REPORTS

A General: Submit special reports directly to Owner within one day 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 Owner in advance when these events are known or predictable.

2.03 LEED LOG BINDER (IF LEED IS REQUIRED)

A. Maintain LEED log binder at field office.
   1. Include copies of updated materials tracking spreadsheet.
   2. Include copies of all LEED-related information submittals required by technical specifications sections.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 32 00

SECTION 01 32 13
CRITICAL PATH SCHEDULE

PART 1 - GENERAL

1.01 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.

1.02 DESCRIPTION

A. The Work specified in this Section consists of developing and maintaining an accurate critical path schedule in sufficient detail to show a logical sequence in which Contractor proposes to carry out all Work required under this Contract. It is Contractor's responsibility to effectively plan, schedule, manage, and execute the Work in accordance with Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PROJECT SCHEDULE

A. Unless otherwise provided in the Contract Documents, within **ten (10) calendar days** after execution of the Agreement, Contractor shall submit a baseline project schedule for the Work for comment and approval by Owner. The baseline Project Schedule shall: (i) not exceed time limits currently set forth in the Contract Documents; (ii) be updated at appropriate intervals as required by the conditions of the Work and the Project; (iii) be related to the entire Project; and (iv) provide for expeditious and practicable execution of the Work. Upon Owner's approval of such baseline project schedule, the same shall be referred to herein as the "**Project Schedule**." Any revisions or updates to the Project Schedule are subject to review and approval by Owner. If not accepted by Owner, the baseline Project Schedule and/or any updates shall be promptly revised by Contractor in accordance with the recommendations of Owner and be re-submitted for acceptance.

1. Initial Schedule
   a. If the Agreement provides for preconstruction phase services, Contractor shall submit within **ten (10) calendar days** after execution of the Agreement, an Initial Schedule containing detailed activities for preconstruction services activities and summary level 1 activities for construction submittals, material and equipment procurement, permits, and construction activities. The summary construction activities shall adequately demonstrate the logical phasing and the intended sequencing of the Work. Critical milestones, showing

the required interface with Owner and/or third party activities, shall be made explicit in the schedule. Update the approved Initial Schedule monthly and submit until the specified Contractor's Baseline Construction Schedule is approved.

2. Baseline Construction Schedule

   a. If the Agreement calls for preconstruction phase services, Contractor to submit Baseline Construction Schedule, containing detailed activities and intended sequencing of Work included in Contract, during the design phase of the project.

   b. If the Agreement does not provide for preconstruction services, then Contractor shall submit the Baseline Construction Schedule within **ten (10) calendar days** after NTP or execution of the Agreement containing detailed activities and intended sequencing of Work included in Contract.

   c. The Baseline Construction Schedule submittal shall be an un-progressed representation of Contractor's work-plan for the Construction Work. The first accepted, un-progressed construction schedule shall be referred to as Contractor's Baseline Construction Schedule.

   d. Owner acceptance of the Baseline Schedule or Contractor's failure to identify and/or include any element of the Contract, shall not release Contractor's obligation to complete all required Work in accordance with the Contract Documents.

3.02 FORMAT

A. The Project Schedule shall be in a detailed precedence critical path management ("**CPM**") using a scheduling software program acceptable to Owner, which shall also: (i) provide a graphic representation of all activities and events that will occur during performance of the Work; (ii) identify each phase of construction and occupancy, including ample time for third party commissioning of equipment and systems; and (iii) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents. At a minimum the Project Schedule shall depict the schedule for Work on a discipline by discipline and trade by trade basis and tasks within each discipline and trade. The Project Schedule shall include: (i) a schedule of the Construction Documents issuance dates, including sequentially issued documents for phased construction; (ii) proposed activity sequences and durations; (iii) milestone dates for receipt and approval of pertinent information, including Owner-supplied information and approvals by public authorities having jurisdiction over the Project; (iv) changes required by the GMP Proposal, if applicable; (v) dates for preparation and processing of Shop Drawings, Product Data, and Samples; (vi) dates for delivery of materials or equipment requiring long-lead time procurement; (vii) commissioning requirements and timeframes; (viii) Owner's occupancy requirements showing portions of the Project having

occupancy priority; (ix) the date of Substantial Completion; and (x) other information reasonably required by Owner.

B. Float is not for exclusive use or benefit of either Owner or Contractor but is an expiring resource available to both parties on a nondiscriminatory basis. Float is used by either party, as needed to meet Contract milestone dates. Contract time extensions for Contract performance will be granted only to extent that delays or disruptions to affected Work paths exceed total float along those paths of the Approved Construction Schedule (updated schedule) in effect at time of delay or disruption. These delays or disruptions must also cause end date of Work to exceed current Contract date or milestone date and be beyond control and without fault or negligence of Contractor or any Subcontractor at any tier. If delays or disruptions impact an already negative float path, Contractor will not receive a time extension unless and until activity with highest negative float is driven even further negative in accordance with impacting the Contract date or milestone date, and considering concurrency delays set forth in the Contract.

C. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times or durations shall be submitted with written justification to obtain Owner's approval. Use of float time disclosed or implied by use of alternate float suppression techniques shall be shared to proportionate benefit of Owner and Contractor. Use of any network technique solely for purpose of suppressing float will be cause for rejection of schedule submittal.

D. Contractor to analyze in detail the activities included in the Construction Schedule to determine activity time durations in units of project Working days. Base durations on submittal review periods, procurement lead time and duration, manufacturing times, labor (crafts), equipment, and materials required to perform each activity on a normal Work day basis. No on-site activity shall have duration of over 20 Working days except non-construction activities such as submittals, submittal reviews, procurement and delivery of materials or equipment, and concrete curing. Durations shall be the result of definitive manpower planning by Contractor to perform Work in consideration of Contract defined on-site Work conditions.

3.03 UPDATES

A. With each Application for Payment submitted by Contractor (other than the final Application for Payment), Contractor shall submit to Owner an updated Project Schedule revised to indicate the portion of the Work executed, all progress slippages, corrective actions taken, or slippage carry-over, for all anticipated delays or difficulties, and all other information required to accurately present the actual status of the progress of the Work as of the date of the Application for Payment. If Contractor does not submit an updated Project Schedule with an Application for Payment, Owner may withhold payment, in whole or in part. In the event any update to the Project Schedule indicates any delays to the Contract Time that are the fault of Contractor or others for whom Contractor is responsible, Contractor shall propose an affirmative

plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any Project Schedule update constitute an adjustment in the Contract Time, any milestone date, or the Contract Sum unless any such adjustment is agreed to by Owner and authorized pursuant to Change Order.

B. Subject to the requirements of the Contract, Contract time extensions will be granted only to the extent that equitable time adjustments for activity or activities affected exceed total or remaining float along critical path of activities at time of actual delay, or at time Change Order/Modification was issued.

C. When Contractor receives a Change Order/Modification, or delays are experienced by Contractor and a time extension is requested, submit to Owner a written Time Impact Analysis illustrating the influence of each change or delay on the Contract milestone completion date, utilizing the Approved Construction Schedule. Include in each Time Impact Analysis a fragnet demonstrating how Contractor proposes to incorporate the Change Order/Modification or delay into the Approved Construction Schedule. The fragnet shall contain a sequence of new and/or activity revisions that are proposed to be added to the Approved Construction Schedule in effect at the time the change or delay is encountered, to demonstrate influence or delay and method for incorporating the delay, and its impact into the schedule as they are encountered.

1. Each Time Impact Analysis shall demonstrate estimated time impact based on events of delay, date of Change Order/Modification given to Contractor, status of design or construction at that point in time, and event time computation of activities affected by change or delay. Event times used in analysis shall be those included in latest Owner accepted version of the Approved Construction Schedule, in effect at time change or delay was encountered.

2. Fragnets demonstrating delays caused by waiting for decisions and approvals shall not project such delays to extend later than one (1) day past the Data Date of the schedule used to analyze the impact of the delay, unless approved by Owner.

3. Each Time Impact Analysis shall demonstrate evaluation of possible concurrency between Contractor's own delays and Owner caused delays.

4. Submit each Time Impact Analysis within ten calendar days after a delay occurs. If Contractor does not submit a Time Impact Analysis for a specific Change Order/Modification or delay within specified period of time, Contractor will be deemed to have irrevocably waived rights to additional time and cost.

5. Because float time within the Approved Construction Schedule is jointly owned, it is acknowledged and agreed by Contractor that Owner caused delays on the project may be offset by Owner caused time savings (including, but not limited to: critical path submittals returned in less time than allowed for in the Contract, approval of substitution requests which result in a savings of time along the critical path for Contractor, etc.). In such an event, Contractor will not be entitled to receive an extension of time or delay damages until Owner caused time saving is exceeded and Contract completion date is also exceeded.

6. Owner will accept or reject each Time Impact Analysis. Upon approval, a copy of a Time Impact Analysis signed by Owner will be returned to Contractor for incorporation into the schedule. Incorporation of any Time Impact Analysis to the Construction Schedule prior to acceptance of Owner will result in an immediate rejection to the submitted Construction Schedule prior to the Owner performing any detailed review of that schedule.

7. Upon mutual agreement by both parties, incorporate fragnets illustrating the influence of Change Orders/Modifications and delays into the Current CPM Contract Schedule during first update after agreement is reached.

3.04 EXTRAORDINARY MEASURES

A. In the event Owner determines that the performance of the Work has not progressed or reached the level of completion required by the Contract Documents, Owner shall have the right to order Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, the Extraordinary Measures as provided in Paragraph GC-2.8.

3.05 EARLY COMPLETION

A. While Contractor may schedule completion of the Project earlier than the date established by the Contract Documents, no additional compensation shall become due Contractor for the use of float time between Contractor's projected early completion date and the date for Substantial Completion established by the Contract Documents except any bonus or penalty provisions set forth in the Supplementary Conditions, which would take precedence over and supersede this paragraph.

3.06 PROGRESS REPORT

A. Contractor shall prepare on a monthly basis and submit to Owner with each Application for Payment, a progress report in a form approved by Owner. The progress report shall include, among other things, a narrative summary of Work performed and significant events, the estimated percentage of completion, whether the Project is on schedule and, if not, the reasons for the delay and a recovery schedule, as well as the projected Work to be completed in the next **three (3) week** period.

3.07 MASTER LIST OF SUBMITTALS

A. Within **fourteen (14) calendar days** after the date of commencement provided in Owner's Notice to Proceed, Contractor shall prepare and keep current, for the Owner's review and approval, a "**Master List of Submittals**" for Shop Drawings, Product Data, Samples, and similar submittals, coordinated with the baseline Project Schedule and allowing Owner reasonable time to review. Contractor shall be solely responsible

for any delay, disruption, impact, loss of efficiency or other loss, arising directly or indirectly from Contractor's failure to manage Submittals properly.

B. In preparing the Construction Schedule, Contractor shall consider the nature and complexity of each submittal and shall allow ample time for review, revisions or corrections. Under no circumstances will an extension of time be allowed for any submittal for which a resubmittal is required and resubmittal time was not originally scheduled. Once the need for a resubmittal is identified, a second submittal preparation and review cycle must be added to the schedule. If a Construction Schedule shows that submittal reviews will place an extraordinary labor demand on the technical reviewing staff of Owner, Architect or any jurisdictional Third Party, the Construction Schedule submittal will be rejected. Contractor shall then prioritize the criticality of submittals, revise and resubmit the Construction Schedule submittal.

3.08 PROCUREMENT SCHEDULE

A. Within **fourteen (14) calendar days** after the date of commencement provided in Owner's Notice to Proceed, Contractor shall prepare and keep current, for Owner's approval, a schedule for procurement of materials and equipment which is coordinated with the Project Schedule and allows the Owner reasonable time to review. Contractor is solely responsible for any delay, disruption, impact, loss of efficiency, or other loss arising directly or indirectly from Contractor's failure to manage Submittals properly.

3.09 PERFORMANCE

A. Contractor shall perform the Work in accordance with the most recent Project Schedule and Schedule of Submittals approved by Owner. Contractor shall monitor the progress of the Work for conformance with the requirements of the Project Schedule and shall promptly advise Owner of any delays or potential delays.

3.10 RAIN DELAYS

A. Contractor shall allow for inclement weather in the Baseline Construction Schedule by incorporating a critical path activity titled "Rain Day Impact Allowance" as the last activity prior to the Substantial Completion Milestone. No other activities may be concurrent with the Rain Day Impact Allowance. The duration of the Rain Day Impact Allowance activity in working days represents the expected impact of normal rainfall (based on a five (5) day Regular Work Week) over the Contract Time and will be based on the table below calculated from the Notice to Proceed for the construction until the original date of Substantial Completion.

Table Used to Determine Cumulative Working Days for "Rain Day Impact Allowance":

January	5	May	1	September	1
February	5	June	1	October	1
March	5	July	1	November	2
April	2	August	1	December	3

3.11 AS-BUILT SCHEDULE (ONLY FOR PROJECTS OVER $1 MILLION)

A. The final schedule submitted after Substantial Completion and certified by Contractor as to how the Contract was executed shall be considered the "As-Built" schedule for the project. Submittal and approval of the Schedule will be a condition precedent to release withholding defined in the General Conditions of the Contract.

END OF SECTION 01 32 13

SECTION 01 32 23
PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

PART 1 - GENERAL

1.01 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.

1.02 DESCRIPTION

A. Owner uses a web-based Program Management Information System ("**PMIS**") to facilitate program-wide project tracking, administration and management reporting. PMIS is a centralized database that maintains all Project information and manages Project communications amongst Project team members. This allows for project collaboration between Project team members during the course of the Project.

B. e-Builder is the comprehensive PMIS for Project administration, document control, cost and change management. The e-Builder system includes process work-flows as well as a central database that maintains all Project information and manages Project communications among Project team members.

C. e-Builder provides electronic routable communication forms that provide historical tracking and documentation of the time and date of submittal. Additionally, meetings will be scheduled and maintained centrally on e-Builder.

1.03 ELECTRONIC DOCUMENT SUBMISSION

A. General

1. In general, in addition to the formats and requirements specified below and elsewhere in the Contract Documents, all documents shall be submitted in Adobe PDF format using the PMIS.

2. Documents, comments, drawings and other records posted to PMIS shall remain in PMIS for the Project record.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 WEB ACCESS

A. Access to PMIS will be provided through an internet website. Project management communications shall be provided within e-Builder in the form and manner required by Owner.

B. All drawings, documents, data, materials and information uploaded to, and downloaded from, PMIS are deemed strictly confidential and the property of Owner.

C. PMIS communications do not replace, change or modify any contractual responsibilities of the participants.

3.02 SOFTWARE LICENSES

A. All licenses for e-Builder will be provided by Owner. The user license is the property of Owner and the use of such shall be in strict accordance with the terms and conditions of the user license for the duration of the Project.

B. Access to PMIS will be by individuals who are licensed users. All licenses shall be controlled by Owner's PMIS Administrator. Individuals as agents of the company in which they are employed, shall be responsible for the proper use of their passwords and access to data.

C. Should additional licenses be required, Contractor shall submit a written request to Owner. It is the responsibility of Contractor to notify Owner in writing when a user license is no longer required.

D. The sharing of user licenses is prohibited. User registration, computer equipment, and internet connections are the responsibility of Contractor.

E. Nothing in this specification supersedes the Parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the Project specified herein.

3.02 TRAINING

A. Contractor is responsible for arranging for its employees and Subcontractors to attend PMIS training, including notifying them that they are bound to hold all information in the strictest of confidence, including their individual user names and passwords.

B. Group training in the use of PMIS shall be provided by Owner's PMIS Administrator. Users are required to attend scheduled training sessions as assigned. Requests for specific scheduled classes will be on a first come, first served basis and shall be based on available spaces.

C. On-going telephone support as well as on-line help files are also available.

3.04 ORIGINALS AND RECORD KEEPING

A. Documents received in electronic format are to be considered as if received in paper document form. Signed PDF documents shall be binding upon the Parties to the same degree as if they were wet signed originals. Owner reserves the right to and may copy any paper document into electronic form and make the same available on the PMIS website.

B. Notwithstanding the above, certain paper documents require original wet signatures to be submitted to Owner and shall also be submitted in electronic form to PMIS. Currently, the paper documents which require original wet signatures to be submitted to Owner and with electronic copies to PMIS are as follows:

1. Contract
2. Change Orders and other Modifications and Amendments
3. Certified payroll documents, if required
4. All Conditional and Unconditional Waiver and Release Forms

Owner may issue contract, Change Orders, Modifications and Amendments for electronic signature through its electronic signature system in lieu of requiring wet signatures.

C. In addition to the standard closeout submittal requirements detailed elsewhere in the Contract, all closeout documents including but not limited to Record Drawings, catalog cuts, and Owner's Operation and Maintenance manuals shall be submitted in original digital format (CAD, Microsoft Word, Microsoft Excel, Revit, etc). Additionally, all documents (including As-built drawings) shall be converted or scanned into Adobe Acrobat (.PDF) file format and uploaded into PMIS.

END OF SECTION 01 32 23

SECTION 01 32 33
PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Monthly construction photographs.
3. Final completion construction photographs.
4. Preconstruction video recordings.
5. Periodic construction video recordings.
6. Web-based construction photographic documentation.

B. Definitions:

1. Photograph: A single, still visual image with no time component.
2. Video Recording: digital recording with the ability to capture motion, sound and time components.

1.03 SUBMITTALS

A. Qualification Data: For photographer.

B. Key Plan: Submit key plan of Project Site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

C. Digital Photographs: Submit image files via e-Builder Project Management Information Systems (PMIS) within three days of taking photographs.

1. Digital Camera: Minimum sensor resolution of 8 megapixels.
2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
3. Identification: Provide the following information with each image description in file metadata tag:

a. Name of Project.

b. Name and contact information for photographer.

c. Name of Architect.

d. Name of Contractor.

e. Date photograph was taken.

f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

g. Unique sequential identifier keyed to accompanying key plan.

h. Weather conditions at time of photograph recording.

1.04 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.05 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

B. Digital Video Recordings: Provide high-resolution, digital video disc in format acceptable to Architect.

PART 3 - EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.

B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.

2. Field Office Images: Maintain one set of images accessible in the field office at Project Site, available at all times for reference. Identify images in the same manner as those submitted to Owner.

D. Preconstruction Photographs: Before starting construction, take photographs of Project Site and surrounding properties, including existing items to remain during construction, from different vantage points.
   1. Flag excavation areas and construction limits before taking construction photographs.
   2. Take a minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
   3. Take a minimum of 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
   4. Take additional photographs and/or videos as required to record settlement or cracking of adjacent structures, pavements, and improvements.

E. Periodic Construction Photographs: Take a minimum of 20 photographs monthly, coinciding with the cutoff date associated with each Monthly Report, with views to clearly delineate construction progress for inclusion in Monthly Report. Select vantage points to show status of construction and progress.

F. Owner-Directed Construction Photographs: From time to time, Owner will instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

G. Time-Lapse Sequence Construction Photographs: Take a minimum of 20 photographs as indicated, to show status of construction and progress since last photographs were taken.
   1. Frequency: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment.
   2. Vantage Points: Following suggestions by Owner and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:
      a. Commencement of the Work, through completion of subgrade construction.
      b. Above-grade structural framing.
      c. Exterior building enclosure.
      d. Interior Work, through date of Substantial Completion.

F. Videos: Provide the video recordings required by Section 01 79 00 “Demonstration and Training” and others as required by the Construction Documents.

G. Final Completion Construction Photographs: Take a minimum of 20 photographs after date of Substantial Completion for submission as project record documents. Owner will inform photographer of desired vantage points. These photographs shall not include a date stamp.

3.02 LEED CONSTRUCTION DOCUMENTATION (IF REQUIRED)

A. Take a minimum of 6 photographs taken at 3 different times during the construction process demonstrating compliance with the following:
   1. The 5 SMACNA guidelines related to the Construction IAQ Management Plan as defined in Sustainable Design Requirements Section 01 81 13, if applicable.
   2. Erosion and sedimentation control measures.
   3. The Construction Waste Management Program (recycling bins sorted). Refer to Section 01 74 19.

B. Provide documentation for environmental procedures as specified and in accordance with approved Construction Waste Management Plan, IAQ Management Plan, and Erosion and Sedimentation Control.

C. Erosion and Sedimentation Control Photographs: Take a minimum of 10 photographs of erosion and sedimentation control measures implemented, including any corrective action that may be taken, on at least three different occasions, equally spaced over the site work period. Photographs must be taken once monthly at a minimum.

D. Indoor Air Quality Management Plan Photographs: Refer to Section 01 81 13 - Sustainable Design Requirements, if applicable.

E. Construction Waste Management Photographs: Take photographs of Construction Waste Management Program, including recycling bins showing sorted waste.

END OF SECTION 01 32 33

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.01 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.

1.02 SUMMARY

A. The Work described in this Section summarizes requirements and procedures for submitting Shop Drawings, Product Data, Samples and other submittals.

B. Owner maintains the right and responsibility to review all submittals for quality control effectiveness, timeliness, certification and compliance with the Contract. It is Contractor's responsibility to develop, in conjunction with and accepted by Owner, a complete "**Master List of Submittals**". This requirement is not intended to limit in any way the submittals Contractor may require from Subcontractors, suppliers and fabricators for the construction of the Project.

C. Contractor shall provide to Owner copies of all submittals to third parties concurrently with its submittal to the third party and copies of third party responses and/or comments on submittals upon receipt.

D. Related Requirements:

1. Section 01 32 23 "Project Management Information System (PMIS)" for electronic formatting and requirements for uploading to Owner's document control website.
2. Section 01 25 00 "Substitution Procedures" for requirements relative to submittal of requests for substitutions.
3. Section 01 60 00 "Product Requirements" for requirements relative to proposed products of methods of construction which Contractor proposes to furnish and install instead of those indicated.
4. Section 01 32 00 "Construction Progress Documentation" for submitting reports.
5. Section 01 32 13 "Cost Loaded Critical Path Schedule" for submitting schedules
6. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
8. Section 01 79 00 "Demonstration and Training" for submittal requirements related to the demonstration of equipment and training of Owner's personnel.
9. Section 01 81 13 "Sustainable Design Requirements" submittal requirements, if any.

1.03 SUBMITTAL QUALITY CONTROL REQUIREMENTS

A. Prepare all design and record documents in accordance with USC CAD and Layering Standards, and to a high standard of quality, such as set forth in ANSI 14Y Series or other relevant lower tier specification defining equal drafting quality for microfilming.

B. Reference Standards:
   1. USC CAD and Layering Standards, 06.18.2004 Version: http://facilities.usc.edu/uploads/documents/CAD_Guidelines.pdf
   2. American National Standards Institute (ANSI) ANSI Y14 Series, American Drafting Standards

1.04 SUBMITTALS

In addition to the formats specified below, each individual submittal, along with its transmittal, shall be submitted in text recognizable Adobe PDF format and uploaded to Owner's document control website as required by Section 01 32 23, Project Management Information System.

A. Shop Drawings - Fabrication or layout drawings required to supplement Construction Drawings or individual specification Sections for permanent incorporation into the Work as required by all relevant Sections of these General Requirements and the Contract Drawings and Specifications.

B. Working Drawings - Contractor's plan for temporary equipment or structures and for other such Work as may be required for construction but do not become an integral part of the permanent Work. Submit signed and stamped Working Drawings (drawing size 22 inch x 34 inch) and associated calculations as required by the Contract Documents for temporary Work which will not become part of the permanent structures included in this Contract. Provide all information required by the Master List of Submittals.

C. Engineering Calculations - Where required, signed and stamped by Professional Engineer registered in the State of California for the involved discipline. Prepare calculations, required by specification Sections, on 8-1/2 inch by 11 inch sheets. When calculations accompany drawings in a submittal, the body of the calculations must contain cross-referencing to the individual drawing to which the page of the calculations pertain.

D. Certifications and Documentation - As identified in Contract, certificates or certified test results that demonstrate proof of compliance with Specifications for products, materials, equipment, systems, and qualifications of personnel, manufacturers, fabricators and installers. Documentation required by the Contract Documents, including miscellaneous items such as delivery tickets, batch tickets and bills of materials.

E. Test Procedures and Test Reports - Test Procedures for review and, if required, acceptance by Owner before commencement of testing. Provide test reports in the accepted format for review by Owner. Refer to Contract Documents relating to testing and startup, and individual mechanical and electrical Specifications for further testing requirements.

F. Manufacturer/Product Data - Standard schematics and drawings, stamped calculations and related data, and product data including manufacturer's literature, catalog cuts and Material Safety Data Sheets (MSDS) for each type of material used in the Work. 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 printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Modify manufacturers' standard schematic drawings to delete information which is not applicable to the Work. Supplement standard information with additional information applicable to the Work.
3. Modify manufacturers' standard catalog cuts, brochures, diagrams, schedules, performance charts, illustrations, calculations, and other descriptive data to delete information that is not applicable to the Work. Failure to comply with this requirement will result in rejection of the submittal. Indicate dimensions, clearances, performance characteristics, capacities, wiring and piping diagrams, controls, and other information as required.
4. Modify manufacturer's printed installation, erection, application and placing instructions to delete information that is not applicable to the Work.
5. Where manufacturer's printed literature is required to be submitted, submit an original printed form of the literature. Reproductions which will fade with time or exposure, cut off portions of text or graphics, or are not clear enough to all further accurate reproduction are not acceptable.
6. Include appropriate information as required herein and in the Contract Documents, such as:
    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Mill reports.
    j. Standard product operating and maintenance manuals.
    k. Compliance with recognized trade association standards.
    l. Compliance with recognized testing agency standards.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.

7. Submit Certificates of Compliance for those products called out in the Contract Documents not later than 45 days before products are installed. Have copy of certificate accompany the product for which the certificate is prepared. Include on the certificate:
    a. Affirmation that the product complies with respective requirements indicated.
    b. Submittal date, name and address, Contract Title and Number, product represented and its location in the Work, producer's name, product trade name and catalog number, place of product origin, test date, testing organization's name and address, and quantity of the product furnished.
    c. Signature of an officer or other authorized representative of the manufacturer or producer.

G. Coordination Drawings: Comply with requirements in Section 01 31 00, "Project Management and Coordination".

H. Permanent Materials Data, Mock-ups, and Samples: Prepare physical units of materials or products, including the following:
    1. Comply with requirements in Section 01 40 00, "Quality Requirements" for mockups.
    2. 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.
    3. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the 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.
    4. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. In addition to information required elsewhere in this Section for label, include the following on the permanent label attached to the unexposed side of the Sample:
        a. Specification Section number and reference.
        b. Generic description of Sample.
        c. Product name and name of manufacturer.
        d. Sample source.
        e. Model or catalog number, finish numbers and designations and other identifying information.

5. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:
    a. Size limitations.
    b. Compliance with recognized standards.
    c. Availability.
    d. Delivery time.
6. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
    a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of the variations.
    b. Refer to individual specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
7. Number of Samples for Initial Selection: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
8. Number of Samples for Verification: Submit 4 sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
9. 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 Owner's property, are the property of Contractor.
10. Architect and Owner reserve the right to require submission of samples or Site mock-ups of any material, whether or not such material required in the Specifications or has been previously approved for use elsewhere on the Project.
11. Architect will not issue the final Color Schedule for the Project until all required Samples have been submitted and favorably reviewed by Architect.
12. Provide materials and installation in the Work that match in every respect Samples favorably reviewed by Architect. After a Sample has been favorably reviewed by Architect, no change in make, model, finish or other characteristics

will be permitted in materials and installation incorporated in the Work unless a change is favorably reviewed by Architect in accordance with requirements of Section 01 60 00, "Product Requirements".

13. Architect's favorable review of Samples will not preclude rejection of Work discovered to have defects or that is otherwise not in compliance with the Contract Documents and which defects or noncompliance reviewed Samples failed to represent.
14. Ensure Samples of materials requiring laboratory tests are tested sufficiently in advance of the time they are required for submittal to Architect so as to cause no delay.
15. In addition to providing Samples as indicated above, Contractor shall attach Transmittal Sheet and Submittal details through the PMIS.

I. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
   1. Type of product. Include unique identifier for each product.
   2. Number and name of room or space.
   3. Location within room or space.

J. Operation and Maintenance Manuals – Submit Operations and Maintenance Manuals for equipment and systems as specified in Section 01 78 23, Operation and Maintenance Data, and elsewhere in the Contract Documents.

K. Substitutions - Comply with requirements specified in Section 01 25 00, Substitution Procedures, and utilize forms required by Owner, for all substitution requests. Substitutions indicated, or implied, on any submittals, including Shop Drawings or product data submittals, will not be considered unless a request for substitution has been formally submitted in conformance with Section 01 25 00 and this Section.

L. Construction Progress Photographs - Photograph documentation of construction progress as specified in Section 01 32 00, Construction Progress Documentation.

M. Construction Schedule - Comply with requirements specified in Section 01 32 13, Cost Loaded Critical Path Schedule.

N. LEED Submittals, if required - Comply with requirements specified in Section 01 81 13, Sustainable Design Requirements.

O. Third-party Approvals - Submit copies of all approvals required from the appropriate departments of the City of Los Angeles and County of Los Angeles, and all other affected third parties.

P. As-Built Drawings - Submit final as-built drawings as specified in Section 01 78 39, Project Record Documents.

1.05 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 Owner.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and 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.

C. Revit Linked Model File Incorporation: Incorporate delegated-design drawing and data files into Revit Linked Models established for Project.
   1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.

1.06 CHANGES

A. Changes proposed to items listed in this Section will not be permitted unless those changes have been submitted and accepted in writing, by Owner.

PART 2 – PRODUCTS

2.01 MASTER LIST OF SUBMITTALS

The Master List of Submittals identifies items that are contractually required to be submitted to Owner, and the date by which each submittal is required in conformance with the Project Schedule. Within 30 days after the effective date of the Notice to Proceed, Contractor shall prepare and furnish the Master List of Submittals containing a comprehensive list of submittals required by the Contract Documents, with the required submittal date for each submittal. Submittal numbering should correlate with the Contract Document, section, and paragraph from which the requirement was derived and be organized such that like items are grouped together with distinct serialization (maximum length fifteen (15) alphanumeric characters including any dashes ("-"), spaces (" "), or periods (".")). Incorporate the submittals with dates in the detailed Baseline Schedule and update schedules required by Section 01 32 13. As indicated in Section 01 32 13, paragraph 3.03(E), allow for not less than 21 calendar day cycles for review by Owner. The list is to be furnished in both hardcopy and electronically (upload to the

PMIS), in Excel spreadsheet format. Arrange the following information in tabular format:

A. Scheduled date for submittal.

B. Specification Section number and title.

C. Name of Subcontractor.

D. Description of the Work covered.

E. Scheduled date for Architect's final release or approval.

2.02 CORRESPONDENCE AND DOCUMENTATION

A. Submit all printed correspondence and other contractually required documentation, including Submittals, Requests for Information (RFI), and Change Order Proposals (COP) in electronic format to Owner in accordance with Section 01 32 23, in addition to hard copy distribution specified in Section 2.04 below. Project data is to be submitted electronically in the following formats:

1. Drawing files in AutoCAD 2005 or higher format (exported to AutoCAD format from other CAD systems acceptable) and PDF (in 11 inch x 17 inch page format). Provide narrative description of the file organization and drawing list, including file name, drawing number, and sheet number.
2. Drawings must be in accordance with, USC CAD and Layering Standards, 06.18.2004 Version: http://facilities.usc.edu/uploads/documents/CAD_Guidelines.pdf
3. Schedules – comply with requirements of Section 01 32 13.
4. Applications for Payment – in both PDF and Excel Spreadsheet format.
5. E-mail, Letters, Spreadsheets, and Charts in Microsoft Office format (Outlook, Word, Excel, PowerPoint).
6. Other Documents, Pictures, Digital Images, Graphs, etc. in PDF format (TIFF or JPEG as an alternative).

2.03 SUBMITTAL FORMAT AND INSTRUCTIONS

A. Shop Drawings – Prepare Project-specific information, drawn accurately to scale. Highlight, encircle, or otherwise clearly indicate deviations from the Contract Documents, if any, along with a notation which reads "VARIATION FROM CONTRACT DOCUMENTS". Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Create in AutoCAD 2005 or higher per latest USC CAD and Layering Standards, located at http://facilities.usc.edu/uploads/documents/CAD_Guidelines.pdf
2. Sheet Size: Except for the templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets of size sufficient to show information clearly at a proper scale, and least 8-1/2 x 11 inches but no larger than 30 by 42 inches.

3. Title block including title of drawing, engineering Contractor and Subcontractor logo and/or identification.
4. Drawing title, date and revision dates, scale and consecutive drawing numbers. Total number of drawings contained in set.
5. Contract title and number.
6. Drawing number using codes (accepted by Owner).
7. Professional Engineer Seal, expiration date, and signature of an engineer, currently registered in the State of California for the involved discipline.
8. Preparation: Include the following information, as applicable:
    a. Dimensions
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shop work manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
    m. Arrangements and plan, elevation, sectional views, and details as necessary to fully describe the Work, including complete information for making connections with other Work.
    n. List of all Subcontractors involved.
    o. Identification of finishes on all materials.
    p. Show descriptive names of materials and equipment, and locations at which materials and equipment are to be installed in the Work. Use same reference identification as shown on the Contract Drawings.
9. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
10. Number of Copies: In addition to the upload to PMIS as required in Section 01 32 23, submit copies of each submittal, as follows:
    a. Submittal: Submit two (2) sets of blue-prints and one electronic version.

B. Submittals - Show the following information when applicable:

1. Names of Contractor, Subcontractors, suppliers, manufacturers and, when applicable, the Professional Engineer Seal, expiration date, and signature of an engineer currently registered in the State of California for the involved discipline.
2. Identification of product by description, model number, style number, serial number or lot number, and finish numbers.
3. Subject identification by Master List of Submittals submittal number.
4. Relation to adjacent structures or materials.
5. Field dimensions, clearly identified as such.
6. Applicable standards, such as ASTM or Federal Specification numbers.
7. Identification of deviations from Contract Documents.
8. Contractor's stamp, signed and dated, certifying:
    a. Review of submittals for compliance with Contract requirements.
    b. Verification of field measurements.
    c. Verification of Subcontractors Work for accuracy.
    d. Compatibility of the Work shown thereon with affected trades and other contracts.
9. Identification: Place a permanent label or title block on each submittal for identification.
    a. Indicate name of firm or entity that prepared each submittal on label or title block.
    b. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings. On Samples, physically attach label (paper, plastic, or cardboard form) to the sample. On Product Data, attach a separate sheet if there is not adequate space on the Product Data.
    c. Include the following information on label for processing and recording action taken:
        1) Project name, as listed on the Contract Documents, and Architect's work order number (indicated as "W.O. No." or "Job No." on the Drawings and Specifications, and Owner's contract number or other identifying number, if any.
        2) Date.
        3) Name and address of Contractor.
        4) Submittal Number, including revision number, if applicable.
        5) Number and title of appropriate specification Section.
        6) Drawing number and detail references, as appropriate.

7) Contractor's review certification indicating submittal is "Approved" by Contractor.

8) Other necessary identification.

d. In addition to space provided on label or title block for Contractor's information, provide a separate blank space approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record Architect's review markings and the action taken.

C. Unless specified otherwise, transmit submittals at least 45 calendar days before commencement of related Work. If "For Record Only" submittals are transmitted less than 21 calendar days before commencement of related Work, obtain Owner approval prior to commencement of Work. Do not start Work until required submittals are accepted by Owner or Architect.

D. Unless specified otherwise, allow 21 calendar days for review of each submittal cycle by Owner and other third parties having jurisdiction.

E. Ship hard copy submittals prepaid by overnight express delivery, or hand carry to Architect and Owner and third parties having jurisdiction.

F. Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Owner will return submittals, without review, received from sources other than Contractor.

1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations and reasons for deviations. Include the same label information as the related submittal.

2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.

3. Transmittal Form: Accompany submittals with Transmittal Form acceptable to Owner, indicating all required information for transmittal of submittals. Provide locations on form for the following information:

a. Project name and Architect's work order number (indicated as "W.O. No." or "Job No." on the Drawings and Specifications.

b. Owner's Contract number and title.

c. Date.

d. Name, address, telephone number and FAX numbers for home office or field office of Contractor.

e. Designer of Record (for each corresponding portion of the Work) name, address, telephone number and FAX numbers for home office or field office.

f. Name, address and telephone number of Subcontractor.

g. Name, address and telephone number of supplier.

h. Name, address and telephone number of manufacturer.

i. Submittal number based on Master List of Submittals number.

j. Subject identification, including name and title of appropriate specification section and drawing number and detail references, as appropriate.

k. Identification of deviations from Contract Documents, if any, for which the approval required.

l. Copy of Subcontractor and Supplier transmittals.

m. List of all City agencies or third parties receiving copies.

n. Signature of transmitter.

G. Provide subsequent submittals in the same manner as preceding submittals. Resubmittals shall be complete standalone documents that supersede the previous submittal in its entirety, and not only the revised pages or sheets. Allow a minimum of 10 calendar days for review of resubmittals.

H. Incomplete or partial submittals will be returned without review. Allow a minimum duration of 21 calendar days for review of submittals that were rejected for being incomplete.

I. Illegible copies of any portion of a submittal will not be accepted.

J. Substitution or Deviations – Substitutions and deviations from approved design documents must be pre-approved by Owner. To indicate approved substitution or deviation, stamp the submittal or drawings "SUBSTITUTION" or "DEVIATION" in ½-inch minimum size diagonal letters. Reference Section 01 25 00, Substitution Procedures, for additional requirements relative to substitutions.

K. No extension of Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

L. If a submittal is not transmitted to Architect in sufficient time to allow adequate review by Architect without causing delay in construction activities, and Architect agrees in writing that an accelerated review is feasible by working in addition to normal working hours, Contractor shall be responsible for costs including, but not limited to, labor costs at 1-1/2 times Architect's normal hourly billing rates and reimbursable expenses at cost plus 15 percent incurred by Architect in reviewing on an accelerated basis. Unless approved by Owner in writing, in advance, these costs shall be the sole expense of Contractor and shall not be eligible for reimbursement by Owner.

M. Except where the Specifications specifically call for more than one submittal of the same item, or in the event an initial submittal results in substantial clarification of the Contract Documents by Architect or Owner, Architect has allowed time for review of initial submittal and one resubmittal. If after one resubmittal more than the number of submittals required by the Specifications or by clarification, Architect determines submittal fails to address comments and corrections previously indicated by Architect and requires an additional resubmittal, Contractor shall be responsible for costs, including but not limited to, labor costs at Architect's normal hourly billing rates and reimbursable expenses at cost plus 15 percent incurred by Architect in reviewing the these additional resubmittals. Unless approved by Owner in writing, in advance, these

costs shall be the sole expense of Contractor and shall not be eligible for reimbursement by Owner.

2.04 QUANTITIES

A. In addition to the electronic versions, unless otherwise indicated, the number of hard copies submitted shall be at least 3 copies each of all documents. For drawings larger than 11 inches by 17 inches, provide 2 sets of half-sized and 2 sets of full-sized drawings.

PART 3 – EXECUTION

3.01 CONTRACTOR REVIEW OF SUBMITTALS

A. All submittals required by the Contract shall bear a stamp or other imprint indicating that the submittals were reviewed by Contractor, and comply with the Contract and Applicable Laws and are approved by Contractor prior to construction. Submittals not bearing this stamp and evidence of review and approval shall be rejected by Architect or Owner, and not used for construction.
   1. Before submission, Contractor shall have determined and verified quantities and dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each submittal with other submittals and with the requirements of the Work, the Applicable Laws and the Contract Documents.

3.02 ARCHITECT AND OWNER REVIEW OF SUBMITTALS

A. Submittals will be reviewed by Architect or Owner for conformance to requirements of the Contract and conformance with the design concept of the Project and shall not extend to means, methods, techniques, sequences, or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Documents). Review of a separate item will not constitute review of an assembly in which the item functions. Review and/or acceptance by Architect or Owner, or content or absence of any Architect or Owner review comments, will not relieve Contractor from responsibility for accuracy of submittals, conformity of submittals to requirements indicated, compatibility of described product with contiguous products and the rest of the system, or for prosecution and completion of the Contract in accordance with the Contract Documents.

B. Architect Review stamp will be affixed, action block will be marked, and stamp will be signed, name printed and dated. Stamp lettering to be 1/8-inch minimum.

C. Action block stamp marks have the following meanings:
   1. Final Unrestricted Release: The mark "ACCEPTED (ACP)" is an acceptance of the submittal as submitted, and means every illustration and description appears to conform to the respective requirements of the Contract Documents; fabrication,

assembly, manufacture, installation, application and erection of the illustrated and described product may proceed; the submittal is accepted and need not be resubmitted. When Architect marks a submittal "REVIEWED", the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.

2. Final-But-Restricted Release: The mark "ACCEPTED AS NOTED (AAN)" is an acceptance, and it means that every illustration and description appears to conform to respective requirements of Contractor Documents upon incorporation of reviewer's corrections. The comments shall be incorporated into the final Contract (as built) documents. When Architect marks a submittal "REVIEWED AS NOTED" or "FURNISH AS CORRECTED", the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.

3. The mark ACCEPTED AS NOTED, RESUBMITTAL REQUIRED (ANR) is an acceptance, and it means that every illustration and description appears to conform to respective requirements of the Contract Documents contingent upon incorporation of reviewer's corrections. However, resubmittal incorporating resolution is required. The reviewer's final comments (after resolution of disagreements) shall be incorporated into the final Contract (as built) documents.

4. Returned for Re-submittal: The mark REJECTED, REVISE AND RESUBMIT (RRR), is a rejection, and means the submittal is deficient to the degree the reviewer cannot correct the submittal with a reasonable degree of effort, and the submittal needs revision and is to be corrected and resubmitted, within 30 calendar days for review. Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark. In case of multiple submittals covering same items of Work, Contractor is responsible for any time delays, schedule disruptions, out of sequence Work, or additional costs due to multiple submissions of the same submittal item. Do not use, or allow others to use, submittals marked "Rejected, Revise and Resubmit" at the Project site or elsewhere where Work is in progress.

5. Other Action: The mark FOR RECORD ONLY (FRO) means the submittal was not reviewed for acceptance and was received for information only. Architect and Owner may, however, use the submittal to verify or monitor Contractor's Work and/or progress. Where a submittal is for information or record purposes or special processing or other activity, Architect will return the submittal marked "Action Not Required".

D. Written comments and/or one marked up copy of the submittal document(s) reviewed for acceptance will be returned to Contractor within 21 calendar days of date received.

E. Architect will not review submittals that do not bear Contractor's approval stamp, and will return them without review as indicated under Section 2.03(H).

F. Submittals not required by the Contract Documents will not be reviewed and will be returned to sender without action.

3.03 CONTRACTOR'S RESPONSIBILITIES

A. Coordinate each submittal with requirements of the Work; place particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals and requirements of that trade and other trades.

B. Thoroughly review each submittal for compliance with the Contract Documents prior to transmitting to Architect. Do not transmit a submittal to Architect until that submittal is approved by Contractor and marked "APPROVED" as indicated under Section 3.01(A). Failure to comply with this requirement will result in return of submittal with no action taken by Architect.

B. Approval by Owner or its designee of submitted Shop Drawings and associated calculations does not relieve Contractor from the responsibility for errors or omissions in the drawings and associated calculations, or from deviations from the Contract Documents, unless such deviations were specifically called to the attention of Owner in the Letter of Transmittal submitted with the Shop Drawings, and at all affected locations on the drawings. Contractor is responsible for the correctness, accuracy and completeness of its Drawings, including shop fits and field connections, dimensions and quantities, and for results obtained by use of such drawings.

C. Distribution of Submittals After Review - Distribute prints of approved submittals, bearing Owner or its designee's stamp and signature, to affected Subcontractors, Suppliers, Fabricators and members of Contractor's Workforce, and all other concerned parties.

D. Contractor's liability to Owner, in case of deviations in the submittals from requirements of the Contract Documents, is not relieved by Owner or its designee's review and approval of submittals containing deviations, unless Owner expressly approves deviations by issuing a Change as contemplated in the General Conditions.

E. Do not start Work for which Owner-accepted submittals (as indicated in the Master List of Submittals and/or required by the Contract Documents) are required until such required submittals bearing the stamp and/or signatures of Owner or Architect indicating review and acceptance, have been received.

F. Before making submittals, ensure products are available in quantities required by the Contract.

G. Verify field measurements, catalog numbers and similar data.

H. Resubmittals – Promptly make all required corrections and resubmit to Architect only those submittals which have been specifically requested to be resubmitted by placing the mark "Revise and Resubmit" on the original submittal or transmittal. Do not assign a new number to a resubmittal, but clearly note that it is a resubmittal of a previous Submittal Number by adding a revision number.

1. All information in the original submittal shall be included in any resubmittals. Clearly indicate all changes from previously submitted documents with specific attention directed to revisions other than those requested by the Architect or Owner on previous submittals. In the absence of such written notice, Architect's

or Owner's review and approval of a resubmission shall not apply to such revisions.

2. Do not resubmit Shop Drawings or other submittals which have not been requested as resubmittals by Architect.
3. If an error is discovered or a change is made for any reason to a submittal previously marked "Reviewed" or "Accepted" by Architect or Owner, resubmit the submittal with all changes made since the prior review clearly marked and noted. Provide written explanation of each change and the reason the change is required.
4. When resubmitting a Sample, clearly mark the Sample with the words "Resubmitted Sample" in addition to other information required.

END OF SECTION 01 33 00

SECTION 01 35 25
SITE SAFETY REQUIREMENTS

PART 1 – GENERAL

1.01 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.

1.02 DESCRIPTION

A. Contractor shall establish, implement and maintain an effective Injury and Illness Prevention Program in accordance with California Code of Regulations (CCR) Title 8 Section 3203. Contractor is solely responsible for keeping its records and seeing that its Subcontractors' records are updated and accurate.

B. Contractor shall comply with the CCR Title 8, as well as all other Federal, State and local regulations, statutes, codes and laws applicable to safety and security operations at the Project Site. Strict compliance with all applicable regulations as determined by Owner, or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of any claim. Compliance with determinations by Owner or its designee shall not relieve Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

C. Contractor shall comply with Paragraph 1.03 of this Section. Compliance with the parts of this Section shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of any claim.

D. Contractor shall comply with the USC Environmental Health and Safety Department programs (http://adminopsnet.usc.edu/node/244) including, but not limited to:

1. Injury and Illness Prevention
2. Means of Egress Program
3. Hazard Communication Program
4. Confined Spaces
5. Personal Protective Equipment (PPE)
6. Fall Protection/Fall Arrest
7. Lock-Out/Tag-Out

1.03 REQUIREMENTS

A. Comply with both the CCR Title 8, and the Code of Federal Regulations (CFR) Title 29. Where the State and Federal regulations have differing requirements, Contractor shall comply with that which is more stringent. Contractor shall have full

responsibility for maintaining conditions which are free from recognized hazards that are likely to cause physical harm to its employees.

B. Air Quality Testing - Perform air quality testing by qualified individuals. Maintain a record of the date, time and location of tests and levels of contaminants. Make all records, including printouts, and independent testing laboratory analyses of jobsite samples, available for review by Owner or its designee upon request.

C. Comply with Owner's Hot Work Program, including permitting, as described at: http://adminopsnet.usc.edu/department/fire-safety-and-emergency-planning/hot-work-program .

D. Conform to City of Los Angeles Fire Code 915 and Owner's fire watch program when hot work is conducted and fire systems are impaired. Owner's Fire Watch Implementation Checklist is available at: http://capsnet.usc.edu/sites/default/files/all_departments/FireSafetyEmergPlanning/FireWatchImplementationChecklist.doc

E. Comply with the requirements of CCR Title 8, Section 5192, Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening.

F. For contracts with an Owner Provided Insurance Program (OCIP), comply with the requirements in the OCIP Safety Requirements Manual.

1.04 SUBMITTALS

All submittals and re-submittals, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with Owner accepted submittal schedule so as to not delay the performance of Work by Contractor. Upon receiving the Notice to Proceed for any element of Work, Contractor shall prepare and submit for review the submittals listed as A, B, and C below and shall not receive permission to perform Work upon the Site for this Contract or any work order hereunder, until Owner has returned the submittals as "Final Unrestricted Release" or "Final But Restricted Release" as defined in Section 01 33 00. Owner refusal to issue permission to perform Work upon the Site, either prior to Work beginning or during Contractor's performance of the Work, due to Contractor's failure to submit listed safety submittals, or due to Owner rejection of unacceptable submittals, shall not constitute a basis for any claim of delay, interference, disruption or other similar types of claims nor serve as the basis of request for change or claim to increase the cost of the Work. At a minimum, the following items shall be submitted by Contractor for review and acceptance by Owner:

A. Site specific Injury and Illness Prevention Program including a Site Specific Emergency Action Plan, to be revised and resubmitted as conditions warrant.

B. Qualifications and certifications of designated Lead and other Safety Representatives, and other first aid providers.

C. Job Hazard Analyses (JHA) Matrix for each construction operation or activity. Individual JHAs will be required to be submitted with sufficient review time prior to the start of any task included in this matrix.

D. Qualifications and/or certifications of individuals who will serve as Qualified or Competent Persons. These supervisory individuals are designated by Contractor to supervise special high risk/high hazard safety programs such as (but not limited to)

Fall Protection, Excavation, Hazardous Waste Operations and Confined Space Entry. In addition, Contractor shall submit the qualifications, and certifications for each crane operator and rigger. This Submittal shall be re-submitted by Contractor upon any change to the personnel submitted.

E. Fall Protection Program - Include details of procedures, equipment and training. This program shall be established and implemented to ensure that Contractor's and Subcontractor's workers, exposed to a vertical fall of six (6) feet or more to another level, are properly protected. This program shall provide protection from hazards such as, but not be limited to: floor and wall openings, leading edges, and steel erection. Methods of protection shall include, but not be limited to: fixed systems (guardrails, covers, nets, etc.), personal fall arrest systems and job specific fall protection plans. A key provision of this program shall be that no employee shall work in an unprotected manner while exposed to a vertical fall of six (6) feet or greater. The Fall Protection Program shall be submitted and accepted prior to any Work covered by the plan.

F. Regarding the training required by CCR Title 8, Section 5192, Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening. Submit a list of qualified personnel at least 15 days before commencing any excavation; update at monthly intervals during ongoing excavation operations. Include, for each individual, the date of certification and sufficient evidence of training and medical screening to conform to appropriate laws, regulations and the requirements of this Contract. Plan to be revised and resubmitted as conditions warrant

G. Excavation Action Plans for all excavation activities for which a protective system is required by CCR Title 8 Article 6. Include all drawings for any ground support system to be used during the excavation activity. Include the slopes and configurations of sloping or benching systems. All excavation submittals shall be submitted at least 15 days prior to the planned Work. Compliance with this provision and any stoppage of Work resulting from compliance with this provision shall be considered within the original scope of this Contract and shall not delay the schedule nor shall it be relied upon to form the basis of any claim for performance of Work by Contractor.

H. Provide annual and four year certifications for all cranes operated on the Site by Contractor and or Subcontractors of any tier. Re-certification is required for any crane subjected to any upset, overloading, side pulling, shock loading or support failure, prior to any further use of the equipment on the Site.

I. Before making a critical lift, a Critical Lift Plan shall be prepared by the crane operator, lift supervisor, and rigger. The plan shall be reviewed and signed by all Contractor personnel involved in the lift. The signed plan shall be submitted for acceptance by Owner. The lift shall not be under taken until Contractor has received the Accepted submittal from Owner.

    1. Critical Lift: A Critical lift is defined as a crane lift required detail planning and additional or unusual safety precautions. Critical lifts include, but are not limited to:

        a. Lifts made with more than one crane.

b. Hoisting of personnel with a crane.

c. A lift, which will meet or exceed 80% of the rated capacity of the specific crane as indicated on the Manufacturer's Load Charts or Tables.

d. A lift, which by its nature is unusual and not regularly (at least on a monthly basis) completed by the lifting crew (Crane operator, oiler & or riggers).

E. Any lift deemed Critical by Owner.

2. The Critical Lift Plan shall include, at minimum, the following elements:

a. The exact size and weight of the load to be lifted and all crane and rigging components which add to the weight. The manufacturer's maximum load limits for the entire range of the lift, as listed in the load charts, shall also be specified.

b. The plan shall specify the lift geometry and procedures, including the crane position, height of the lift, the load radius, and the boom length and angle, for the entire range of the lift.

c. The plan shall designate the crane operator, lift supervisor and rigger and state their qualifications.

d. The plan will include a rigging plan that shows the lift points and describes rigging procedures and hardware requirements.

e. The plan will describe the ground conditions, outrigger requirements, and if necessary, the design of mats, necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift.

f. The plan will list environmental conditions under which the lift operations are to be stopped.

g. The plan will specify coordination and communication requirements for the lift. Strict compliance with this Section as determined by Owner or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of any claim. Compliance with determinations by Owner or its designee shall not relieve Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

J. Within thirty (30) days of Notice to Proceed for the GMP Amendment or Notice to Proceed for any portion of the construction work, submit a list of qualified riggers to Owner for review and acceptance. The submittal shall include a description of each candidate's experience and qualifications. This list shall be re-submitted by Contractor upon any changes in the personnel submitted.

K Energy Isolation Program (Lock Out, Tag Out): Include details of procedures, equipment and training. This program shall be established and implemented to ensure that Contractor's and Subcontractor's workers exposed to sources of stored energy are properly protected. This protection shall provide protection from hazards such as, but

not limited to: electrical, hydraulic, gravitational and compressed air or gas. The Energy Isolation Program shall be submitted and accepted prior to any Work covered by the plan.

1.05 SITE CONDITIONS.

A. Contractor shall maintain a current list of all hazardous substances that will be used in Site operations. Unless Contractor provides, in writing, an alternate method to be used to provide Owner employee's access to Material Safety Data Sheets, copies of all Material Safety Data Sheets for substances appearing on the hazardous substance list shall be readily available at the Site.

B. Contractor's employees shall comply with all posted traffic safety regulations while operating motor vehicles upon Owner properties. Employees walking or working in areas subject to vehicular traffic shall wear retro-reflective orange high visibility safety vests.

C. When conducting Work which negatively impacts existing sidewalks (including both improved and unimproved sidewalks), Contractor shall take all possible steps to insure the continuing ability for pedestrians to safely pass through or around the work areas (including pedestrians utilizing motorized wheel chairs) without being directed into the adjacent street, traffic or bike lane.

D. When the specific Work Site conditions do not match the conditions illustrated on any standard traffic control plan, (as published in the most recent Manual on Uniform Traffic Control Devices, WATCH Manual, etc.) Contractor shall draft and submit to Owner and the traffic department of the authorities having jurisdiction the Site Specific Traffic Control Plans. The failure of Contractor to comply with this paragraph will result in the issuing of a Stop Work Notice to Contractor for the particular work. Compliance with any Stop Work Notice for Traffic Control issued by Owner, or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of any claim. Compliance with any Stop Work Notice for Traffic Control issued by Owner, authorities having jurisdiction or their designee(s) shall not relieve Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

PART 2 – PRODUCTS

2.01 CONSTRUCTION EQUIPMENT AND TOOLS.

A. Select and operate construction and personal protective equipment and tools in conformance with Paragraph 1.03 of this Section and in accordance with the manufacturer's specifications for the equipment or tools' intended use.

B. Equipment. All equipment, tools and or other items used to complete the Work shall be inspected by Contractor to insure compliance with applicable regulatory standards. Equipment, tools and or other items are subject to periodic inspection by Owner. Contractor shall promptly remove equipment rejected by Owner as not conforming to Article 1.03 of this Section. This removal shall be considered within the original scope of this Contract and the Work shall be completed in such a manner so as to not

delay the schedule for performance of Work by Contractor nor shall the removal serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

1. Red Tag Program. Contractor shall established a program by which equipment, tools and other items used to complete the Work shall be removed from service when it has been determined that the equipment, tools and other items present a potential for unintended injury when used as directed by the manufacturer. A tag with a prominent red and black message including the word "DANGER" may be used; this tag shall be known as a "Red Tag." The tag will be signed by the Owner, dated and note the specific reasons for the rejection. Any equipment, tool and or other item so tagged shall not be used to complete the Work until the condition noted on the tag has been corrected and the tag has been removed by the person who affixed the tag or their designee.

   Any person who ignores, removes, damages or otherwise tampers with a Red Tag shall be immediately removed from the Work by Contractor and shall not return to the project without the written permission of Owner.

C. Special Safety Equipment. Where necessary for conformance with Article 1.03 of this Section, Contractor shall provide special safety equipment and persons qualified to operate same to insure the safety of the Site. Such special safety equipment may include but is not limited to air quality measuring and monitoring equipment, noise measuring and monitoring equipment and other measuring devices related to industrial hygiene. Compliance shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall be relied upon to form the basis of a claim for delay. Equipment shall be used in accordance with the respective manufacturer's design, directions, and intended use.

D. Electrical installations for construction activities shall conform to the National Electrical Code ANSI/NFPA 70-2008 or later edition (next edition scheduled for 2011) for electrical installations and be acceptable and the State of California, Division of Occupational Safety and Health.

E. Electrical equipment and tools to be used on the Site shall be listed by at least one of the following USA testing facilities: Underwriters Laboratories, Factory Mutual or Electrical Testing Laboratories. Any electrical tool or equipment which is not listed by at least one of the above testing facilities shall be removed from the Site.

2.02 SAFETY EQUIPMENT.

A. All personal protective and other safety equipment placed into use at the Site shall conform to Paragraph 1.03.A of this Section and shall include markings to show appropriate ANSI approval codes or other indications of acceptable usage. Equipment shall not be altered in any way without written approval from the respective manufacturer.

B. Persons entering the Site shall, at a minimum, be equipped with the following personal protective equipment: hardhat, eye protection, and work boots. ANSI accepted protective footwear shall be worn by all personnel exposed to foot hazards or working below grade (steel toed recreational shoes are not permitted).

C. No person shall be allowed to wear recreational pants (shorts) or sleeveless shirts into any work areas of the Site.

2.03 TESTING EQUIPMENT.

Air monitoring, and air flow testing equipment used in underground or other locations where there is the potential for an explosive atmosphere, shall be "permissible" as defined, tested and certified by the Mine Safety and Health Administration Laboratory of the U. S. Department of Labor.

2.04 SAFETY MANAGER.

Contractor Safety Manager's performance will be subject to periodic evaluation by Owner throughout the prosecution of the Work. Conclusions and recommendations of the review will be forwarded to Contractor for information or action. The Safety Manager shall at a minimum perform the following duties:

A. Document in writing daily safety observations of the Site(s) and public areas contiguous and adjacent thereto and take necessary and timely corrective action(s) to eliminate unsafe acts and/or conditions and document outstanding safety compliance activities or behaviors.
B. Review foremen's incident and investigation reports, to insure timely submission, and that corrective action(s) have been completed to prevent recurrence.
C. Provide line supervisors with relevant material for use in conducting weekly toolbox safety meetings.
D. Review safety meeting reports submitted by line supervisors to ensure adequacy of training as well as subject matter.
E. Conduct incident investigations and preserve incident sites. Prepare and submit the required reports to the Project Manager for final distribution in accordance with the manual.
F. Develop and implement a safety training programs for line supervisors and employees as applicable to their specific jobs.
G. Develop and implement incentive programs designed to recognize individual contractor/Subcontractor employee safety efforts and contributions towards improvement of jobsite safety.
H. Attend the monthly safety professionals and monthly all hands meetings as held by Owner as well as other meetings as directed by Owner or its designee.
I. Ensure that employees receive medical treatment for occupational injuries and that a written OSHA 300 log is maintained and available for review by Owner or designee without prior notice.
J. Ensure that all Subcontractor employees at any tier comply with jobsite safety rules and regulations; and that the Subcontractors' reports are completed in accordance with this Contract and according to the requirements of the applicable regulatory agencies.

K. Provide for control, availability, and use of safety equipment, including employee personal protective equipment.

L. Shall perform or supervise environmental testing on items including, but not limited to; noise, air flow, and air quality. Written records of such tests shall be kept and made available upon request. It is the Safety Manager's responsibility to ensure that Contractor complies with pollution and environmental control requirements.

M. Attend scheduled meetings of Contractor and Owner.

N. Shall supervise other Contractor Safety Representatives assigned to the contract.

O. Conduct weekly safety meetings to be attended by all Contractor/Subcontractor and management personnel. Written records of these meetings shall be maintained at the Site and made available to Owner upon request without prior notice.

P. Coordinate and participate in the development of job hazard analyses (JHAs), ensuring quality and timely submittals. Coordinate training of work crews and line supervision affected by each JHA.

2.05 SAFETY REPRESENTATIVE(S).

Contractor Safety Representatives' performance will be subject to periodic evaluation by Owner Construction Safety Staff. Conclusions and recommendations of the review will be forwarded to the Resident Engineer for information or action. Contractor's Safety Representative(s) shall at a minimum:

A. Document in writing daily safety observations of the Site(s) and public areas contiguous and adjacent thereto and take necessary and timely corrective action(s) to eliminate unsafe acts and/or conditions and document outstanding safety compliance activities or behaviors.

B. Review safety meeting reports submitted by line supervisors to ensure adequacy of training as well as subject matter.

C. Conduct incident investigations and preserve incident sites. Prepare and submit the required reports to the Construction Manager for final distribution in accordance with the manual.

D. Provide the safety training program for supervisors and employees as applicable to their specific jobs and as instructed by the Safety Manager.

E. Ensure that employees receive medical treatment for occupational injuries and that a written OSHA 300 log is maintained and available for review by Owner or designee without prior notice.

F. Ensure that all Subcontractor employees at any tier comply with jobsite safety rules and regulations; and that the Subcontractors' reports are completed in accordance with this manual and according to the requirements of the applicable regulatory agencies.

G. Provide for control, availability, and use of safety equipment, including employee personal protective equipment.

H. Shall perform environmental testing on items including, but not limited to; noise, air flow, and air quality. Written records of such tests shall be kept and made available upon request.

I. Conduct weekly safety meetings to be attended by all Contractor/Subcontractor and management personnel. Written records of these meetings shall be maintained at the Site and made available to Owner upon request without prior notice.

J. Coordinate and participate in the development of Job Hazard Analyses, ensuring quality and timely submittals. Coordinate training of work crews and line supervision affected by each authority having jurisdiction.

PART 3 – EXECUTION

3.01 SAFETY PERSONNEL.

A. To insure the safety of the Site, Contractor safety personnel shall not work more than eleven hours in any twenty-four hour period or more than fifty-five hours in any consecutive seven day period. Included in the definition of Contractor safety personnel are the Safety Manager, Safety Representative(s) and any other persons accepted in writing by Owner Construction Safety staff as safety representatives.

B.. In the event Contractor is performing work on more than one Contract for Owner at the same time, Contractor safety personnel shall not perform safety duties on more than one Contract during any twenty-four hour period.

C. Contractor shall insure that only those safety representative(s) accepted in writing by Owner for employment on the Site is/are present at the Site whenever work is in progress at the Site. The absence of the required safety representative shall result in the immediate stoppage of all work at the Site. Contractor is responsible for maintaining an adequate staff of safety personnel, whose qualifications have been submitted to and accepted in writing by Owner, in order to avoid work stoppages in the event of an expected or unexpected absence due to vacation, illness, personal emergency, resignation or termination of the assigned safety representative(s). Contractor's safety representative(s) shall have the authority to direct immediate correction of any unsafe or unhealthful condition and, as necessary, to stop work until appropriate corrective measures have been completed.

   Compliance with this provision shall be considered within the original scope of this Contract and any stoppage of work resulting from compliance with this provision shall not delay the schedule for performance of Work by Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of a claim for delay.

D. Contractor shall designate a Safety Manager who is accepted in writing by Owner. The Safety Manager must be assigned to the Site whenever Work is in progress. The Safety Manager shall regularly work the day shift, attend required meetings and be fully cognizant of all project-specific safety practices, processes, rules and procedures, and maintain regular contact with Owner-designated Safety Personnel. The Safety Manager shall meet the following qualifications:

   1. A full-time supervisory employee of Contractor responsible for the implementation of Contractor's safety and health program at the Site.

   2. Five years relevant construction experience including two years of full time responsibility for construction safety programs.

3. Current certification in good standing as a Construction Health & Safety Technician and Red Cross (or equivalent) First Aid and CPR.

4. For projects with an OCIP, Safety Managers must meet the qualifications set forth in the OCIP Safety Requirements Manual.

E. Contractor shall utilize Safety Representatives for second and third shift The Safety Representatives must be assigned full time to the Site whenever Work is in progress. Safety Representatives utilized by Contractor shall be acceptable to Owner for employment on the Site and must meet the following qualifications:

1. A full-time supervisory employee of Contractor responsible for the implementation of Contractor's safety and health program at the Site.

2. Three years relevant construction experience including one year of full time responsibility for construction safety programs.

3. Current certification in good standing as a Construction Health & Safety Technician and Red Cross (or equivalent) First Aid and CPR.

4. For projects with an OCIP, Safety Representatives must meet the qualifications set forth in the OCIP Safety Requirements Manual.

F. Either the Safety Manager or a Safety Representative must be present whenever construction work is in progress.

3.02 CONFINED SPACE OR UNDERGROUND AIR MONITORING.

A. All air monitoring activities shall conform to Paragraphs 1.03.A & B of this Section.

B. Select and use equipment capable of providing printed logs of gas tests.

C. Operate and maintain a gas monitoring system as required by Article 2.03 of this Section. Perform air monitoring and sample analyses as required by Paragraphs 1.03.A & B of this Section.

D. Begin testing for toxic and explosive gases as soon as the excavation or drilled hole has progressed to a level of five feet below surface level.

E. Test air quality in the most stagnant portions of excavation to ensure there is no accumulation of explosive or other dangerous gases.

3.03 CONFINED SPACES.

A. Work in confined spaces shall be completed in conformance with Paragraph 1.03.A of this Section.

B. Perform confined space operations under the immediate supervision of a competent person as defined in CCR Title 8 who is fully familiar with the requirements for safe entry, egress, ventilation and air monitoring procedures and capable of enforcing strict compliance.

C. Include confined space permitting system in Contractor's written Injury and Illness Prevention Program and implement for all confined space areas on the Site.

D. Areas on the Site designated as confined spaces shall have prominent sign posted at the entrance identifying the area as a confine space and list requirements for entry.

E. Air samples shall be taken before any entry into the confined space and continuously throughout the work period.

3.04 CRANE OPERATIONS.

A. All crane operators shall be licensed by the authorities having jurisdiction for the equipment type to be operated and copies of said licenses shall be submitted to Owner or its designee.

B. All crane operations where the load is beyond the direct view of the operator shall be observed by a signal person who can directly observe the load and be observed by the operator. Stop load movement in the event the signal person is unable to observe the load or fails to continuously observe the load and signal the operator.

C. Prior to operating cranes on the Site, all crane operators shall have successfully completed testing that verifies the crane operator's ability to read and understand the load chart for the equipment to be operated. This testing may be performed by an independent certifying agency or a qualified member of Contractor's supervisory staff who is acceptable to Owner, has a minimum of five years heavy civil construction experience, and can satisfactorily demonstrate the ability to read and understand load charts and rigging tables to Owner or its designee when requested, without prior notice. Written records of this testing shall be maintained on the Site and made available to Owner for review without prior notice.

D. Re-certification is required for any crane involved in an incident involving but not limited to upset, overloading, side pulling, shock loading, or support failure. Recertification and written acceptance by the manufacturer is also required for any modification to a crane. Contractor shall make crane acceptance and certification records available for review by Owner or its designee without prior notice. Any re-certification of a crane required for compliance with this section shall be considered within the original scope of this contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of a claim for delay.

E. Every crane shall have the following documents with them at all times they are to be operated. A copy of the operating manual developed by the manufacturer for specific make and model of the crane; a copy of the operating manual for any crane operator aids which the crane is equipped; a copy of the checklist used for the inspection shall be maintained at the Site. Start-up pre-operational inspections shall be conducted by the operator before every operational (shift) of the crane.

3.05 RIGGING

Rigging activities, regardless of the equipment used to hoist or move the materials shall comply while the following requirements:

A. Comply with Paragraph 1.03.A of this Section.

B. The use of chains, including alloy steel chains, for the purposes of rigging any load, is prohibited. The use of a chain or chains to rig a load shall result in immediate disciplinary action by Owner against the supervisory workers and Contractor involved in the incident.

C. The rigging of loads shall be completed under the supervision of a qualified rigger.

D. The fork of any industrial forklift shall not be altered in any way to allow the attachment of a shackle or other rigging device. Rigging equipment shall not be directly supported or attached to the forks. A forklift may only be used to lift materials securely attached to pallets or when utilizing a manufacturer accepted or approved attachment that allows for the use of rigging equipment.

E. Only safety hooks, or properly housed hooks shall be used. Suspended loads shall be controlled by tag lines.

F. Hooks, shackles, wire rope, synthetic slings, and other rigging equipment subject to wear must be thoroughly inspected at regular intervals by a qualified rigger and repaired or replaced as required. Records of such inspections shall be maintained by Contractor and made available to Owner for review upon request and without prior notice.

G. All rigging equipment which is removed from service due to wear or defect shall be either destructively discarded or returned to the manufacturer. Records of such removals shall be maintained by Contractor and made available to Owner for review upon request and without prior notice.

H. Rigging equipment shall be inspected by a qualified rigger prior to each lift for obvious damage or defects. Equipment found to be damaged or defective shall be retired in compliance with Paragraph 1.03.A of this Section.

3.06 PROTECTION FROM FALLS

A. Comply with Paragraph 1.03.A of this Section.

B. Maintain the Site in an organized and clean manner, as accepted by Owner, to reduce the potential for slips, trips and falls. Compliance with this provision shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

3.07 AERIAL LIFTS

A. Aerial lifts mounted on the bed of trucks shall be installed by an authorized manufacturer.

B. Personnel who operate the aerial lifts shall be trained by the manufacturer in the safe operation of the lift.

C. All personnel shall wear and use a personal fall protection system while on the lift. The lanyard shall be anchored to the lifts guard rails.

D. Aerial lifts shall only be used within the guidelines of the manufacturer.

3.08 EXCAVATIONS

A. All excavation activities shall comply with Paragraph 1.03.A of this Section.

B. All excavation operations shall be under the immediate supervision of a Competent Person, as defined in CCR Title 8, who is fully familiar with the requirements for safe

excavation procedures and capable of enforcing strict compliance. The support system shall be designed by a Civil Engineer, licensed in the State of California and the support system plan shall be available for review by Owner without prior notice.

3.09 LOCK OUT/TAG OUT PROCEDURES

Include written lock out/tag out procedures in Contractor's Injury and Illness Prevention Program. Submit specific procedures as part of job hazard analysis submittals. At all times comply with Paragraph 1.03 of this Section.

3.10 HEALTH AND SAFETY PLAN

A. Comply with the requirements CCR Title 8 Section 5192 Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening. The plan is to be revised and resubmitted as conditions warrant.

B. Comply with Paragraph 1.03.A of this Section.

C. Provide training to construction personnel, subject to exposure during the course of excavation, prior to entering any excavation-sites. Provide necessary yearly refresher training as required by Paragraph 1.03.A of this Section.

3.11 HOUSEKEEPING

The Site shall be maintained in a clean and neat manner. All scrap, trash, and other refuse shall be placed in containers prior to the end of each work shift. Trash containers shall be scheduled for regular emptying or replacement. Immediate emptying or replacement shall be ordered by Contractor in the event a container is filled prior to the scheduled emptying or replacement.

END OF SECTION 01 35 25

SECTION 01 35 53
SECURITY PROCEDURES

PART 1 – GENERAL

1.01 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.

1.02 SUMMARY

A. The work in this Section consists of providing, operating and maintaining security at the Site during construction. Security refers to the protection of both Owner property and the property of Contractor from theft, vandalism, pilfering or other destructive activities. It is Contractor's sole responsibility to provide protection for any property (including equipment and supplies) under Contractor's care, custody and control.

B. Contractor shall establish, implement and maintain an effective, Site specific, Security and Loss Prevention Program (referred to herein as the Program). Contractor is solely responsible for record keeping and insuring that Subcontractors are informed of and comply with the Program.

C. Contractor shall comply with the CCR Title 8, as well as all other federal, state and local regulations, statutes, codes and laws applicable to safety and security operations at the Project Site. Strict compliance with all applicable regulations as determined by Owner or its designee shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of a claim for delay. Compliance with determinations by Owner or its designee shall not relieve Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

D. Contractor shall comply with all special site conditions identified in the Supplementary Conditions, if any.

1.03 REQUIREMENTS

A. The Program shall comply with CFR 1926.800 (b) (3), which states: "The employer shall control access to all openings to prevent unauthorized entry underground. Unused chutes, manways, or other openings shall be tightly covered, bulkheaded, or fenced off and shall be posted with warning signs indicating "Keep Out", "No Trespassing", or similar language."

B. The Program shall include methods of protecting physical structures, above, below or at-grade from trespassers and malicious mischief.

C. On Projects involving multiple Prime Contractors or Contractors and Contracts, each Prime Contractor or Contractor shall coordinate with all other Prime Contractors or Contractor to insure that Contractor's security personnel adequately patrols all Project

areas. For the purposes of this paragraph, a Prime Contractor is defined as any Contractor, Joint Venture Partnership or other business entity that enters into a Contract for Construction or Construction-related Work with Owner.

D. Contractor shall coordinate with the local law enforcement and USC Department of Public Safety for patrol enhancement.

E. Contractor shall be required to protect all existing buildings within the Site against vandalism and vagrants until such time that Contractor or Separate Contractor demolishes the buildings. Vacated buildings shall be boarded up until demolition.

1.04 SUBMITTALS

All submittals and re-submittals, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with Owner accepted submittal schedule so as not to delay the performance of Work by Contractor.

Upon receiving Notice of Award of this Contract, Contractor shall prepare and submit for review the submittal listed below and shall not receive permission to perform Work upon the Site for this Contract or any work order there-under, until Owner has returned the submittals "Final Unrestricted Release" or "Final But Restricted Release" as defined in Section 01 33 00. Owner's refusal to issue permission to perform Work upon the Site, due to Contractor's failure to submit listed safety submittals, or due to Owner's or Architect's rejection of unacceptable submittals, shall not constitute a basis for any claim of delay, interference, disruption or other similar types of claims.

A. Contractor shall submit for acceptance by Owner, a written Site specific Security and Loss Prevention Program that outlines the method of property and asset protection to be used by Contractor and is to be revised and resubmitted as conditions warrant. Owner shall review and accept written plans from Contractor identifying measures for securing project related Sites. The Program shall address both active and passive security measures to be implemented by Contractor and shall include, but is not limited to the following:

   1. Security Guard Service: Contractor shall provide on-site Security Guard Service 24 hours a day and seven days a week. The Security Guard Service shall include, at a minimum, the following:

      a. Patrolling Guards: Security and Loss Prevention Program shall clearly indicate the number of Patrolling Guards to be utilized at any given time of day or day of the week. Specific Patrol Areas shall be defined in the plan and shall include the entire Site. No single Patrol Area shall be larger than the area which can be traveled by motor vehicle from one end to the other in fifteen (15) minutes while observing posted traffic rules.

      b. Stationary Guards: Security and Loss Prevention Program shall clearly indicate the number and stations for Stationary Guards whose duties will be limited to providing security at key access points.

2. Lighting/Illumination: Contractor shall provide and maintain adequate lighting without spillover throughout each Site including but not limited to staging, lay-down areas and employee parking lots.
3. Office Security: All Contractor office facilities shall be secured to prevent entry and shall be provided with alarm systems.
4. Physical Barriers: Contractor shall provide and install perimeter fencing. Access areas shall be closed and locked at the end of shift or when work is completed in the area.
5. Project Warning Signage: Contractor shall provide signs such as 'Keep Out - No Trespassing."
6. During special events (if any), Owner will provide additional security as needed.

B. Upon acceptance by Owner, Contractor shall implement the accepted Program. Owner will monitor the performance of Contractor's Program to ensure that adequate security is provided during the construction of the project.

C. Should conditions change, Contractor will be required to resubmit an updated Site specific Security and Loss Prevention Program that reflects the changes in conditions. Any re-submittal, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with Owner accepted submittal schedule so as to not delay the performance of Work by Contractor.

PART 2 - PRODUCTS

2.01 SECURITY EQUIPMENT AND TOOLS

A. Select, provide and retain a reputable uniformed security guard service. If requested by Owner, such services shall be provided by a bonded Subcontractor. Security guards shall only be assigned to Project Sites for patrol and other security related activities.

B. Security guards shall be equipped with cell phones to enhance their ability to report incidences in a timely manner and allow direct contact with emergency communications dispatchers.

C. Security guards shall be provided with Personnel Protective Equipment (PPE), to insure compliance with Section 01 35 25 "Site Safety Requirements."

PART 3 - EXECUTION

3.01 SECURITY PERSONNEL

A. Contractor shall ensure security guard service is on time and on duty providing security protection during construction activities, including holidays and weekends.

B. Contractor shall ensure security guard service employs personnel who are professional, well-groomed and wear clean, pressed uniforms.

C. Contractor shall provide security personnel who are bonded and certified as security officers. Security personnel shall be properly licensed and certified to bear and use service weapons. Contractor shall audit and review the security Subcontractor's recruitment policies and procedures to insure appropriate background checks and training is completed.

D. Contractor shall insure that security personnel receive orientation training regarding Site and known or potential hazards, and methods for recognizing and avoiding known or potential hazards.

END OF SECTION 01 35 53

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. This 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 quality 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 quality assurance and quality control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:

1. Section 01 32 00 "Construction Progress Documentation" for developing a schedule of required tests and inspections.
2. Section 01 73 29 "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
3. Specification Sections for specific test and inspection requirements.

1.03 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that the actual products incorporated into the Work and the completed construction complies with requirements. Services do not include contract enforcement activities performed by Owner or Architect.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials that are constructed on-site. Mockups are used to verify selections made under

Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation. 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.

J. 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).

K. 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.

1.04 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 Owner and Architect 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 Owner and Architect for a decision before proceeding.

1.05 SUBMITTALS

A. Contractor’s Quality Assurance and Quality Control Plan: For quality-assurance and quality control activities and responsibilities.

B. Qualification Data: For Contractor's quality assurance and quality control personnel.

C. Testing Agency Qualifications: For testing agencies specified in the General Conditions and Construction Documents 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.

D. Qualifications for Continuous Inspection: When required by the Contract Documents or authorities having jurisdiction, engage inspectors registered and approved for "continuous inspection" by authorities having jurisdiction.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality control service.

F. Shop Drawings: For mockups, 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 condition difficult to illustrate in two dimensions.

1.06 REPORTS AND DOCUMENTS

A. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and Architect's work order number (indicated as "W.O. No." or "Job No." on the Drawings and Specifications); and Owner's contract number or other identifying number, if any.
3. Name, address, and telephone number of testing or inspecting agency.
4. Dates, times 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. Ambient 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.
14. In addition to items "1" through "5" above, include the following information in reports of continuous inspection:
    a. All information required by authorities having jurisdiction.
    b. Number of hours of inspection
    c. Summary of progress and condition of the Work.
    d. Observations of noncompliance with requirements of the Contract Documents, if any.
    e. Description of the Work observed.

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.

E. Permits, Licenses, and Certificates: For Owner'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.

1.07 CONTRACTOR'S QUALITY ASSURANCE AND QUALITY CONTROL PLAN

A. Quality Assurance and Quality Control Plan

1. General: Submit quality control plan at least 30 days prior to the start of construction. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality control procedures similar in nature and extent to those required for Project.

1. Project quality control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality plan, include a comprehensive schedule of Work requiring testing or inspection. Coordinate and submit concurrently with Contractor's construction schedule. Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required. Update as the Work progresses. Testing and Inspection schedule shall including the following:

1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."

3. Owner-performed tests and inspections.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.08 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual specification Sections specify additional requirements.

B. 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.

C. 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.

D. 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.

E. 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.

F. 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.

G. 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 products that are similar to those indicated for this Project in material, design, and extent.

H. Specialists: Certain sections of the Specifications 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. Requirement for specialists shall not supersede requirements of authorities having jurisdiction, building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

I 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; 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.

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 and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.

    b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

    c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.

    d. Fabricate and install test assemblies using installers who will perform the same tasks for Project.

    e. When testing is complete, remove assemblies; do not reuse materials on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, 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

2. Notify Architect seven 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 Architect's approval of mockups before starting work, fabrication, or construction.

    a. Allow seven 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.

1.09 QUALITY CONTROL

A. Owner Responsibilities: Where quality control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. 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**,** and the Contract Sum will be adjusted by a credit Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner 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 Owner, unless agreed to in writing by Owner.

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.

7. Reimburse Owner for costs of additional inspections and tests required due to any of the following:

   a. Contractor's failure to complete the entire Work within the contract time stated in the Agreement between Owner and Contractor, including properly authorized time extensions.

   b. Claims between Subcontractors.

   c. Covering of Work before required inspections and tests are performed.

   d. Tests and inspections of Contractor's correction of defective Work.

   e. Inspecting and testing agency overtime costs due to acceleration of the Work for Contractor's convenience.

   f. Tests and inspections required because of a change in materials provided or a change in source of supply.

   g. Tests and inspections required solely for the convenience of Contractor in scheduling and performing the Work.

8. Regardless of the status or result of tests and inspections, promptly notify Owner of observed irregularities or deficiencies in the Work or in products scheduled to be used in the Work.

C. Testing Agency Responsibilities: Owner will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner. Testing agency shall cooperate with Owner, Architect and Contractor in performance of duties and provide qualified personnel to perform required tests and inspections.

1. Testing agency shall verify that manufactures maintains detailed fabrication/quality control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Testing agency will determine the location from which test samples will be taken and in which in-situ tests are conducted.
4. Testing agency will submit a certified written report of each test, inspection, and similar quality control services to Owner with copies to Architect and Contractor and to authorities having jurisdiction.
5. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
6. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
7. Testing agency will retest and reinspect corrected work.

D. 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 required in Section 01 33 00 "Submittal Procedures".

E. 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.

F. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

G. Associated Services: Contractor shall 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.
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.
8. Furnish copies of mill test reports.

H. Coordination by Contractor: Coordinate sequence of activities to accommodate required quality-assurance and quality 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, notification, and similar activities.
2. Notification: Architect and Owner may elect to attend some or all of the field tests and inspections. Notify Architect and Owner not less than 24 hours in advance of each field test and inspection.

I. Architect and Owner reserve the right to require testing and inspection of any material or product used in the Work, including materials and products already installed.

J. Owner will furnish inspection of the Work at no cost to Contractor except as otherwise provided herein and except for those inspections required to be furnished and paid for by Contractor elsewhere in the Contract Documents:
1. Perform and construct all work under inspection of Owner's inspector unless waived in writing by Owner in each case or exempted wholly or in part from inspection elsewhere in the Contract Documents.
2. Any work requiring such inspection that is performed or constructed during the absence of Owner's inspector is considered defective and is subject to rejection.
3. Contractor shall give written notice to Owner at least 2 working days in advance of performance of any part of the Work requiring special inspection by someone other than Owner's inspector and shall state probable duration of the required special inspection.
4. The inspection of any material or equipment at the factory or shop will not constitute acceptance.
5. Owner's inspector is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
6. Owner's inspector shall not perform any duties of Contractor.
7. Owner's inspector is not authorized to stop the Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. 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 Architect.

4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project Site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.02 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Comply with the Contract Document requirements for Section 01 73 29 "Cutting and Patching."

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.

END OF SECTION 01 40 00

SECTION 01 42 00
REFERENCES

PART 1 - GENERAL

1.01 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.

1.02 DEFINITIONS

A. General: Basic Contract definitions are included in the General Conditions of the Contract.

1.03 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.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

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.

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

B. 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.

AA	Aluminum Association (The) www.aluminum.org	(703) 358-2960
AABC	Associated Air Balance Council www.aabchq.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
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	American Concrete Institute 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) www.aeic.org	(205) 257-2530
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
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
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	(405) 780-7372
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 www.ari.org	(703) 524-8800
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 International) www.asme.org	(800) 843-2763 (973) 882-1170
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
AWCMA	American Window Covering Manufacturers Association (Now WCMA)	
AWCI	Association of the Wall and Ceiling Industry www.awci.org	(703) 534-8300
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood Protection Association	(205) 733-4077

	(Formerly: American Wood Preservers' Association) www.awpa.com	
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.bia.org	(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 International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(610) 527-3880
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.canelect.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
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	(423) 892-0137
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.com	(800) 882-8846 (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	(847) 517-1200 (800) 328-6306
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
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
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
ECA	Electrical Components Association www.ec-central.org	(703) 907-8024
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee http://content.asce.org/ejcdc/	(703) 295-6000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) www.esda.org	(315) 339-6937
ETL SEMCO	Intertek ETL SEMCO (Formerly: ITS - Intertek Testing Service NA)	(800) 967-5352

	www.intertek-etlsemko.com	
FIBA	Federation Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
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.floridaroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(301) 277-8686
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GRI	(Part of GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association Division of Air-Conditioning, Heating, and Refrigeration Institute (AHRI) www.ahrinet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc.	(410) 838-6550

	www.hpwhite.com	
IAPSC	International Association of Professional Security Consultants www.iapsc.org	(515) 282-8192
ICBO	International Conference of Building Officials www.iccsafe.org	(888) 422-7233
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
ICPA	International Cast Polymer Association www.icpa-hq.org	(703) 525-0320
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 of North America www.iesna.org	(703) 525-0320
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISA	Instrumentation, Systems, and Automation Society, The www.isa.org	(919) 549-8411
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (801) 341-7360
ITS	Intertek Testing Service NA (Now ETL SEMCO)	
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LGSEA	Light Gauge Steel Engineers Association www.arcat.com	(202) 263-4488

LMA	Laminating Materials Association (Now part of 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
MH	Material Handling (Now MHIA)	
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
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.com	(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
NAGWS	National Association for Girls and Women in Sport www.aahperd.org/nagws/	(800) 213-7193, ext. 453
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
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 222-2300
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
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.org	(901) 526-5016
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	(800) 673-6275

	(National Sanitation Foundation International) www.nsf.org	(734) 769-8010
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 (540) 751-0930
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
PGI	PVC Geomembrane Institute http://pgi-tp.cee.uiuc.edu	(217) 333-3929
PTI	Post-Tensioning Institute www.post-tensioning.org	(248) 848-3180
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 www.sae.org	(877) 606-7323 (724) 776-4841
SCAQMD	South Coast Air Quality Management District www.aqmd.com	(909) 396-2000
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	(866) 817-8888

	www.siaonline.org	(703) 683-2075
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
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 (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
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. www.tileusa.com	(864) 646-8453
TEMA	Tubular Exchanger Manufacturers Association www.tema.org	(914) 332-0040
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700

TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
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 (Formerly: NWWDA - National Wood Window and Door 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 www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

C. 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.

CBSC	California Building Standards Commission www.bsc.ca.gov	(916) 263-0916
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, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

D. 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 www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://dodssp.daps.dla.mil	(215) 697-6257
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
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111

HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
PHS	Office of Public Health and Science http://www.hhs.gov/ophs/	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USP	U.S. Pharmacopeia www.usp.org	(800) 227-8772
USPS	Postal Service www.usps.com	(202) 268-2000

E. 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.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office	(866) 512-1800 (202) 512-1800

	www.gpoaccess.gov/cfr/index.html	
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 Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil/	(215) 697-2664
	Available from Defense Standardization Program www.dsp.dla.mil	
	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences www.wbdg.org/ccb	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

F. State 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.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 574-2041
CCR	California Code of Regulations www.calregs.com	(916) 323-6815

CDHS	California Department of Health Services www.dhcs.ca.gov	(916) 445-4171
CDPH	California Department of Public Health, Indoor Air Quality Section www.cal-iaq.org	
CPUC	California Public Utilities Commission www.cpuc.ca.gov	(415) 703-2782
TFS	Texas Forest Service Forest Resource Development http://txforestservice.tamu.edu	(979) 458-6606

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

1.01 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.

1.02 SUMMARY

A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, security and protection facilities, and traffic control.

B. Temporary utilities include, but are not limited to, the following:
   1. Sewers and drainage.
   2. Water service and distribution.
   3. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
   4. Heating and cooling facilities.
   5. Ventilation.
   6. Electric power service.
   7. Lighting.
   8. Telephone service.

C. Support facilities include, but are not limited to, the following:
   1. Temporary roads and paving.
   2. Dewatering facilities and drains.
   3. Project identification and temporary signs.
   4. Waste disposal facilities.
   5. Field offices.
   6. Storage and fabrication sheds.
   7. Lifts and hoists.
   8. Temporary elevator usage.
   9. Temporary stairs.
   10. Construction aids and miscellaneous services and facilities.

D. Security and protection facilities include, but are not limited to, the following:

1. Environmental protection.
2. Stormwater control.
3. Tree and plant protection.
4. Pest control.
5. Site enclosure fence.
6. Security enclosure and lockup.
7. Barricades, warning signs, and lights.
8. Covered walkways.
9. Temporary enclosures.
10. Temporary partitions.
11. Fire protection.

E. Related Sections include the following:
1. Section 01 33 00 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
2. Section 01 73 00 "Execution Requirements" for progress cleaning requirements.
3. Specification Section for "Hot-Mix Asphalt Paving" for construction and maintenance of asphalt paving for temporary roads and paved areas.
4. Specification Section for "Cement Concrete Pavement" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.
5. Specification Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.03 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.04 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the GMP or Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
1. Owner’s construction forces.
2. Occupants of Project.
3. Architect.
4. Testing agencies.

5. Personnel of authorities having jurisdiction.

B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project Site.

C. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project Site. Provide connection and extensions of services as required for construction operation.

D. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project Site. Provide connection and extensions of services as required for construction operation.

1.05 SUBMITTALS

A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

B. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

C. Graphic Design: Submit drawings indicating graphic design for temporary project identification signs designed by Contractor.

D. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

E. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

F. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.

2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

G. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of work.

2. HVAC system isolation schematic drawing.

3. Location of proposed air-filtration system discharge.
4. Waste handling procedures.
5. Other dust-control measures.

1.06 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
   1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
   2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and California Building Code.

1.07 PROJECT CONDITIONS

A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
   1. 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 Owner's acceptance, regardless of previously assigned responsibilities.

B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
   1. Keep temporary services and facilities clean and neat.
   2. Relocate temporary services and facilities as required by progress of the Work.

C. Security: Employ all measures necessary to ensure the security of the Project Site. Security measures, if any, provided by Owner do not relieve Contractor from responsibility for Site security as required by the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Owner. Provide materials suitable for use intended.

B. Pavement: Comply with pavement specification sections.

C. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 8 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.

1. Main access gate into construction area is to be double chained with dual padlocks. One padlock to be provided by Contractor and one by Owner. Contractor to limit and restrict distribution of keys or pass code. Provide Owner with one set of keys or passcode to Contractor's lock.

D. Portable Chain-Link Fencing: Minimum 2-inch 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized steel bases for supporting posts.

E. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

1. Color: Green.

E. Lumber and Plywood: Comply with requirements in specification section for "Miscellaneous Carpentry."

F. Paint: Comply with requirements in specification section for "Painting."

G. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

H. Water: Potable.

I. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.

J. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.02 EQUIPMENT

A. General: Provide equipment suitable for use intended.

B. Field Offices: Prefabricated or Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.

C. Owner Field Office: See Scope of Work

D. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

2. Comply with requirements of authorities having jurisdiction.

D. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

E. Drinking-Water Fixtures: Adequate supply of drinking water and paper cups within 200 feet of work areas and a trash can immediately adjacent to water supply for disposal of cups.

F. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and at all intakes to units being operated and replace with specified filter at end of construction.

G. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light. Permanent outlets may be used when available if on a GFIC circuit or used with a GFIC protected extension cord.

H. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

I. 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.

J. First Aid Supplies: Provide types and quantities required by referenced standards, authorities having jurisdiction, and as prudent for the conditions existing for the Work.

K. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.03 PROJECT IDENTIFICATION AND TEMPORARY SIGNS

A. Approval: Do not erect, exhibit, or display graphic signs or other media device for advertisement or acknowledgment unless previously approved in form, content and location. Trailers for delivery or otherwise, remaining at the site overnight or longer, shall bear visible identification located no higher than six feet above the ground.

B. Site Sign: Provide Site "Protect Identification" Sign as shown on the Sketch at the end of this ‘Section; install sign where directed.

1. Architect will provide the rendering of the Project Image.

2. Colors:

a. USC Cardinal shall match Pantone PMS 201, as approved.

b. USC Gold shall match Pantone PMS 123, as approved.

3. Lettering shall be Caslon and Frutiger in sizes as indicated and approved.
4. Posts, edges of sign and back of sign shall be Cardinal color.
5. Black & White layout artwork for USC Logo must be downloaded from: http://www.usc.edu/identity/print/usc_logo/

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
   2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
   3. Obtain easements to bring temporary utilities to Project Site where Owner's easements cannot be used for that purpose.

B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
   1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
   2. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
   3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
   4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.

1. Provide rubber hoses as necessary to serve Project Site.
2. As soon as water is required at each level, extend service to form a temporary water and fire-protection standpipe. Provide distribution piping. Space outlets so water can be reached with a 100-foot hose. Provide one hose at each outlet.
3. Provide pumps to supply a minimum of 30-psi static pressure at highest point. Equip pumps with surge and storage tanks and automatic controls to supply water uniformly at reasonable pressures.
4. Provide all connections and extensions required.
5. Maintain connections and extensions in a safe manner and utilize so as to not constitute a hazard to persons or property.
6. Connections and extensions will be subject to approval of Owner. Immediately remove or remedy connections and extensions that represent safety hazards or cause undue interruption of Owner's normal operations.
7. Provide all drinking water.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
    a. Where required by authorities having jurisdiction or deemed necessary by Contractor for health or safety reasons, provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
4. Drinking-Water Facilities: Provide adequate supply of potable drinking water based on the staff size and OSHA requirements.
5. Locate toilets and drinking-water fixtures so personnel need not walk more than two stories vertically or 200 feet horizontally to facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select

equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

1. Maintain temperature as required in other Sections of these Specifications, but maintain a minimum temperature of 60 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

1. Connect temporary service to Owner's existing power source, as directed by Owner. Unless overhead service approved by Owner in writing, in advance, install electric power service underground. Maintain equipment in a condition acceptable to Owner.

2. Install power distribution wiring overhead and rise vertically where least exposed to damage.

    a. Provide distribution of temporary electric power service so that adequate power is available in a safe manner at any position within the Work without using an extension of more than 100 feet.

H. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.

1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

2. Provide warning signs at power outlets other than 110 to 120 V.

3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.

4. Provide metal conduit enclosures or boxes for wiring devices.

5. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.

I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Provide illumination levels appropriate to task, but not less than 25 foot-candles (270 lux).
3. Install exterior-yard Site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
4. Install lighting for Project identification sign.

J. Telephone Service: Provide temporary telephone service for facilities provided by Contractor. Install separate telephone line for each field office and first-aid station.

1. Provide additional telephone lines for the following:
   a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
   b. Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.
   c. Provide a dedicated telephone line at each first aid station.
   d. If required in the Scope of Work, provide separate telephone lines for Owner's exclusive use.
2. At each telephone, post a list of important telephone numbers.
   a. Police and fire departments.
   b. Ambulance service.
   c. Contractor's home office.
   d. Architect's office.
   e. Engineers' offices.
   f. Owner's office.
   g. Principal Subcontractors' field and home offices.
3. Provide voice-mail service or messaging service on all telephones.
4. Furnish superintendents with cell phones for use in making and receiving telephone calls and text messages when away from field office.

3.03 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access, and as approved by Owner, Architect, and authorities having jurisdiction.

2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet of building lines. Comply with NFPA 241, unless more stringent requirements are established by Owner in writing.

3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide a reasonably level, graded, well-drained subgrade of satisfactory soil material, compacted to not less than 95 percent of maximum dry density in the top 6 inches.

2. Provide gravel paving course of subbase material not less than 3 inches thick; roller compacted to a level, smooth, dense surface.

3. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.

2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section "Earthwork."

3. Provide dust-control treatment that is non-polluting and non-tracking. Reapply treatment as required to minimize dust.

4. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

5. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section "Hot-Mix Asphalt Paving."

D. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. 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.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction and in applicable Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. 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 property nor endanger permanent Work or temporary facilities.
2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
3. Remove ice as required to minimize accumulations.

F. Waste Disposal Facilities: Comply with the requirements of Section 01 74 19 "Construction Waste Management".

G. Janitorial Services: Provide janitorial services on a daily basis for temporary offices, first-aid stations, toilets, wash facilities, lunchrooms, and similar areas, including Owner and Architect offices.

H. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.

1. Construct framing, sheathing, and siding using fire-retardant-treated lumber and plywood.
2. Paint exposed lumber and plywood with exterior-grade acrylic-latex emulsion over exterior primer.
3. Provide ventilation and maintain temperatures as required for the items stored by regulations of authorities having jurisdiction, Sections of these Specifications, and manufacturer's instructions.
4. Maintain secure storage for tools (including personal tools of individual workers), equipment, and materials. Owner will not be responsible for loss or damage to tools, equipment, or materials.
5. Store combustible materials apart from buildings.

I. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Elevator Use: Limit temporary use of elevator for construction purposes to one elevator. Comply with the following requirements for elevator used for construction purposes:

1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
2. Provide strippable protective film on entrance and car doors and frames.

3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
5. Do not load elevators beyond their rated weight capacity.
6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
7. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

L. Existing Stair Usage: Use of Owner's existing stair will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of corrective work.

M. Temporary Use of Permanent Stairs: Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance. Use of new permanent stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

N. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes and design indicated, or if not indicated, as appropriate so that information may be read from the far side of adjoining street. Install signs where indicated and appropriate to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
2. Prepare temporary signs to provide directional information to construction personnel and visitors.
3. Construct signs of exterior-type Grade B-B high-density concrete form overlay plywood in sizes and thicknesses indicated. Support on posts or framing of preservative-treated wood or steel.
4. Paint sign panel and applied graphics with exterior-grade alkyd gloss enamel over exterior primer.

3.04 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. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that avoids air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project Site. Provide measures, including regular watering, necessary to minimize air-borne dust.

   1. Comply with regulations of authorities having jurisdiction and with work restrictions specified in the Contract Documents including mitigations called for in the environmental document.

C. 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 EPA Construction General Permit, authorities having jurisdiction, or as specified herein, whichever is more stringent.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.

E. Protection Against Inclement Weather: Brace, secure, and cover all parts of the Work to prevent damage by inclement weather.

F. Protect the Work from damage due to nuisance water such as rainwater, surface runoff, and irrigation water. Comply with requirements of authorities having jurisdiction regarding routing and disposal of nuisance water.

G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.

H. Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

I. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates and privacy/windscreen that minimizes visibility of the construction operations. Locate where indicated, or enclose entire Project Site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily

entering Site except by entrance gates. Comply with regulations of authorities having jurisdiction.

1. Set fence posts in compacted mixture of gravel and earth or on self supporting stands over hardscape. Brace fence to preclude it from tipping over.
2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
3. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.

J. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

K. Barricades, Warning Signs, Signals, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and include warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

1. Enclose excavations and openings with proper barricades.
2. Clearly identify hazards on and adjacent to the Project Site. Maintain clearly visible and, if applicable, audible identification on a continuous 24-hour-per-day basis.
3. Illuminate barricades, warning signs, obstructions, and other hazards at night. Provide adequate light for clear visibility from sunset to sunrise.
4. Where appropriate, provide audible warning signals.
5. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior plywood.

L. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

M. Covered Walkway: Erect a structurally adequate, protective, covered walkway for passage of persons along adjacent public street. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.

1. Construct covered walkways using scaffold or shoring framing.
2. Provide wood-plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
3. Join back wall and roof so that no dust or debris can enter the pedestrian area.
4. Paint and maintain in a manner approved by Owner.
5. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior plywood.

M. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use fire-retardant-treated material for framing and main sheathing.

N. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241 and requirements of authorities having jurisdiction.

1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
   a. Field Offices: Class A stored-pressure water-type extinguishers.
   b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
   c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
2. Store combustible materials in containers in fire-safe locations.
3. Prohibit smoking on Project Site.
4. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting.
5. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
6. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
7. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project Site. Review needs with local fire department

and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

8. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

9. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

O. Protection and security measures required by authorities having jurisdiction are considered minimum requirements. Provide additional measures as necessary and appropriate to the hazards of this Project.

3.05 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.

2. Protect stored and installed material from flowing or standing water.

3. Keep porous and organic materials from coming into prolonged contact with concrete.

4. Remove standing water from decks.

5. Keep deck openings covered or dammed.

C. Partially enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.

2. Keep interior spaces reasonably clean and protected from water damage.

3. Periodically collect and remove waste containing cellulose or other organic matter.

4. Discard or replace water-damaged material.

5. Do not install material that is wet.

6. Discard, replace, or clean stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Use permanent HVAC system to control humidity.

3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

   a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.

   b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect on a monthly basis.

   c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.06 Traffic Control

A. Prior to start of Work, determine the routing of construction vehicles and the measures necessary to control traffic during construction. Provide measures including, but not limited to, the following:

1. Be responsible for controlling construction traffic on and adjacent to the Site, including public right-of-ways. Comply with requirements of authorities having jurisdiction for traffic controls in public right-of-ways.

   a. Provide necessary measures including, but not limited to, flag personnel, barricades, sufficient lights, reflectors, warning signals, warning signs indicating closures, directional, and detour instructions.

2. Route construction equipment, trucks, and similar vehicles via existing public streets to and from the Site as approved by authorities having jurisdiction.

3. Obtain and pay for permits and inspections made necessary by use of public street, sidewalks, curbs, and paving. Post guarantees and bonds that may be required, and repair subsequent damage to public property in a manner acceptable to authorities having jurisdiction.

3.07 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.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

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.
2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

D. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, 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. 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 the property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements in Section 01 77 00 "Closeout Procedures."
4. After removal of temporary facilities which were placed on portions of the existing Site not scheduled for new Work, restore those portions of the Site occupied by the temporary facilities to at least the condition they existed prior to start of Work.

F. Permanent Systems Used as Temporary Facilities: When a permanent building or Site system, or portion thereof, is in a condition allowing operation as intended by the manufacturer and as required by the Contract Documents, the permanent system or portion thereof may be used as a temporary facility unless indicated otherwise in the Contract Documents, provided the following conditions are satisfied by Contractor:
1. Request and obtain written approval from Owner to use a specific permanent system or designated portion thereof as a temporary facility.
2. Assume full responsibility for the permanent system or portion thereof and clean, repair, or replace systems, or parts, damaged or soiled as a result of use as a temporary facility.

3. Pay all costs associated with using the system or portion thereof as a temporary facility including, but not limited to, operating costs, maintenance, repair, or replacement.
4. Operate the system under supervision of a person or persons qualified and knowledgeable about the proper operation of the system in accordance with the manufacturer's instructions.

END OF SECTION 01 50 00

SECTION 01 55 26
TRAFFIC CONTROL

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. 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.

B. Submittals - Temporary Traffic Control Plans and Work Site Traffic Control Plan shall include and show the following:
   1. The size of the work area, including all dimensions.
   2. The location of the work area in relation to the cross streets, alleys, or other major reference points, including all distances and dimensions:
   3. All temporary traffic control devices (signs, delineators, striping, others) to be used
   4. Access to all existing parking facilities affected by the proposed work zone

C. LEED Requirements (if any)
   1. Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED requirements and Construction Waste Management and Disposal requirements are mutually inclusive.

D. References
   1. Temporary Traffic Controls (excerpt from the California Manual of Uniform Traffic Control Devices (CA M.U.T.C.D.); Current Edition (Parts 1, 6 and Appendix))
   2. Work Area Traffic Control Handbook (W.A.T.C.H Manual); Current Edition
   3. American Public Works Association Standard Specifications for Public Works Construction, current edition (Green Book).
   4. City of Los Angeles Department of Public Works Standard Specifications for Public Works Construction, current edition (Brown Book) for any projects within the City of Los Angeles

PART 2 - PRODUCTS

2.01 DOCUMENTS

Approved documents for the following plans which shall include the staging and phasing plans:

A. Work Site Traffic Control Plans (WTCP)/ Temporary Traffic Control Plans (TTCP)
B. Detour Plans
C. Street Closure Plans

2.02 PERMITS AND FEES

A. Contractor shall prepare plans and obtain approval by the governing agency and pay the fees to receive the permit(s) from the governing agency to perform the work.

PART 3 - EXECUTION

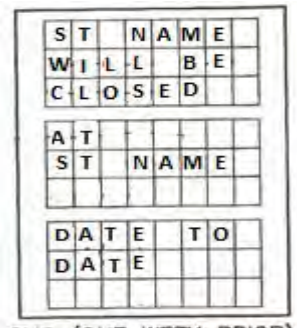
3.01 QUALIFICATIONS

A. Plans shall be prepared, signed, and sealed by both a California Registered Professional Civil Engineer and Traffic Engineer. A Professional Traffic Operations Engineer (PTOE) must also be a California registered Professional Civil and Traffic Engineer. The professional certifications need not be mutually inclusive to an individual.
B. Wet seal and signature are required for approval.

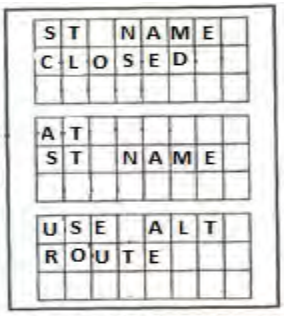
3.02 CONDITIONS AND REQUIREMENTS FOR PREPARATION OF WTCP AND TTCP

A. The conditions and requirements are not limited to the items listed below and may be subject to deletions, revisions and/or additions by the governing agency.
B. Contractor may make adjustments according to the criteria of appropriate agencies. Prior to beginning of work, Contractor shall coordinate and schedule with the governing agency a pre-design meeting for approvals, requirements, and permits.
    1. There shall be one lane of traffic in each direction at all times; except for night work.
    2. Dedicated turning lanes must be provided at all times; except for night work.
    3. Traffic signals shall be in operation at all times.
    4. Less than 72 hours shall be considered a temporary situation and temporary pavement markups and delineation may be required unless otherwise directed by the governing agency.
    5. More than 72 hours shall be considered a temporary long term situation and will require permanent pavement markings and delineation.
    6. WTCP/TTCP shall be coordinated with the Drawings and with Contractor's construction operation.
    7. Driveway access to be unimpeded with delineators or construction spoils.
    8. Signs on detour plans shall also be shown on TTCP/WTCP.

9. Taper rates shall be indicated on plans.
10. On street parking at parking meters (if any) which are to be prohibited during a stage or phase shall be purchased for its downtime value as required by the City.
11. All frontage business names and use shall be noted on the plan.
12. Sign type, message, symbol and shape shall be noted on each sheet.
13. Non-standard signs to have 1" black border with 8" upper case letters and shall be placed 500' (plus or minus) in advance or as directed by the governing agency engineer for the impacted location.
14. Changeable Message Signs (CMS) shall be placed 400' (plus or minus) in advance or as directed by the governing agency engineer from the impacted location.
15. Stationary non-standard signs shall be placed 500' (plus or minus) in advance or as directed by the governing agency engineer from impact location.
16. CMS to be detailed on TTCP/WTCP as follows:



CMS (ONE WEEK PRIOR)
CMS "A"



(DURING CONSTRUCTION)
CMS "B"

17. Any changes to the TTCP/WTCP shall be approved by Owner and governing agency engineer.
18. Night work shall be approved by Owner and governing agency.
19. Maintain pedestrian traffic on one side of street at all times. Provide advance warning signs for all pedestrian detours.
20. Cold mill and resurfacing shall not take place during peak hours.

END OF SECTION 01 55 26

SECTION 01 56 39
TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Sections:

1. Division 01 Section "Temporary Facilities and Controls" for temporary site fencing.

1.03 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 SUBMITTALS

A. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or videotape.

2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.05 QUALITY ASSURANCE

A. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

B. Pre-installation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.

b. Enforcing requirements for protection zones.

c. Arborist's responsibilities.

d. Field quality control.

C. Post Installation Conference: Conduct conference at Project site.

1. Review methods and procedures incorporated in the field related to temporary tree and plant protection including, but not limited to the following:

a. Enforcing requirements for protection zones.

b. Field quality control.

c. Identify any areas of concern.

d. Establish corrective actions.

1.06 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.

2. Parking vehicles or equipment.

3. Foot traffic.

4. Erection of sheds or structures.

5. Impoundment of water.

6. Excavation or other digging unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

D. Storage of Materials: There shall be NO storage of materials or supplies of any kind within the area of the protection barrier. Concrete and cement materials, forms, form oil, fuel, solvents, block, stone, sand, soil, and portable latrines shall not be placed within the protection zone of the trees. Parking vehicles in the shade of these trees is not permitted.

E. Fuel Storage: Fuel storage shall NOT be permitted within 100 feet of any tree to be preserved. Refueling, servicing, and maintenance of equipment and machinery shall NOT be permitted within 100 feet of protected trees.

F. Debris and Waste Materials: Debris and waste from construction or other activities shall NOT be permitted within protected areas. Wash down of concrete or cement handling equipment, in particular, shall NOT be permitted within 100 feet of these or other trees.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.

1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.

B. Topsoil: Imported or manufactured topsoil complying with ASTM D 5268.

C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood, ground or shredded bark, or wood and bark chips.

2. Size Range: 3 inches maximum, 1/2 inch minimum.

3. Color: Natural.

D. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements.

1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch OD line posts, and 2-7/8-inch OD corner and pull posts; with 1-5/8-inch OD top rails and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

a. Height: 6 feet.

2. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches.

E. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with non-fading lettering and as follows:
   1. Lettering: 3-inch high minimum, black characters on red background.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.02 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Tie a 1-inch blue-vinyl tape around each tree trunk at 54 inches above the ground.
B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
   1. Apply 4-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.03 TREE- AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
   1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
   2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
   3. Access Gates: Adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or

malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by arborist. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Owner or Architect.

E. Maintain protection-zone fencing and signage in good condition as acceptable to Owner or Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.

2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.04 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Contract Drawings or Specifications.

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

E. Grade Changes: Grade changes can be particularly damaging to trees. Even as little as two inches of fill can cause the death of a tree. Lowering the grade can destroy major portions of a root system. Final grade changes should be approved by arborist before construction begins, and precautions taken to mitigate potential injuries.

3.05 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut root ends smoothly with a sharp product so as not to smash, or crush. Cutting of root shall be no larger than that of 1 1/2 inches in diameter.
3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in the Contract Drawings or Specifications.

B. Root Pruning at Edge of Protection Zone: Prune roots 12 inches outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.06 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
1. Prune trees to provide clearance for pedestrian traffic or if trees severely impede flow of work, as determined by arborist.
2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
3. Cut branches with sharp pruning instruments; do not break or chop.
4. Do not apply pruning paint to wounds.

B. Chip removed branches and dispose of off-site.

C. Safety pruning should be performed in early spring, or as soon as possible.

3.07 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.08 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

B. Preventative Measures: Soil analysis testing should be completed to assure fertilization with the appropriate fertilizer products. High or low nitrogen levels should be avoided. Pruning of the tree canopies and branches should be done at the direction of the campus arborist to remove any hazardous, dead or broken branches, and to provide the necessary clearances for the construction equipment. Normal irrigation schedules and volumes should be maintained during construction. If the irrigation will be shut down more than one month during construction, a temporary source of water must be found and used for the trees. Locate such a source and make a preparation to use it before fencing and before construction begins.

3.09 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Owner or Architect.

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
4. Perform repairs within 24 hours.
5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Owner or Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that arborist determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
2. Provide one new tree(s) of 6-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.
3. Plant and maintain new trees as specified in the Specifications.

C. Soil Aeration: Where directed by Owner or Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch diameter holes a minimum of 12 inches deep at 24 inches on center. Backfill holes with an equal mix of augered soil and sand.

D. Damages: Any damages or injuries should be reported to the arborist as soon as possible. Severed roots shall be pruned cleanly to healthy tissue, using proper pruning tools. Broken branches or limbs shall be pruned according to the university's pruning specifications and ANSI A-300 Pruning Standards.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 01 56 39

SECTION 01 57 23
TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A Installation of Storm Water Pollution Prevention Plan (SWPPP) measures as per plans, specifications, and the project SWPPP document for the purpose of preventing the discharge of pollutants from the construction site.

B. Compliance with local, state, and federal regulations.

1.03 REFERENCES

A. California Stormwater Quality Association Stormwater Best Management Practice Handbook for Construction Activity (BMP Handbook)

B. Construction General Permit (CGP) Order No. 2009-009-DWQ

1.04 SUBMITTAL REQUIREMENTS

A. Product Data: Provide product catalog cut sheets of all temporary and permanent equipment and specialty items that will be provided to comply with the SWPPP, including items necessary for storage, disposal and recycling.

B. Shop Drawings: Provide site plan indicating construction staging, storage, refuse areas and vehicular routing and parking areas.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use materials of a class, grade and type needed to meet the performance described in the BMP Handbook and project SWPPP document.

PART 3 - EXECUTION

3.01 QUALIFIED SWPPP DEVELOPER (QSD)

A. Owner shall designate a Qualified SWPPP Developer (QSD) having registrations, certifications and appropriate experience as defined by the State of California Construction General Permit Order No. 2009-009-DWQ to perform the following:

1. Prepare, certify and amend as required the project SWPPP document.

2. Assist Owner in obtaining permit coverage prior to the commencement of construction activity through filing of Permit Registration Document (PRDs) on the Storm Water Multiple Application and Report Tracking System (SMARTS).

3. Assist Owner in filing the Notice of Termination (NOT) when construction is complete and final stabilization has been reached.

3.02 QUALIFIED SWPPP PRACTITIONER (QSP)

A. Owner shall designate a Qualified SWPPP Practitioner (QSP) having registrations, certifications and appropriate experience as defined by the State of California Construction General Permit Order No. 2009-009-DWQ to perform the following:

1. Conduct stormwater and non-stormwater visual inspections of Best Management Practices and prepare documentation as prescribed by the Construction General Permit according to the risk level and project type.

2. Identifying Best Management Practice failures or shortcomings and provide an action plan to correct the deficiencies.

3. Conduct discharge monitoring as prescribed by the Construction General Permit for pH, turbidity, and non-visible pollutant monitoring, according to the project risk level and project type.

4. Develop a Rain Event Action Plan (REAP) for Risk Level 2 and 3 projects for qualifying rain events.

5. Conduct pre-storm event visual inspections for qualifying rain events.

6. Implement a Construction Site Monitoring Program (CSMP).

7. Track weather forecasts from the National Oceanic and Atmospheric Administration (NOAA) in accordance with Permit requirements.

8. Complete applicable monitoring, sampling, and inspection logs, forms and documents for filing to the Storm Water Multiple Application and Report Tracking System (SMARTS).

9. Report Numeric Action Level (NAL) exceedances to SMARTS for Risk Level 2 and 3 projects.

10. Provide assistance to Owner with annual reporting requirements.

3.03 PERFORMANCE BY CONTRACTOR

A. Contractor shall adhere to the requirements of State of California Construction General Permit Order No. 2009-009-DWQ and Amendments and the project SWPPP prepared by the Qualified SWPPP Developer (QSD).

END OF SECTION 015723

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes the following general administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Sections include the following:

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 78 23 "Operations and Maintenance Data" for submitting warranties for contract closeout.
4. Sections for specific requirements for warranties on products and installations specified to be warranted.

1.03 DEFINITIONS

A. Products: Items purchased 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, or where indicated as a product substitution, 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: Where 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 other named manufacturers.

C. Manufacturer's Warranty: Written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

D. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide specific rights for Owner.

1.04 SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in Paragraph 2.02 "Comparable Products" below.

2. Owner's Action: If necessary, Owner or Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Owner will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

   a. Use product specified if Owner does not issue a decision on use of a comparable product request within time allocated.

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

1.05 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, Owner will determine which products shall be used.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. 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 ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Immediately remove from the Site materials and equipment that are damaged or do not comply with requirements of the Contract Documents.
6. When handling and moving materials and equipment, protect all finished surfaces, including jambs and frames of openings, and soffits. Protect finished floor surfaces from damage while moving and storing materials and equipment.

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.
    a. Concrete slabs on grade and suspended floors have not been designed for heavy loading. Design live loads are indicated on the Drawings.
    b. Slabs on Grade: Do not subject slabs on grade to excessive loading by shoring, storage of materials, or operation of construction equipment unless adequately protected by planking designed to safely distribute loads. Maintain slabs and repair or replace damaged slabs at no additional cost to Owner.
    c. Suspended Floors: Do not subject suspended slabs to construction loads greater than 40 psf unless adequate shoring and protection is provided. Retain a civil or structural engineer experienced in shoring design and registered in the state in which the Project is located to design necessary temporary support systems.
3. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
5. Protect stored products from damage and liquids from freezing.
6. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
7. Provide a secure location and enclosure at Project Site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

D. Keep copies of manufacturer's specifications and instructions on site and available for reference.

1.07 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.
   1. Manuafacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

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 appropriate form properly executed.
   3. Refer to individual Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 78 23 Operations and Maintenance Data."

PART 2 - PRODUCTS

2.01 PRODUCT OPTIONS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that 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. Owner 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," Owner or Architect will make selection.
   5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.

6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products 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 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 will not be considered unless otherwise indicated.

b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements for “Comparable Products” in this Section 01 60 00 for consideration of an unnamed product.

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 will not be considered unless otherwise indicated.

b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" in this Section 01 60 00 for consideration of an unnamed manufacturer’s product.

5. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Products" are included and also introduce or refer to a list of manufacturers’ names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in "Comparable Products" in this Section 01 60 00 to obtain approval for use of an unnamed product.

6. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with

requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.

a. 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 a matching product.

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

2.02 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.

4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

5. Samples, if requested.

PART 3 - EXECUTION (NOT USED)

FORMS ATTACHED:

Special Warranty

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SPECIAL WARRANTY

When required in Sections of the Specifications, Special Warranties shall be in the following form and written on Contractor's own letterhead:

"Warrant_____
(portion of work warranted)

Project: _____

Address: _____

Date: _____

We, the undersigned hereby warrant that the _____ which we have installed in the _____ Project has been performed in accordance with the Contract Documents and that the work, as installed, will fulfill the requirements of the warranty included in this Specification. We agree to repair or replace any or all of our work, together with any other work which may be damaged or displaced by so doing, that may prove to be defective in its workmanship, materials, operation, or failure to conform to Contract provisions and requirements within a period of ___ year(s) from date of Substantial Completion of the above-named structure, without any expense whatever to the said Owner, ordinary wear and tear and unusual abuse or neglect excepted. In the event of our failure to comply with the above-mentioned conditions within thirty (30) calendar days after being notified in writing by Owner, we collectively or separately do hereby authorize Owner to proceed to have said defects repaired and made good at our expense, including all collection cost and reasonable attorney fees, and we will honor and pay the costs and charges therefore upon demand."

SPECIFICATION SECTION: _____

WARRANTY PERIOD: _____ STARTING: _____ TERMINATING _____

Name of General Contractor	Name of Subcontractor
Signature of General Contractor	Signature of Subcontractor
Address	Address
Phone Number	Phone Number
State License Number	State License Number
Name of Manufacturer	Manufacturer Phone Number
Signature of Manufacturer	

END OF SECTION 01 60 00

SECTION 01 73 00
EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. This Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Utility As-builts.
   2. Construction layout.
   3. Field engineering and surveying.
   4. Installation of the Work.
   5. Coordination of Owner-installed products.
   6. Progress cleaning.
   7. Starting and adjusting.
   8. Protection of installed construction.
   9. Correction of the Work.

B. Related Sections include the following:
   1. Section 01 31 00 “Project Management and Coordination” for procedures for coordinating field engineering with other construction activities.
   2. Section 01 33 00 “Submittal Procedures” for submitting surveys.
   3. Section 01 73 29 “Cutting and Patching” for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
   4. Section 01 77 00 “Closeout Procedures” for final site cleanup requirements.
   5. Section 01 78 39 “Project Record Documents” for submitting final property survey with Project Record Documents and recording of Owner-accepted deviations from indicated lines and levels.
   6. Section 01 91 13 “General Commissioning Requirements” for startup and adjusting of equipment and operating components.

1.03 SUBMITTALS

A. Qualification Data: For land surveyor or professional engineer to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Certificates: At completion of the Work, after all governmental agency approvals have been obtained, and prior to request for final payment, submit a certificate signed by the land surveyor or professional engineer and Contractor certifying that location and elevation of improvements, quality and quantity of materials and installation are in compliance with requirements of the drawings and specifications approved by governmental agencies having jurisdiction over the Project.

   1. If any changes from approved drawings and specifications were made in the Work, include a statement that changes to the Work were performed after such changes, including revised drawings and specifications, were approved by Owner, Architect and governmental agencies having authority.

      a. Include a chronological list of changes with date each was approved by Owner and governmental agencies having authority.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.

E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.04 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. Manufacturer's Installation Instructions. Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

C. Cutting and Patching: Comply with requirements in Section 01 73 29 "Cutting and Patching".

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Comply with requirements specified in other Sections.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Existing Conditions: The existence and location of Site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work,

investigate and verify the existence and location of all utility systems, including mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning Work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and all underground services such as mechanical, electrical and telecommunications.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project Site.

3. Coordinate with, and obtain required approvals from authorities having jurisdiction.

C. Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.

b. List of detrimental conditions, including substrates.

c. List of unacceptable installation tolerances.

d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Existing Utility Information: Furnish information to Owner 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, and obtain required approvals from authorities having jurisdiction.

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

1. Notify Owner not less than twenty-one (21) days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Owner's written permission.

C. 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.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Owner. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.03 UTILITY AS-BUILTS

A. All installed and exposed existing underground utilities shall be surveyed by a certified land surveyor or professional engineer prior to backfill. Survey shall include top of pipe elevation, bottom of pipe elevation, pipe material, pipe size, and number of conduits, if applicable. For utilities which are encased, provide top of encasement, bottom of encasement and width.

3.04 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 Owner 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 Owner and Architect when deviations from required lines and levels exceed allowable tolerances.

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 invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. 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 Owner.

3.05 FIELD ENGINEERING

A. Identification: Owner's survey 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 Owner. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Owner 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 licensed land surveyor to prepare a final topographic property survey showing significant features (real property) for Project. As a minimum, include the following information:

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. Finish floor elevations of all buildings at each doorway and entryway to the building.
3. Elevations of exterior walkways, curbs, curb and gutter combinations, gutter pavement, and ungraded area elevations, all at sufficient intervals to confirm drainage and slopes.
4. Invert elevations of all pipes in manholes and catch basins, and elevations of tops of manhole covers and catch basin grates (or gutter flow lines of side inlet basins).
5. Horizontal location, by measured dimension, of significant structures and Site improvements, including buildings, curbs, gutters, drainage structures, and driveways.
6. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey.
7. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.06 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.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
   4. Maintain minimum headroom clearance as required by the Construction Documents.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. 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.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on Site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. 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.

H. 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 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 Owner or Architect.

2. Allow for building movement, including thermal expansion and contraction.

3. 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.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

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

3.07 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project Site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Pre-installation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.08 PROGRESS CLEANING

A. General: Clean Project Site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 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. Site: Maintain Project Site free of waste materials and debris.

C. 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.

3. Vacuum clean interior areas just prior to application of painting, wall and ceiling finishes, and floor finishes.

4. Once finishes are installed in an area, continue vacuuming that area on a regular basis until Owner has accepted the area and is ready for occupancy.

5. Schedule cleaning operations so that dust and other contaminants resulting from cleaning operations will not settle on wet paint, or other coatings or finishes during their cure period.

6. Comply with manufacturer's instructions for cleaning the surfaces and parts of finishes and equipment. Use only those cleaning materials and procedures recommended by the manufacturer of the item to be cleaned.

7. Provide cleaning during construction as necessary to ensure operations can proceed on schedule and that finish materials can be installed properly and viewed for determination of aesthetic characteristics.

D. 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.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management".

I. 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.

J. 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.

K. 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.

3.09 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. 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.

3.11 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01 73 29 "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:

1. Section 01 73 00 “Execution Requirements” for requirements for notice requirements for proposed utility interruptions.
2. Specification Section for "Through-Penetration Firestop Systems" for patching fire-rated construction.
3. Individual Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
    a. Requirements in this Section apply to mechanical and electrical installations. Refer to individual specification sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.03 DEFINITIONS

A. Cutting: In addition to requirements of the General Conditions, includes removal of in-place construction necessary to permit installation or performance of other Work as required to accomplish the following:

1. Make several parts fit properly.
2. Uncover work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove samples of installed work as specified or requested by Owner for testing.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.04 SUBMITTALS

A. Cutting and Patching Plan: Submit a plan describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe reason for and extent of occurrence and cutting and patching. Show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. 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.
    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
6. Owner's Approval: Obtain approval of cutting and patching proposal from Owner or Architect before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.05 QUALITY ASSURANCE

A. Structural Elements:
    1. Obtain approval of the cutting and patching proposal before cutting and patching structural elements including, but not limited to, the following:
        a. Foundation construction.
        b. Bearing and retaining walls.
        c. Structural concrete.
        d. Structural steel.
        e. Lintels.
        f. Structural decking.
        g. Stair systems.
        h. Miscellaneous structural metals.
        i. Exterior curtain-wall construction.
        j. Equipment supports.
        k. Piping, ductwork, vessels, and equipment.

B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
    1. Primary operational systems and equipment.

2. Air or smoke barriers.
3. Fire-protection systems.
4. Control systems.
5. Communication systems.
6. Conveying systems.
7. Electrical wiring systems.
8. Operating systems of special construction in individual Sections.

C. Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
   1. Water, moisture, or vapor barriers.
   2. Membranes and flashings.
   3. Exterior curtain-wall construction.
   4. Equipment supports.
   5. Piping, ductwork, vessels, and equipment.
   6. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
   1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
      a. Processed concrete finishes.
      b. Stonework and stone masonry.
      c. Ornamental metal.
      d. Matched-veneer woodwork.
      e. Roofing.
      f. Firestopping.
      g. Window wall system.
      h. Stucco and ornamental plaster.
      i. Fluid-applied flooring.
      j. Wall covering.
      k. HVAC enclosures, cabinets, or covers.

E. Cutting and Patching Conference: Before proceeding, meet at Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.06 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. In-Place Materials: Use materials 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 Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing 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.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.03 PERFORMANCE

A. 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 existing 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. Cutting: Cut existing 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 as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable individual Sections where required by cutting and patching operations.

5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

6. Proceed with patching after construction operations requiring cutting are complete.

C. 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 possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate 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.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken

surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.

END OF SECTION 01 73 29

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 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.

1.02 DEFINITIONS

A. C&D: Construction and Demolition

B. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

C. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

E. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

F. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

G. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of Owner and authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 WASTE AND DISPOSAL PROVIDER

A. Preferred Provider: Athens Services is designated by Owner as its preferred provider of waste, recycling, and construction and demolition disposal services. Through the Waste Management and Recycling agreement between Athens Services and Owner, Contractor and its Subcontractors will have access to all of Athens Services Facilities, including its Material Recovery Facility (MRF) located in the City of Industry and its C&D Facility (CDF) located in Sun Valley.

B. Services: Athens Services is a full service provider including waste transportation, transfer and materials recovery, storage box rentals, and street parking lot sweeping services.

C. Contacts: Rates for these services have been established through Owner's agreement with Athens Services. To set up service and accounts, the Athens Services contact is:

Karla Ybelles
323-215-1836
626-705-4278 (cell)

D. Criteria for Bidding: Owner is willing to accommodate contractors using their own waste disposal companies providing they meet the following requirements:

1. The cost of disposing C&D Waste with their own waste disposal company must be less than Athens Services.
2. Contractor shall be a permitted C&D Waste Hauler by the City of Lost Angeles. Contractor's waste disposal company must send all Project non-contaminated C&D Waste to a Los Angeles certified construction and demolition processing facility.
3. Contractor shall provide in writing to Owner the tonnage reports from the C&D processing facility showing the total tonnage of material brought to the facility and the total tonnage of material diverted from the landfill by the processing facility. Owner will take credit for the diversion.
4. The following information shall be provided:
   a. Certificate of Proof that the facility is certified by the City of Los Angeles to process C&D Waste.
   b. Name of C&D facility.
   c. Name of C&D Waste Hauler.

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

A. General: Provide handling, containers, storage, signage, transportation, and other items as required.
   1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Site Access and Temporary Controls: Conduct operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

3.03 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems or streams. Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. List of Incomplete Items (Contractor's Punch List).
   2. Substantial Completion procedures.
   3. Final Completion procedures.
   4. Warranties.
   5. Final cleaning.
   6. Repair of the Work.

B. Related Sections include the following:
   1. Section 01 73 00 "Execution Requirements" for progress cleaning of Project site.
   2. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications and Record Product Data.
   3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
   4. Section 01 79 00 "Demonstration and Training" for requirements for instructing Owner's personnel.
   5. Individual Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.03 SUBMITTALS

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

1.04 CLOSEOUT SUBMITTALS

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

1.05 LIST OF INCOMPLETE ITEMS (CONTRACTOR'S 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, starting with exterior areas first and proceeding from lowest floor to highest floor.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:

   a. Project name.

   b. Date.

   c. Name of Architect.

   d. Name of Contractor.

   e. Page number.

4. Submit list of incomplete items through the PMIS in the following format:

   a. MS Excel electronic file. Owner will return annotated file and provide update in PMIS.

   b. PDF electronic file. Owner will return annotated file.

1.06 SUBSTANTIAL COMPLETION PROCEDURES

A. Definition: Substantial Completion is defined to mean the stage in the progress of the Work when all of the requirements for Substantial Completion identified in the General Conditions, Agreement and other Contract Documents have been met.

B. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

C. Submittals Prior to Substantial Completion: Complete the following as required by specification sections or other Sections of these General Requirements, or no less than 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

2. Submit closeout submittals required throughout the Contract Documents, including the following items:

   a. All documents required in Section 01 78 39 "Project Record Documents";

b. All submittals required in Section 01 78 23 “Operation and Maintenance Data”;

c. Attic stock submittals as required in Section 01 78 23 “Operations and Maintenance Data” and as specified in individual specification Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner.

d. Final completion construction photographic documentation;

e. Demonstration and training documentation as specified in Section 01 79 00 “Demonstration and Training”;

f. Statement of Commissioning Completion from the third party Commissioning Authority per the requirements of Section 01 91 13 General Commissioning Requirements;

g. Damage or settlement surveys; and

h. Property surveys.

3. Submit closeout submittals specified in individual specification Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit changeover information related to Owner’s occupancy, use, operation, and maintenance.

D. Procedures Prior to Substantial Completion: Complete the following as required by specification sections or other Sections of these General Requirements, or no less than 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.

2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner’s personnel of changeover in security provisions.

3. Complete startup and testing of systems and equipment.

4. Perform preventative maintenance on equipment used prior to Substantial Completion.

5. As required by Section 01 79 00 “Demonstration and Training,” instruct Owner’s personnel in operation, adjustment, and maintenance of products, equipment, and systems.

6. Advise Owner of changeover in heat and other utilities.

7. Inspect, test, and adjust performance of every system of facility of the Work to ensure that overall performance is in compliance with terms of the Contract Documents. Provide statement of Commissioning Completion from the third party Commissioning Authority.

8. Terminate and remove temporary facilities from Project Site, along with mockups, construction tools, and similar elements.

9. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
11. Remove broken and scratched glass and replace with the glass complying with requirements of the Contract Documents.
12. Check fluid and gas carrying pipe systems, roofs, flashings, gutters and downspouts for leaks. Repair or replace as necessary.
13. Lubricate all moving parts of machinery and equipment as recommended by the manufacturers of the machinery and equipment.
14. Complete final cleaning requirements, including touchup painting.

E. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owner, that must be completed or corrected before certificate will be issued.
   1. Reinspection: Request the reinspection for determining the date of Substantial Completion when the Work identified in the previous inspection as incomplete is completed or corrected.
   2. Results of the completed reinspection will form the basis of requirements for final completion.

1.07 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
   1. Certified List of Incomplete Items: Submit certified copy of Owner's Substantial Completion reinspection list of items to be completed or corrected (Punch List), endorsed and dated by Owner. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   3. Pest Control: Submit pest-control final inspection report and warranty.
   4. Permit and Inspection Records: Submit all permit and inspection records for the Project as required in Section 01 78 39 "Project Record Documents".

B. Procedures prior to Final Completion: Submit a final Application for Payment according to the General and Supplementary Conditions of the Contract.

C. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Owner will approve the final Certificate for Payment or will notify

Contractor of construction that must be completed or corrected before certificate will be approved.

1.08 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Owner or Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
C. Organize warranty documents into an orderly sequence based on the requirements of Section 01 78 23 "Operation and Maintenance Data".

PART 2 - PRODUCTS

2.01 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

3.01 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: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
    1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion 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 and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, fingerprints, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition. Polish bright surfaces to shine finish.

g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

h. Sweep concrete floors broom clean in unoccupied spaces.

i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent.

l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

   1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.

q. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a full inspection and rid Project of rodents, insects, and other pests. Submit pest-control final inspection report and warranty.

D. Comply with safety standards for cleaning.

E. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management."

3.02 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 that already show evidence of repair or restoration.

      a. Do not paint over “UL” and other required labels and identification, including mechanical and 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.

END OF SECTION 01 77 00

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Operations and Maintenance manuals for the care and maintenance of products, materials, and finishes, systems and equipment.
   2. Attic stock submittals and handover procedures.

B. Related Sections include the following:
   1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
   2. Section 01 78 39 "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
   3. Section 01 79 00 “Demonstration and Training” for instruction of Owner’s operating personnel.
   4. Individual Specification Sections for specific operation and maintenance manual requirements for products in those Sections.

1.03 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.

1.04 MANUAL SUBMITTALS

A. Initial Manual Submittal:
   1. Submit one (1) draft copy of each manual at least thirty (30) days before commencing demonstration and training. Draft copy may be in electronic PDF format. Hard copies may be required upon request.
   2. Owner and/or Architect and Commissioning Authority will review and comment on general scope, content and completeness of each manual. The Commissioning Authority may be a 3rd Party, hired by Owner, or a member of Owner’s staff.
   3. For any design-build elements, Contractor’s designers shall review these submittals.

B. Final Manual Submittal

1. Correct or revise each manual to comply with Owner, Architect's, Commissioning Authority's and Contractor's designers' (if any) comments.
2. Submit one (1) hard copy and one (1) electronic copy in PDF via CD or other storage device of each manual in final form to Owner prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. All submittals shall be reviewed and approved by Owner, Architect or Commissioning Authority.
3. Once approved, the final manuals shall be delivered to Owner.
4. Scheduling of Demonstration and Training cannot be done until the Final Operation and Maintenance data is submitted and approved.

1.05 ATTIC STOCK SUBMITTALS

A. Ensure that keys, special tools, replacement parts and attic stock items are delivered to Owner. Such equipment shall be inventoried and Owner will sign a receipt for the equipment upon delivery to Owner. Attic Stock shall be delivered at the time of Substantial Completion.

PART 2 - FORMAT

2.01. GENERAL

A. Where O&M instruction manuals are required to be submitted under any sections of the specifications, prepare in accordance with the provisions of this Section.
B. Bind hard copy documentation in heavy-duty, 3-ring, vinyl-covered, loose leaf binders (sized for 8½"x11" paper), with clear plastic sleeve on spine to hold label describing contents and thickness as necessary to accommodate contents.
C. When necessary, binders shall have pockets inside the covers to hold folded oversized sheets.
D. Provide heavy paper dividers with plastic coated/covered tabs for each separate section. Mark tab to identify the specification section and product/installation.
E. Provide protective plastic sleeves for any diagnostic software disks or computerized electronic equipment.
F. For drawings, attach reinforced, punched binder tabs on drawings and bind with text.
    1. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    2. If drawings are too large to use as foldouts, fold and place drawings in labeled pocket and bind in rear of binder.
G. Identify each binder on the front and spine with printed title, volume number, project name, and name of Contractor.
H. Provide a title page for each volume including the following:
    1. Subject matter included in the volume

2. Name and address of Project
3. Date of submittal
4. Name and contact information for Contractor
5. Name and contact information for Architect and major consultants to Architect
6. Cross reference to any other volumes, if applicable

I. Provide a typed table of contents for each binder. List each product included in the manual, indexed to the content of the volume, and referenced with the specification section number.

J. If operation and maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

K. Assemble electronic files in PDF format in folders to exactly match the hard copies as organized by volume, with links enabling navigation to each item and with bookmark tabs, as needed. Create one file folder for each volume and include all files for that volume in the folder, according to the following:

1. Use electronic files prepared by manufacturer, where available. Where scanning of paper documents is required, configure the scanned file for minimum readable file size.
2. Provide bookmarked table of contents at the beginning of each document, if applicable.
3. Name each indexed file with applicable item name following the file-naming convention below:
    a. Specification#_SystemName_DocumentType
    b. Document Types include, but not limited to:
        i. As_Built
        ii. Attic_Stock
        iii. Contact_Directory
        iv. Control_Drawing
        v. Electrical_Acceptance_Report
        vi. Name_Plate
        vii. O&M_Manual
        viii. Panel_Schedule
        ix. System_Flow_Diagram
        x. TAB_Report
        xi. Valve_Chart
        xii. Warranty
    c. Do not include spaces in the file names.
4. Enable inserted reviewer comments on the draft submittals.

L. Accompany submittals with transmittal letter, containing date, project title and number, Contractor's name and address, title and number of each document,

certification that each document as submitted is complete and accurate, and signature of Contractor, or its authorized representative.

2.02 CONTENT

A. The contents of the Operations and Maintenance Data are separated into three separate packages or binder types. The first package type contains Facility Information described in paragraph 2.03 and is a stand-alone binder or volume of binders. The second package type contains the Materials and Finishes Information described in paragraph 2.04 and is a stand-alone binder or volume of binders. The third package type contains the Equipment and Systems Information described in 2.05 and is a stand-alone binder or volume of binders.

2.03. FACILITY INFORMATION

General information that applies to the entire facility, not specific to any one system or piece of equipment shall be included in this section as follows. Each section shall have its own tab, labeled with the section heading.

A. Contact Directory
   Include the contact information for all contractors, Subcontractors, vendors, manufacturers, and any other entity that has provided goods or services installed at the facility. Contact information should include name, title, website, address, phone numbers, and technical support phone numbers and email addresses. Include listing of systems provided by each party.

B. Warranty Information: Provide all warranties indexed and tabbed in accordance with the project specifications.
   1. Each warranty shall include the specification section number, a listing of the Subcontractor, supplier, and manufacturer with name, address, and the telephone number of the responsible principal.
   2. All warranties shall be properly executed and on the letterhead of the provider.
   3. The start date of warranty shall be the date of Substantial Completion.
   4. In addition to Contractor's standard (1) year warranty of the total project, provide warranties, guarantees, and bonds as may be required in each individual section of the specification. Contractor will be co-responsible with the manufacturer and/or Subcontractor for all extended warranty work identified in the specifications.

C. Equipment Nameplate Data: Contractor shall provide as-installed product nameplate data, product numbers, serial numbers, and other information to fully define the asset to Owner. Equipment list shall be submitted in Microsoft Excel format. Data content shall include:
   a. Construction document designation and owner's designation, if different.
   b. Name of installing contractor, vendor, or manufacturer.
   c. Manufacturer name.
   d. Model number.

e. Serial number.

f. Date of manufacture.

g. Warranty start date and duration.

h. Location.

i. Area Served.

j. General description or type classification of the system, equipment, component, or device.

2.04. MATERIALS AND FINISHES INFORMATION

Organize manual into separate section for each product, material, and finish following the outline of the project specifications. Include source information, product information, maintenance procedures, repair materials and source, and warranties and bonds, as described below. There shall be a main tab for each specification section. Behind the section number tab there shall be the material or finish sub-tab for each material or finish type. These sub-tabs shall be similar to the specification number tabs but of a different color. Behind each sub-tab shall be the following sections, in the given order, divided by a double weight colored sheet labeled with the title of the section.

A. Source Information: List each product, identified by product name. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference specification section number and title.

B. Product Information: For all building products, applied materials and finishes, include the following as applicable:

1. Product name and model number.

2. Manufacturer name.

3. Color, pattern, and texture.

4. Material and chemical composition.

5. Reordering information for specially manufactured products.

C. Maintenance Procedures: Include manufacturer's recommendations for cleaning agents and methods. Include 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.

D. As-Built Data: Include a copy of the as-built material or finish schedule.

2.05 EQUIPMENT AND SYSTEM INFORMATION

In each binder, there shall be a main tab for each specification section. Behind the section number tab there shall be the equipment ID tag sub-tab for each piece of major equipment (or group, if small or numerous). These sub-tabs shall be similar to the specification number tabs but of a different color. Behind each equipment name tab shall be the following sections, in the given order, divided by a double weight colored sheet labeled with the title of the section.

A. Contractor. The first page behind the equipment tab shall contain the name, address and telephone number of the manufacturer and installing contractor and the 24-hour number for emergency service for all equipment in this section, identified by equipment.

B. System Flow Diagrams. Provide as-installed flow diagrams indicating system operation during normal operations (liquid, air, gas, or electricity). Integrate all system components into the diagram. Note that a compilation of non-integrated flow diagrams for the individual system components is not acceptable.

C. Operation and Maintenance Instructions. These shall be the written manufacturer's data with the model and features of this installation clearly marked and edited to omit reference to products or data not applicable to this installation. This section shall include data on the following:

1. Installation, startup and break-in instructions
2. All starting, normal shutdown, emergency shutdown, manual operation, seasonal changeover and normal operating procedures and data, including any special limitations.
3. Start-up and Shutdown Procedures: Provide step-by-step instructions to bring systems from static to operational configurations and from operating to shutdown status. Installing contactor or vendor/manufacturer shall author this specifically for this project.
4. Normal Operating Instructions: Provide a discussion of the normal operation and control of the system. Address operating norms (i.e. temperatures, pressures, and flow rates) expected at each zone or phase of the system. Supplement the discussion with control and wiring diagrams and data. Installing contactor or vendor/manufacturer shall author this specifically for this project.
5. Emergency Operating Instructions: Provide emergency operating procedures in the event of equipment malfunctions.
6. O&M and installation instructions that were shipped with the unit.
7. Preventative maintenance and service procedures and schedules. Where instructions for maintenance are not included in the manufacturer's literature, provide supplemental data to enable proper maintenance of the equipment installed. Include specific lubrication methods and recommended frequencies along with procedures and precautions for inspection and routine service.
8. Troubleshooting procedures. Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing and checking instructions.

9. A parts list, edited to omit reference to items which do not apply to this installation.
10. A list of any special tools required to service or maintain the equipment.
11. Performance data, ratings and curves.
12. Any service contracts issued.

D. Panel Board Circuit Directories: Provide electrical panel board circuit directories for each electrical panel included in the work.

E. Valve Charts: Provide charts of valve tag numbers with location and function of each valve clearly keyed to the respective system flow diagram.

2.06. ATTIC STOCK

A. Contractor shall provide all attic stock, keys, special tools, and extra materials to Owner as required by the contract documents.

B. Ensure that keys, special tools, replacement parts and attic stock items are delivered to Owner. Such equipment shall be inventoried and Owner will sign a receipt for the equipment upon delivery to Owner.

C. Quantities of attic stock shall also apply to accepted substitutions for specified materials as well as to quantities of similar or specified materials affected by Change Order.

D. Label all items with manufacturer's name and model number.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 78 23

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

DOCUMENT	PROVIDED BY	DUE
As-Built Drawings, Specifications and Shop Drawings	Contractor	Substantial Completion
Record Drawings	Architect / Engineer	30 days following Substantial Completion
As-Built Models	Contractor	Substantial Completion
Record Models	Architect / Engineer	30 days following Substantial Completion
Record Survey Data	Contractor	Substantial Completion
Record Specifications	Architect / Engineer	30 days following Substantial Completion
Record Product Data	Contractor	Substantial Completion
Record Test Certificates	Contractor	Substantial Completion
Permit and Inspection Records	Contractor	Final Completion
Record Storm Water Documents	Architect / Engineer	30 days following Substantial Completion
Miscellaneous Record Submittals	Contractor	As indicated in Contract Documents or no later than Substantial Completion

B. Related Requirements:

1. Section 01 32 33 “Photographic Documentation for project photographic and video documentation requirements.
2. Section 01 73 00 "Execution" for final property survey and utility as-builts.
3. Section 01 77 00 "Closeout Procedures" for general closeout procedures.

4. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.03 QUALITY CONTROL REQUIREMENTS

A. Print legibly and clearly relevant construction changes/data on current print of Contract Drawings and Shop Drawings to a high standard of quality to create "As-Built Documents." Accurately record information in an understandable drawing technique. Require individual or entity who obtained record data to prepare the marked-up record prints.

B. Contractor shall maintain at its project site office a full set of all As-Built Documents showing as-built design clarifications and construction progress. Post changes and revisions to documents as they occur; do not wait until end of Project. Owner will review monthly As-Built Drawings and Specifications. In the event record documents are not maintained, Owner may withhold monthly payment.

C. Record additional construction information on As-Built Documents.

D. All Project record document submittals shall be reviewed and approved by Architect prior to submittal to Owner.

1.04 SUBMITTALS

A. Deliver As-Built and design-build Record Documents to Owner in accordance with the schedule in Paragraph 1.02(A) of this Section. Accompany submittal with transmittal letter containing date, project title and number, Contractor's name and address, title and number of each record document, certification that each document as submitted is complete and accurate, and signature of Contractor, or its authorized representative.

B. Unless otherwise required, provide one (1) hard copy set and one (1) digital set in AutoCAD or Revit with Linked AutoCAD (or other native file format) and PDF on CD of all documents required by this Section, unless noted otherwise.

C. Organize hard copies into sets. Bind and label sets for Owner's continued use. Bind each set with durable-paper cover sheets. Include appropriate identification, including titles, dates, and other information on the cover sheets.

D. Organize AutoCAD or Revit with Linked AutoCAD information into separate electronic files that correspond to each sheet of the Contract Drawings or Shop Drawings. Name each file with the sheet identification. Include identification in each AutoCAD or Revit with Linked AutoCAD file.

PART 2 – PRODUCTS

2.01 AS-BUILT AND RECORD DRAWINGS

A. As-Built Drawings and design-build Record Drawings (if any): Maintain one clean, undamaged set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark As-Built Drawings 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 prepare the mark-up records that shall be considered "**As-Built Drawings**".

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 understandable drawing technique.

c. Scanning of the red-lined hard copy originals is permitted.

2. Content: Mark record prints to show actual installation where installation varies from that shown originally. 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. Depths of foundations below first floor. Indicate foundation elevations relative to first floor elevation.

d. Horizontal locations and vertical depths of underground utilities and appurtenances, including both site utilities and those under buildings and structures, referenced to permanent surface improvements.

e. Horizontal and vertical locations of internal utilities and appurtenances, concealed in construction, referenced to visible, accessible, permanent features of the buildings or structures.

f. Revisions to routing of piping and conduits.

g. Revisions to electrical circuitry.

h. Actual equipment locations.

i. Duct size and routing.

j. Changes made by Change Order or Construction Work Directive, Architect's Supplemental Instructions or Bulletins.

k. Changes made following Architect's written orders and pertinent graphic and written responses to requests for information (RFI).

l. Details not on the original Contract Drawings or Shop Drawings.

m. Field records for variable and concealed conditions.

n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings. Mark new information that is important to Owner but was not shown on Contract Drawings or Shop Drawings.
6. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Do not permanently conceal any Work until required information has been recorded.
7. Note Construction Work Directive numbers, alternate numbers, Change Order numbers, request for information (RFI) numbers, and similar identification, where applicable.
8. Identify and date each drawing; include the printed designation "AS-BUILT DRAWINGS" in 2 inch high letters in a prominent location on each drawing.
9. Provide identification as follows:

   a. Project name.

   b. Date.

   c. Designation "AS-BUILT DRAWINGS."

   d. Name of Architect.

   e. Name of Contractor.

2.02 AS-BUILT AND RECORD DRAWINGS (CAD DELIVERABLES) FOR PROJECTS NOT REQUIRED TO USE REVIT LINKED MODELS

A. Contractor shall provide (1) hard copy set and one (1) digital set on CD of Subcontractor's As-Built Drawings to Architect/Engineer for development of Record Drawings, organized and bound into sets as indicated in Paragraph 1.04.C. Scanning of the red-lined hard copy originals is permitted.
B. Contractor shall also provide (1) hard copy set and one (1) digital set on CD of Subcontractor's As-Built Drawings to Owner for record.
C. Architect and design team will update the electronic contract drawing files with the information contained in the original hard copy red-lined as-built sets. These files will be considered "**Record Drawings**". For any design-build elements, Contractor shall update the AutoCAD files; scanning of the marked-up hard-copy originals is not permitted.
D. For design-build subcontractors, Architect will review as-built documents and, once approved, attach them to their Record Drawings.
E. All parties creating and submitting AutoCAD files should restrict themselves to the guidelines outlined in the USC CAD and Layering Standards referenced in Section 01 33 00, "Submittal Procedures."

2.03. AS-BUILT AND RECORD MODELS FOR PROJECTS REQUIRED TO USE REVIT LINKED MODELS

A. For projects being designed and constructed utilizing Revit models with linked AutoCAD drawings ("**Revit Linked Models**"), provide As-Built information to

Owner in accordance with the University Record Revit Model Requirements included in the Exhibits to the Agreement.

B. Contractor shall submit Subcontractor's as-built native format models to Owner. These are considered "As-Built Models." System run categories shall include: cable trays, conduit, ducts, pipes, wires, and associated fittings, insulation, linings, hangars, and placeholders.

C. Architect, Mechanical Engineer, Electrical Engineer and their consultants will update the Contract Document Revit models with the information contained in the Sub-contractor's As-Built Models. These Revit files will be considered "Record Models". All Record Models except for Architecture shall include the following equipment categories: air terminals, communication devices, data devices, duct accessories, electrical circuits, equipment and fixtures, fire alarm devices, lighting devices and fixtures, mechanical equipment, nurse call devices, pipe accessories, plumbing fixtures, security devices, sprinklers, switch systems, and telephone devices. The Architecture Record Model shall include the following equipment categories: casework, curtain systems, doors, electrical equipment and fixtures, furniture, furniture systems, lighting fixtures, mechanical equipment, plumbing fixtures, specialty equipment, and windows.

D. For design-build Subcontractors, Architect will review As-Built Models and once approved, consider them a federated model supplement to be linked to their Record Models.

E. The Revit Record Models are to have completed USC Shared Parameters data as a supplement to the requirements of the Operations and Maintenance Manuals required by the Contract. The required USC Shared Parameters are Revit parameters whose values are to be input through Revit template spreadsheets synchronized to the **Revit Linked Models**. Refer to the latest version of the University Record Revit Model Requirements for information regarding the **Revit Linked Models** and the USC Shared Parameters.

2.04. RECORD SURVEY DATA

A. Contractor shall submit record survey data to Owner. The approved land surveyor performing Work shall record vertical and horizontal record survey locations per the requirements of Section 01 73 00 "Execution Requirements" and shall submit the following:

1. Utility As-Builts.
2. Certified Survey.
3. Final Property Survey.

B. Maintain a separate set of Record Survey Data. This set shall be separate from other As-Built and Record Drawings.

C. Contractor shall provide one (1) set of hard copy Record Survey Data to Owner and one (1) digital set on CD in the latest version of AutoCAD, or other digital data software in which the original drawings were created, organized and bound into sets as indicated in Paragraph 1.04.C. Scanning of the marked up hard copy originals is not permitted.

2.05. RECORD SPECIFICATIONS

A. Contractor shall mark specifications to indicate actual product installation where installation varies from that indicated in the Contract Documents or Shop Drawings. Contractor will include notations in the table of contents to allow easy identification of sections that have been amended. Architect will update its electronic file from information contained in Contractor's red-lined original hard copy as-built set.

B. Give particular attention to information on concealed products and installations that would be difficult to identify and record later.

C. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

D. Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made.

E. Note Construction Work Directive numbers, alternate numbers, Change Order numbers, request for information (RFI) numbers, and similar identification, where applicable.

F. Use pen and black ink so marks will reproduce clearly.

G. Scanning of the marked up hard copy originals is acceptable.

2.06 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.

B. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

C. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

D. Note related Change Orders, Contract Drawings where applicable.

E. Use pen and black ink so marks will reproduce clearly.

F. Scanning of the marked up hard copy originals is acceptable.

G. Submit one (1) electronic copy of all product submittals in PDF format to Owner on CD, DVD, or other storage device. Hard copies are not required.

2.07 RECORD TEST CERTIFICATES

A. Contractor shall bind, in a separate binder, record test certificates and identify each, ready for continued use and reference. Digital set shall be an annotated PDF electronic file. Scanning of the hard copy originals is acceptable.

B. Assemble test certificates required for record keeping and submittal in connection with actual performance of the Work.

C. Categories of requirements resulting in test certification records include, but are not limited to the following:

1. Equipment start-up reports.
2. Air and Hydronic Test and Balance reports.

3. Pipe Pressure test reports.
4. Pipe Cleaning reports.
5. Duct Pressure test reports.
6. Back Flow Prevention device certifications.
7. Domestic Water Chlorination reports.
8. Electrical Acceptance test reports.

2.08 PERMIT AND INSPECTION RECORDS

A. Contractor shall bind, in a separate binder, permit and inspection records and identify each, ready for continued use and reference. Digital set shall be an annotated PDF electronic file. Scanning of the hard copy originals is acceptable.
B. Prints or other documents used to obtain permits from authorities having jurisdiction. Submit all prints and documents bearing official approval stamp of authorities having jurisdiction.
C. Originals of all permits issued for the Work by authorities having jurisdiction.
D. Originals of inspection cards completed by authorities having jurisdiction.
E. Equipment operating permits.

2.09 RECORD STORM WATER DOCUMENTS

A. Architect shall provide one (1) set of hard copy Record Storm Water Documents and one (1) digital set submitted through PMIS as a PDF electronic file.
   1. Approved Low Impact Development (LID) plan.
   2. Recorded O & M covenant.
   3. Engineer of Record stamped Storm Water Observation Form.

2.10 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required elsewhere in the Contract Documents 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. Categories of requirements resulting in miscellaneous records include, but are not limited to, the following:
      a. Field records on excavations and foundations.
      b. Field records on underground construction and similar Work.
      c. Authorized measurements utilizing unit prices or allowances.
      d. Records of plant treatment.
      e. Ambient and substrate condition tests.
      f. Certifications received in lieu of labels on bulk products.

g. Batch mixing and bulk delivery records.

h. Testing and qualification of tradesmen.

i. Documented qualification of installation firms.

j. Load and performance testing.

k. Leakage and water-penetration tests.

l. Fire-resistance and flame-spread test results.

m. Final inspection and correction procedures.

n. Field test reports.

PART 3 - EXECUTION

3.01 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for record document purposes. Post changes and modifications to As-Built Documents as they occur, but within 24 hours maximum; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use record documents for construction purposes. Maintain record documents in good order legible condition, and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to record documents for Owner's and Architect's reference during normal working hours.

1. Maintain one (1) set of all record documents at the Project site for the entire duration of construction.

2. Clearly label each document or item "AS-BUILT DRAWING," "PROJECT RECORD SAMPLE," "AS-BUILT SPECIFICATIONS," or similar as appropriate and applicable.

C. Do not conceal Work requiring verification for record documents until such information has been verified and recorded.

D. Certification: Within the title block or immediately adjacent, on each drawing sheet of both the original mark-up record drawings and the front covers of record specifications, include the following statement signed by Contractor:

"I certify to the best of my knowledge, information and belief that the information recorded on this drawing/specification is a complete and accurate record of the final Work of this Contract."

Name (printed) *Title*

Signature *Date*

END OF SECTION 01 78 39

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.01 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.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner'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.
   3. Demonstration and training videotapes.

B. Related Sections include the following:
   1. Section 01 78 23 "Operation and Maintenance Data" for coordinating content and scheduling of training modules with content and completion of operations and maintenance manuals.
   2. Individual Specification Sections for specific operation and maintenance manual requirements for products in those Sections.

1.03 SCHEDULING

A. Schedule training with Owner with at least 14 days advance notice prior to date of demonstration and training session.

B. Provide a complete training schedule to Owner at the time of scheduling. Training schedule shall include all topics in the Instruction Program, dates, times, and locations.

C. Training must be completed prior to requesting inspection for Substantial Completion.

D. Time Period of Training: As specified in the various specification sections, or longer as required to fully instruct Owner's designated operation and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems.

1.04 SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and agendas for each training module per Section 2.01.
   1. Copies of the approved emergency, operations, and maintenance manuals shall be provided during the training sessions for reference.

2. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect and Owner.

B. Qualification Data: For firms and persons specified in paragraph 1.05 of this Section, to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and Owners, and other information specified.

C. Training Manual: At completion of training, submit one complete Training Manual for Owner's use including:

1. Copy of final Instruction Program, agendas and schedule.

2. Attendance Records: For each training module, submit list of participants, and the sign-in sheet

3. Copies of all training materials provided at each training session.

D. Videotape Recording: Engage a qualified commercial photographer to videotape the demonstration and training sessions. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids.

1. Video Format and quality shall be high quality color videotaped modules in DVD format. Video quality shall be such that instruction is clear, audible, and all equipment components are clearly shown. Capture audience questions and responses.

2. Organize DVDs according to the training module topics. Edit unnecessary camera movements/dead time.

3. Label each DVD with the name of the Project, name and address of photographer, name of Architect, name of Contractor, date of DVD, and description of the training module.

4. Provide (2) two copies of each DVD to at the end of each training module. All training DVD's to be submitted prior to substantial completion.

1.05 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: Provide the services of competent Contractor's or manufacturers' engineers and qualified maintenance personnel to properly train designated persons.

C. Photographer Qualifications: A professional commercial photographer who is experienced videotaping demonstration and training sessions.

D. Pre-Instruction Conference: Conduct conference at Project site. Review methods and procedures related to demonstration and training including, but not limited to, the following:

1 Inspect and discuss locations and other facilities required for instruction.

2 Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.

3 Review required content of instruction.

4 For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.06 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program coordinated with the content of the operations and maintenance manuals submitted under Section 01 78 23 "Operation and Maintenance Data" that includes individual training modules for each system and equipment not part of a system and any special requirements specified in the individual specification sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements and Criteria.
2. Identification of equipment and components. Identify location, access, and safety hazards.
3. Review of system documentation including emergency, operations, and maintenance manuals, record documents, test reports, and warranties.
4. Emergency Operation.
5. Normal Operation.
6. Adjustments.
7. Troubleshooting.
8. Maintenance.
9. Repairs and spare parts.

C. Copies of the approved emergency, operations, and maintenance manuals shall be provided during the training sessions for reference.

PART 3 - EXECUTION

3.01 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module.

B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system per the Instruction Program.

1. Owner will furnish Contractor with names and positions of participants.

2. Provide a copy of the instruction program, session agenda, and any training materials to the participants at the beginning of the session.

3. The instructor should begin the session by introducing themselves and the company they represent.

4. At each piece of equipment demonstrated, the instructor should explain their location and/or vantage point and the equipment designation, for the purposes of capturing the information on the training video.

5. All sessions should allow for questions by the participants.

C. 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.

END OF SECTION 01 79 00

SECTION 01 91 13
GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

A. Owner will employ an independent Commissioning Authority or appoint personnel represent Owner in the commissioning process. The Commissioning Authority will verify that the systems work as intended. The Commissioning Authority will inform the Owner and Architect of the results of commissioning and provide recommendations for final acceptance of commissioned systems.

B. Contractor shall be involved in the commission process as outlined below, and in references and attachments throughout the Contract Documents. Contractor shall furnish labor and materials sufficient to meet all requirements of building commissioning under this Contract.

C. The Commissioning Authority is not authorized to modify, add to, or revoke the requirements of the Contractor Documents. A change in the work can only be made as provided in the General Conditions.

1.03 REQUIREMENTS AND RELATED SECTIONS

A. This section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

B. The requirements of the drawings and general provisions of the Contract including the General Conditions, Supplementary Conditions and these General Requirements apply to the Work of this Section.

C. Related Specification Sections:

1. Sections 01 33 00 Submittals and 01 32 23 Project Management Information System for submittal procedures
2. Section 01 40 00 Quality Requirements for requirements for testing agencies
3. Section 01 81 13 Sustainable Design Requirements (if any)
4. Section 01 79 00 Demonstration and Training for additional training and instruction requirements
5. Section 01 78 39 Project Record Documents
6. Section 01 78 23 Operation and Maintenance Data

7. Applicable Divisions 3 through 8 specification sections identify the commissioning requirements for building enclosure components, installation, testing and demonstration performance.

8. Applicable Divisions 22 and 23 specification sections identifying the commissioning requirements for plumbing and HVAC systems relating to the installation of mechanical equipment and systems, particularly with respect to equipment and system testing, start-up and performance demonstration/observation. Coordinate with the Work of Division 26.

9. Applicable Division 26 specification sections specifying the commissioning requirements for materials and installation of electrical equipment and systems, particularly with respect to equipment and system testing, start-up and performance demonstration/observation. Coordinate with the Work of Divisions 22 and 23.

1.04 DESCRIPTION

A. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning begins in the design phase with documenting design intent and continues through construction, acceptance and the warranty period with actual verification of performance. The commissioning process shall encompass and coordinate the traditionally separate functions of system documentation, equipment start-up, control system calibration, testing and balancing, performance testing, training and delivering Operation and Maintenance documentation for the turnover of completed systems.

B. The commissioning process does not take away from or reduce the responsibility of the system designers or installing Contractor or Subcontractor to provide a finished and fully functioning product. The commissioning process will be directed by the Commissioning Authority and executed by Contractor.

C. Commissioning during the construction phase is intended to achieve the following specific objectives:

1. Verify that applicable equipment and systems are installed per the contract documents, according to the manufacturer's recommendations, and to industry accepted standards.

2. Verify and document that the commissioned equipment and systems are checked and functionally tested by installing Contractor or Subcontractor, including documented start-up by factory representatives.

3. Verify and document that equipment and systems perform according to Owner's project requirements, the Basis of Design and the Contract Documents.

4. Verify that Operations & Maintenance (O&M) documentation is complete.

5. Verify that Owner's operating personnel are trained.

D. Contractor may be required to provide deferred or seasonal commissioning if commissioning during the construction phase does not fulfill the objectives listed above.

E. Contractor shall correct deficiencies and update O&M Manuals and as-builts for issues addressed during warranty period.

1.05 ABBREVIATIONS AND DEFINITIONS

A. Abbreviations

O&M: Operations & Maintenance

OPR: Owner's Project Requirement

TAB: Testing, Adjusting and Balancing

B. Definitions

1. Acceptance of Work - When prerequisites to Acceptance of Work required by Contract Documents are fulfilled and Work is ready for use or is being used for purpose intended and state of work is so declared, in writing by Owner.

2. Basis of Design (BOD) - Describes the systems, components, conditions and design methods chosen to meet Owner's Project Requirements.

3. Commissioning Authority (CA) - an independent agent, not otherwise associated with the design team members or Contractor. The Commissioning Authority is hired by Owner and directs and coordinates the day-to-day commissioning activities. The term "Commissioning Agent" shall mean the same as "Commissioning Authority".

4. Commissioning Plan - an overall plan that provides the structure, schedule and coordination planning for the commissioning process.

5. Commissioning Report - a brief summary report that includes a list of participants and roles, brief building description, overview of commissioning and testing scope, and a general description of testing and verification methods. For each component or piece of commissioned equipment, the report should contain the disposition of the Commissioning Authority regarding the adequacy of the component or equipment, documentation and training meeting the contract documents. Also included is the issues log, Commissioning Plan, progress reports, submittal and O&M manual reviews, training records, test schedules, pre-functional checklists, start-up reports, functional tests and trend log analysis.

6. Control system - the central building energy management control system.

7. Datalogging - monitoring flows, currents, status, pressures, etc. of equipment using stand-alone dataloggers separate from the control system.

8. Deferred Testing - Testing that is performed after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that require a test to be postponed.

9. Deficiency - A condition in the installation or function of a component or system that is not in compliance with the Contract Documents and Owner's Project Requirements.

10. Factory Testing - Testing of equipment on-site or at the factory, by factory personnel with an Owner's representative present.

11. Functional Performance Test (FPT) - the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. The Commissioning Authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing Contractor or Subcontractor or vendor. FPTs are performed after pre-functional checklists and start-up are complete.

12. Non-Compliance - see Deficiency.

13. Non-Conformance - see Deficiency.

14. Owner-Contracted Tests - tests paid for by Owner outside the Contractor's Work and for which the Commissioning Authority may or may not oversee. These tests will not be repeated during FPTs if properly documented.

15. Owner's Project Requirements (OPR) - A document that details the functional requirements of the Project and the expectations of the building use and operation as it relates to the systems being commissioned. Elements include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria and supporting information.

16. Pre-functional Checklist (PFC) - A list of items to inspect and test to conduct to verify proper installation of equipment. Pre-functional checklists are developed by the Commissioning Authority and are executed in conjunction with system start-up, and prior to FPT. Pre-functional checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation.

17. Sampling - functionally testing only a fraction of the total number of identical or near identical pieces of equipment.

18. Seasonal Performance Tests - FPT that are deferred until the system(s) will experience conditions closer to their design conditions. See also Deferred Testing.

19. Start-up by Contractor- Sub-Phase of Contractor's work ending with Acceptance of Work, during which Contractor executes a preplanned program of activities including starting, testing, inspecting, adjusting, balancing and correcting deficiencies, and other similar activities.

    a. During this period, the Commissioning Authority or his/her representative shall be periodically on site to observe, inspect installation and start-up.

b. Deficiencies will be noted and brought to the attention of Contractor for resolution.

20. Systems Manual - a document developed by the Commissioning Authority to provide the information needed to understand, operate, and maintain the facility and its systems. The Systems Manual expands on the standard O&M documentation to incorporate additional information developed through the commissioning process, such as system set points.

21. Trending - monitoring using the building control system.

1.06 COMMISSIONING PROCESS OVERVIEW

A. The Commissioning Authority is hired by Owner. The Commissioning Authority directs and coordinates the commissioning activities and reports to Owner. All commissioning team members work together to fulfill their contracted responsibilities and meet the objectives of the commissioning program.

B. The Commissioning Authority will provide progress reports to Owner. The Commissioning Authority will communicate with members of the commissioning team, keeping them apprised of commissioning progress. The Commissioning Authority will provide non-conformance and deficiency reports to Owner and Contractor.

C. The Commissioning Authority shall provide the Commissioning Plan which includes a narrative that describes the commissioning process in detail as well as the roles and responsibilities of the various commissioning team members and details the testing and acceptance of the equipment to be commissioned.

D. Commissioning Meetings

1. The Commissioning Authority shall conduct a commissioning kick-off meeting to review the Commissioning Plan. Questions and comments regarding the commissioning process will be addressed. Roles, responsibilities, tasks, and a preliminary schedule for commissioning activities shall also be discussed.

2. The Commissioning Authority may also conduct periodic meetings from the start of construction until Final Acceptance. The Commissioning Authority shall record minutes and distribute copies to all attendees after meeting for review and comment.

E. Start-up and Pre-functional Checklists
The Commissioning Authority shall develop pre-functional checklists based on equipment submittals, Contractor start-up forms, manufacturer documentation and common issues. Pre-functional checklists are completed by Contractor or Subcontractors and witnessed at the discretion of the Commissioning Authority.

F. Functional Performance Test Procedures

1. Before test procedures are developed, the Commissioning Authority shall be provided with requested documentation including but not limited to a current list of change orders affecting equipment or systems, an updated points list, program code, control sequences and system parameters.

2. The Commissioning Authority shall develop specific test procedures to verify and document proper operation of each piece of equipment and system. At the discretion of the Commissioning Authority and approval of Owner, sampling strategies may be employed for like pieces of identical non-critical equipment.

3. Functional Performance Test Procedures are executed by Contractor under the direction of the Commissioning Authority. The Commissioning Authority maintains testing records including deficiencies and resolutions.

G. O&M Training

The Commissioning Authority oversees training and monitors the execution of Owner's operator training. The Commissioning Authority shall review the content and adequacy of the training of Owner personnel for commissioned equipment. The Commissioning Authority shall meet with Owner to determine the needs of Owner personnel and provide feedback to Contractor.

H. Commissioning Completion

1. The commissioning process shall be completed when the systems operate according to Owner's design intent and the Contract Documents, as determined by the Commissioning Authority. The Commissioning Authority shall provide written confirmation to Owner of commissioning completion.

2. The commissioning process shall be completed prior to Substantial Completion of the Project. Select non-compliance issues may be extended past Substantial Completion, with the approval of Owner.

3. The Commissioning Authority prepares a final Commissioning Report and Systems Manual and delivers to Owner.

I. Warranty Phase Commissioning

1. The Commissioning Authority shall return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have with operating the building as originally intended.

2. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify and distinguish issues or areas that may come under warranty or under the original construction contract.

3. Assist facility staff in developing reports and documents and requests for services to remedy outstanding problems. Include a plan for resolution of outstanding commissioning-related issues sufficiently, prior to the end of the warranty period.

1.07 RESPONSIBILITIES

A. Commissioning Team

The commissioning team is comprised of, but not limited to, the following:

1. Commissioning Authority

2. Owner's Project Manager and Operations Staff

3. Contractor
4. Architect and Design Engineers
5. Mechanical Subcontractor
6. Controls Subcontractor
7. TAB Subcontractor
8. Electrical Subcontractor
9. Plumbing Subcontractor
10. Fire Protection and Fire Alarm Subcontractors
11. Security and Access Controls Subcontractors
12. Irrigation Subcontractor

B. Owner and Operator Responsibilities
1. Assign a Commissioning Authority and provide name and contact information to Contractor, in writing.
2. Champion the commissioning process by requiring members of the commissioning team to fulfill their roles and responsibilities.
3. Attend and participate in commissioning meetings.
4. Prepare Owner's Project Requirements (OPR) document. Update the OPR as required throughout the project.
5. Furnish a copy of all Construction Documents, addenda, change orders, and Approved submittals and shop drawings related to commissioning equipment to the Commissioning Authority. Furnish all Owner-contracted Factory Testing or required Owner acceptance tests to Commissioning Authority.
6. Review the commissioning documents including Commissioning Plan, pre-functional checklists and functional test procedures and Commissioning Report.
7. Perform normal review of Contractor submittals.
8. Observe and witness selected pre-functional checklists, start-up and functional tests.
9. Review commissioning progress and deficiency reports.
10. Coordinate the resolution of non-compliance and deficiencies identified during commissioning with Architect, Contractor and their Subcontractors.
11. Review and comment on the content of the O&M manuals.
12. Witness any seasonal or deferred testing and deficiency corrections and ensure that any seasonal or deferred testing and any deficiency issues are addressed.
13. Assist Contractor in coordinating the training of Owner personnel.
14. Arrange for facility O&M personnel to attend various field commissioning activities and field training sessions according to the Commissioning Plan.

15. Provide final approval for the completion of the commissioning work.

C. Commissioning Authority Responsibilities

1. Coordinate and direct the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
2. Coordinate the commissioning work and provide Contractor with expected durations of commissioning activities for inclusion in the construction schedule.
3. Develop the Commissioning Plan and revise, as necessary, throughout construction.
4. Plan and conduct a commissioning scoping meeting and other commissioning meetings.
5. Request and review additional information required to perform commissioning tasks, including O&M materials, Requests for Information, Change Orders, Coordination Drawings and Contractor start-up and checkout procedures.
6. Before start-up, gather and review the current control sequences and interlocks and work with Contractor and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
7. Review normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with Owner/Architect reviews.
8. Coordinate and conduct a meeting with all involved parties to review the controls submittal and issue meeting minutes.
9. Write and distribute pre-functional tests and checklists for each piece of commissioned equipment for use by Contractor and Subcontractors in developing start-up plans.
10. Review start-up and initial systems checkout plans prepared and submitted by Contractor.
11. Perform site visits, as necessary, to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
12. Witness all or part of the HVAC piping test and flushing procedure, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify Owner of any deficiencies in results or procedures.
13. Witness all or part of any ductwork testing and cleaning procedures, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify Owner of any deficiencies in results or procedures.

14. Approve system start-up completion by reviewing start-up and pre-functional checklist reports and by selected site observation and spot checking.
15. Review TAB execution plan. Plan and schedule a pre-TAB coordination meeting to review TAB plan prior to starting TAB work.
16. Oversee sufficient check-out of the control system and approve it to be used for TAB, before TAB is executed.
17. Approve air and water systems balancing by spot testing, by reviewing completed reports and by selected site observation.
18. Prepare recommended FPT procedures and data forms.
19. Submit recommended FPT procedures and data forms to Contractor for review and approval.
20. Analyze any functional performance trend logs and monitoring data to verify performance.
21. Coordinate, witness and approve manual functional performance tests performed by installing Contractor or Subcontractor. Coordinate retesting as necessary until satisfactory performance is achieved.
22. Maintain a master deficiency and resolution log and a separate testing record. Provide Owner with written progress reports and test results with recommended actions.
23. Witness performance testing of Owner-contracted tests or tests by manufacturer's personnel over which the Commissioning Authority may not have direct control. Document these tests and include this documentation in Commissioning Report.
24. Review equipment warranties to ensure that Owner's responsibilities are clearly defined.
25. Oversee the training of Owner's O&M personnel.
26. Review the preparation of the O&M manuals.
27. Provide a final Commissioning Report and Systems Manual.
28. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
29. Return to the site at 10 months into the 12 month warranty period and review with O&M staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

D. Architect and Design Engineers Responsibilities

1. Attend the commissioning kickoff meeting and selected commissioning team meetings.
2. Review and comment on Owner's Project Requirements, Commissioning Plan, and Commissioning Report.
3. Respond to Commissioning Authority correspondence and inquiries, including design review comments.
4. Provide design intent, sequences of operation, and acceptance criteria as required to support development and performance of Functional Performance Tests.
5. Review Pre-functional checklists for sufficiency prior to use.
6. Review Functional Test procedures for sufficiency prior to use.
7. Assist in the resolution of non-conformance and deficiencies identified during functional performance testing and warranty-period commissioning.

E. Contractor Responsibilities
1. Perform all Work as described in Part 3 – Execution.
2. Include the cost of commissioning including Subcontractors and coordination in the total contract price.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

A. Testing equipment required to perform start-up, initial checkout, and required FPTs shall be provided by Contractor.
B. System specific test equipment, tools and instruments (e.g. test equipment specific to a piece of equipment) required shall be included in the base bid price by Contractor and retained by Owner.
C. Equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates provided.
D. Control System Instrument Calibration:
1. Field-installed sensors, gauges, and actuators shall be calibrated per the manufacturer's recommendations.
2. Alternate calibration methods may be used, if approved by the Commissioning Authority.
3. Test instruments shall have had National Institute of Standards and Technology (NIST) traceable calibration within the last 12 months.

E. For valve and damper actuators, installing Contractor or Subcontractor will verify the actual position against the control system readout, and valve normal setting (normally-opened, or normally-closed).

2.02 QUALIFICATIONS

A. Contractor's Commissioning Coordinator shall have the following qualifications:
   1. Experience with managing, scheduling, and coordinating complex acceptance and verification work of Contractor.
   2. Knowledge of commissioning procedures.
   3. Expertise in complex HVAC temperature control systems and their interface with other building equipment and systems provided by others.
   4. Knowledge of selection, application, and use of field calibration grade equipment and instrumentation for measuring equipment and system performance.

B. Subcontractors shall have the following:
   1. Expert knowledge relative to the specific systems and equipment being commissioned.
   2. Adequate documentation and tools to service and test the equipment.
   3. A willingness to work with the Commissioning Coordinator and Commissioning Authority to complete the work on schedule.

C. Personnel experienced in technical aspects of each system to be commissioned shall be engaged to operate the systems and perform FPT procedures.

PART 3 - EXECUTION

3.01 GENERAL

A. Designate a commissioning coordinator for Contractor and each Subcontractor for major building systems, at a minimum the mechanical, electrical, plumbing, energy management control systems, security, fire alarm and TAB Subcontractors. Establish a contact person for each trade or system involved in the commissioning process to facilitate effective communication during the commissioning process.

B. Provide any documentation needed by the Commissioning Authority in developing the commissioning procedures and other documents identified in Section 3.04.B.

C. Verify that the coordination, installation, quality control and final testing have been completed such that installed systems and equipment comply with the Contract Documents.

D. Although activation and testing of certain equipment such as the elevator and life and fire safety equipment will be done by entities not related to the commissioning process, it is ultimately the responsibility of Contractor to ensure that these systems function as an integrated whole with the rest of the building systems.

3.02 ADDITIONAL SUBCONTRACTOR RESPONSIBILITIES

A. Controls Subcontractor Responsibilities
   In addition to Section 3.01 above, include the following:
   1. Provide controls wiring diagrams, sequences of operations, graphics, and software documentation prior to performance of the FPTs.

2. Provide checklists and procedures to be used to verify performance of the control system checkout and testing, prior to execution.
3. Complete control system checkout and testing and submit completed start-up checklists.
4. Assist in the execution of FPT of all systems controlled and/or monitored by the energy management control system by demonstrating compliance with the sequence of operations.
5. Participate in the correction, fine-tuning or troubleshooting of system performance if either becomes necessary.
6. Provide as-built sequences of operations.

B. Test, Adjust, and Balance (TAB) Subcontractor Responsibilities
In addition to Section 3.01 above, include the following:
1. Provide a TAB execution plan and associated balancing documentation prior to scheduling balance work.
2. Coordinate balance activities with the activities of the mechanical Subcontractor, controls Subcontractor, and Commissioning Authority. Verify that all prerequisites have been completed to allow proper balancing work to be performed.
3. Provide a copy of the preliminary TAB report to the Commissioning Authority for review.
4. Perform field verification of a percentage of the total TAB measurements under the direction of the Commissioning Authority to confirm the accuracy of the TAB report. Resolve identified issues and perform follow-up testing if required.

C. Major Equipment Supplier and/or Third Party Testing Agency Responsibilities
In addition to Section 3.01 above, include the following:
1. Provide all requested submittal data, including detailed checklists start-up procedures.
2. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to the Contract Documents in the base bid price to Contractor.
3. Provide information requested by Commissioning Authority regarding equipment sequence of operation and testing procedures.
4. Provide documentation of inspections of the installation, when required.
5. Provide documented reports of proper start-up, when required.
6. Perform start-up when required by the contract documents for equipment provided.
7. Execute FPTs at the direction of or in the presence of the Commissioning Authority, where required.

3.03 SYSTEMS TO BE COMMISSIONED

The following systems shall be commissioned:

C. All HVAC systems, including but not limited to:
   1. Central building automation system
   2. Cooling chilled water systems, including chillers, cooling towers and associated controls
   3. Heating hot water systems and associated controls
   4. HVAC distribution systems and associated controls
      a. Chilled water, heating hot water and condenser water pumps
      b. Air handling units
      c. Terminal air distribution units
      d. Radiant and/or chilled beam systems
      e. General building supply and exhaust fans
      f. Specialty supply and exhaust fans (i.e. laboratory, kitchen, etc.)
      g. Split System air conditioning units
      h. Fan coil units

B. Electrical systems, including but not limited to:
   1. Lighting and dimming controls, including scheduled and occupancy sensor controls
   2. Emergency power generators and automatic transfer switching
   3. Uninterruptible power supply systems

C. Plumbing systems, including but not limited to:
   1. Domestic hot water heating systems and associated controls
   2. Domestic and process water pumping and mixing systems
   3. Plumbing systems related to kitchen equipment
   4. Sump pump and sewage ejector pumps

D. Specialty systems, including but not limited to:
   1. Landscape Irrigation systems
   2. Security and access control systems
   3. Fire alarm systems
   4. Specialty fire protection systems

3.04 REPORTING AND COMMISSIONING DOCUMENTS

A. Contractor shall cooperate with Commissioning Authority and provide documentation required for incorporation into Owner reports.

B. Commissioning Documents

1. Contractor shall furnish the following written work products:

   a. Commissioning Schedule – in cooperation with the Commissioning Authority as described in Subsection 3.02

   b. Equipment Submittals

   c. Manufacturers Start-up Forms

   d. Start-up and checkout plan

   e. Final TAB report

   f. Operation & Maintenance Manuals

   g. Overall training plan

   h. Input to additional commissioning work products such as those identified in Subsection 1.06.C as required.

C. Commissioning Schedule

1. Contractor shall incorporate commissioning activities into the overall construction schedule. If construction is phased, commissioning activities are to be included in all phases of the schedule. The schedule defines the milestones and conditions that must be achieved before FPT can commence. The schedule also includes the expected duration of the various tasks. The Commissioning Authority will provide Contractor with expected durations of commissioning activities.

2. Commissioning activities to be included in the overall construction schedule include, but are not limited to:

   a. Power installation complete

   b. Equipment start-up

   c. Pre-functional test checklist endorsement

   d. Controls system checkout complete

   e. Controls system fully operational

   f. Testing, adjusting, and balancing

   g. FPT (one line item for each CSI Division)

   h. Performance period.

   i. Operations & Maintenance Manual review.

   j. Owner Personnel training.

D. Commissioning Plan

1. Contractor shall review the Commissioning Plan and provide comments. The Commissioning Authority will incorporate comments as appropriate, however final authority with respect to the content of the Commissioning Plan lies with the Commissioning Authority.

2. The plan may be updated as the project progresses from design through construction and Contractor shall provide comments on each update.

3.05. COMMISSIONING MEETINGS

A. Contractor and Subcontractors are required to attend a commissioning kickoff meeting as scheduled by the Commissioning Authority.

B. Contractor and Subcontractors are required to attend periodic meetings scheduled by the Commissioning Authority from start of construction until Final Acceptance. Meetings may be held monthly through construction, until the final few months of construction when they may be held as frequently as once per week.

C. The meetings shall be at Contractor's site office or other on-site location agreed to between Commissioning Authority and Contractor.

D. Attendees (Contractor's Representatives): Contractor, mechanical, plumbing and electrical Subcontractors, and when so requested by Commissioning Authority, Sub-Subcontractors, suppliers and other parties involved in Work. Contractor's representatives shall be qualified and authorized to act on behalf of party each represents.

3.06 COMMISSIONING SUBMITTALS

A. Contractor shall submit specific equipment submittals for the equipment and systems to be commissioned in accordance with Sections 01 33 00 Submittals and 01 32 23 Project Management Information System and indicate that the submittals also need to be routed to the Commissioning Authority.

B. Submittals include but are not limited to: equipment cut sheets, shop drawings, TAB plan, performance data, installation and operations manuals and manufacturer start-up forms, building management system point lists and detailed sequences of operation. The information shall be used to develop the pre-functional checklists and FPTs.

C. Commissioning Authority will comment on the submittals. The Commissioning Authority does not have the authority to approve or reject submittals.

3.07 START-UP AND PRE-FUNCTIONAL CHECKLISTS

A. Contractor shall review and comment on the draft pre-functional checklists. Contractor comments will be incorporated as appropriate, however final authority to content lies with the Commissioning Authority.

B. Complete pre-functional checklists developed by the Commissioning Authority. Provide completed manufacturer's start-up checklists as a supplement to the pre-functional checklists.

C. The start-up and checkout plans combining the manufacturer and/or Contractor start-up forms and the pre-functional checklists are the responsibility of Contractor, who shall assign this task to the Subcontractor, vendor, or other party responsible for equipment purchase and/or installation.

1. Prior to, and during equipment installation and start-up, Contractor shall verify that the checklist line items shall be completed and signed off by the individual actually performing the work.

2. Parties responsible for indicating line items as complete shall be noted on individual line items.

3. The pre-functional checklists do not take the place of the manufacturer's start-up sheets. Manufacturer's start-up sheets will be completed and a copy provided to Owner and Commissioning Authority for review.

4. Each piece of equipment receives full pre-functional checkout. No sampling strategies are used.

D. Contractor shall keep the start-up and checkout plans and pre-functional checklists in and organized fashion on the jobsite.

1. Contractor shall inform the Commissioning Authority of the schedule of start-up activities for each commissioned system, including power-up, manufacturer start-up, and testing and balancing.

2. The Commissioning Authority shall periodically observe start-up and checkout of equipment.

3. Contractor shall assign only individuals that have direct knowledge of an item on the pre-functional checklists the authority to initial that item.

4. Contractor shall clearly list any outstanding items not completed successfully at the bottom of the relevant checklist and shall be responsible for any deficiencies or delays during testing due to incomplete checklist items.

5. When complete, Contractor shall submit checklists for review and approval by Commissioning Authority prior to FPT.

6. Contractor shall correct areas that are deficient or incomplete in the checklists and tests in a timely manner, and shall notify the Commissioning Authority as soon as outstanding items have been corrected.

7. The pre-functional checklists shall be updated for any deficient item, after the deficiency has been corrected.

8. Ensure the availability of progress sets of preliminary As-Built Drawings, Specifications and Shop Drawings.

3.08 FUNCTIONAL PERFORMANCE TESTING

A. FPT may not commence until successful completion of the start-up plans (Contractor start-up forms, manufacturer documentation, and pre-functional checklists) and testing and balancing. Testing may proceed prior to the completion of systems and /or sub-systems with the advanced written approval of Owner if expediting this Work is in the best interests of Owner.

B. Objectives and Scope

1. The objective of FPT is to demonstrate that each system is operating according to the documented Owner's Project Requirements, Basis of Design, and Contract Documents.

2. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.

3. Each system to be commissioned will be operated through the modes of operation (e.g. seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load). Proper responses to such modes and to such conditions as recovery from power failure, emergency power, freeze condition, low oil pressure, no flow, equipment failure, etc. shall be tested.

C. FPT Procedures

1. Provide Commissioning Authority with controls system wiring diagrams and narrative sequences of operation in time for use in preparing the FPT procedures.
2. Review and comment on the FPT procedures developed by the Commissioning Authority. These test procedures may change due to changes in sequence of operations or other changes in the project.
3. Execute FPT procedures as directed by the Commissioning Authority.

D. General FPT Methods

1. FPT is performed by Contractor and witnessed by Commissioning Authority to verify proper sequencing, operation and performance of installed equipment and systems under realistic operating conditions. Monitoring system performance and analyzing the results using the control system's trend log capabilities may also be employed.
2. FPT Sequence:
   a. FPT is conducted after start-up, checkout and pre-functional checklists have been approved by the Commissioning Authority.
   b. The air and water balancing is completed and reviewed by the Commissioning Authority before FPT of air-related or water-related equipment or systems.
   c. The energy management control system is programmed and checked out and reviewed by the Commissioning Authority before FPT.
3. Functional Performance Testing Coordination, Scheduling and Setup
   a. Each functional test shall be coordinated and scheduled by Contractor and the Commissioning Authority.
   b. Contractor shall issue written notice of readiness for each system to Commissioning Authority and Owner one week prior to testing of systems, including system flushing and cleaning, pressure testing, equipment start-up testing and TAB.
   c. The Commissioning Authority shall oversee, witness and document the FPT of all equipment and systems to be commissioned. Installing Contractor or Subcontractor shall execute the tests.
   d. Each functional test shall be performed under conditions that simulate actual conditions whenever possible.
   e. Contractor or Subcontractor(s) executing the test shall provide necessary materials, system modifications, etc. to produce the flows, pressures,

temperatures, etc. necessary to execute the test according to the specified conditions.

E. Control Signal Manipulation

1. Actual Conditions: Testing system and equipment to experience actual operating conditions and legitimate control signals is preferred, although it will not always be feasible that the system to be commissioned will experience the full range of operating conditions within the scheduled testing period.
2. Simulated Conditions: Simulated conditions shall be used as necessary in order to test the systems in all operating conditions.
3. Overwritten Values: The controls Subcontractor will overwrite values and alter set points at the discretion of the Commissioning Authority.
4. Altering Set Points: Altering system set points to test a sequence will be employed as necessary in the FPT.
5. Trend Logs: A 72-hour trend log will be provided to the Commissioning Authority by Contractor.
6. False Load Testing: Where false load testing is specified, provide temporary equipment, power, controls, wiring, piping, valves and connections required to apply the specified load to the system.

F. Deficiency Resolution and Retesting

1. The Commissioning Authority will record the results of the FPT on the procedure or test form. Deficiencies or non-compliance issues shall be noted and reported to Owner and Contractor. Contractor shall participate in resolution of system identified deficiencies, including responding to Commissioning Authority correspondence and inquiries.
2. Corrections of minor issues identified shall be made during the tests at the discretion of the Commissioning Authority. In such cases the issue and resolution will be documented on the procedure form.
3. As tests progress and issues are identified, the Commissioning Authority will inform Contractor.
    a. When there is no dispute on the non-compliance issue and Contractor or Subcontractor accepts responsibility to correct it:
        1) The Commissioning Authority documents the issue and the Subcontractor's response and intentions and they go on to another test or sequence.
        2) The Commissioning Authority reschedules the test and the test is repeated until performance satisfactory to the Commissioning Authority is achieved.
    b. If there is a dispute about a non-compliance issue, regarding whether it is a deficiency or who is responsible:
        1) The issue shall be documented along with the response and provided to Contractor.

2) Final design interpretive authority is with the Architect. Final acceptance authority is with Owner.

3) The Commissioning Authority documents the resolution process.

4. Contractor is responsible to repeat a Pre-functional Checklist or Functional Test after deficiencies are corrected.

5. Retesting shall not be a justified reason for a claim of delay or for a time extension by Contractor.

G. The Commissioning Authority will assist with deficiency resolution however the burden of responsibility to solve, correct, and retest problems is with Contractor, Subs and Architect.

1. Cost of Retesting.

a. For a deficiency identified, not related to any pre-functional checklist or start-up fault, the following shall apply: The Commissioning Authority will direct the retesting of the equipment once at no "charge" for the Commissioning Authority's time. However, the Commissioning Authority's time for a second retest will be at Contractor's expense.

b. The time for the Commissioning Authority to direct any retesting required because a specific pre-functional checklist or start-up test item, reported to have been successfully completed, but determined during FPT to be faulty, will be at Contractor's expense.

c. For each retest, submit a new FPT data form marked "Retest".

2. Failure Due to Manufacturer Defect. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to meet the performance requirements in the Contract Documents (mechanically or substantively) due to manufacturing defect, all identical units may be considered unacceptable by Owner. In such case, Contractor shall provide Owner with the following:

a. Within one week of notification from Owner, Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to Owner within two weeks of the original notice.

b. Within two weeks of the original notification, Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.

c. Owner will determine whether a replacement of all identical units or a repair is acceptable.

d. Two examples of the proposed solution will be installed by Contractor and Owner will be allowed to test the installations for up to one week, upon which Owner will decide whether to accept the solution.

e. Upon acceptance, Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty has begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

3.09 DEFERRED AND SEASONAL TESTING

A. Seasonal Testing
   1. Seasonal testing is any testing delayed until weather conditions are closer to the systems design.
   2. During the warranty period, seasonal testing shall be at the discretion of the Commissioning Authority with the approval of Owner.
   3. The Commissioning Authority shall direct the testing.
   4. Tests will be executed, documented and deficiencies corrected. Any final adjustments to the O&M manuals and as-builts due to the testing will be made by Contractor.

B. Deferred Testing
   1. If any check or test cannot be completed due to the building structure, required occupancy condition or other situation, execution of checklists and FPT may be delayed upon approval of Owner.
   2. Deferred tests will be conducted in the same manner as the seasonal tests.
   3. Services of necessary parties will be negotiated.

3.10 OPERATIONS & MAINTENANCE DOCUMENTATION

A. Contractor will provide Owner with Operations and Maintenance (O&M) information, per the provisions in the contract documents including Section 01 78 23, including updating the original sequences of operation to as-built conditions.

B. Prior to substantial completion, the Commissioning Authority shall be provided with the O&M submittals, manuals, and documentation for commissioned systems.

C. The Commissioning Authority will review each O&M manual submittal for commissioned systems. This review does not supersede the Owner or Architect review of the O&M manuals.

D. The Commissioning Authority reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated.

3.11 SYSTEM DEMONSTRATION AND TRAINING

A. Contractor shall be responsible for ensuring that training for Owner personnel is provided and completed for commissioned systems. Contractor and Owner will coordinate and schedule the training of the commissioned systems per the requirements of Section 01 79 00 “Systems Demonstration and Training.”

3.12 WARRANTY PHASE COMMISSIONING

A. Contractor shall participate and support all warranty phase commissioning required by the Commissioning Authority.

END OF SECTION 01 91 13