Project Manual

Project No.: 16-0409
Issue Date: October 13, 2017

Tri-City Medical Center

Surface Parking Lot

4002 Vista Way
Oceanside, California 92056

Plan Check Submittal

OWNER:

Tri-City Medical Center
4002 Vista Way
Oceanside, California 92056

ARCHITECT:

CUNINGHAM
GROUP

Cuningham Group Architecture, Inc.
1030 G Street
San Diego, California 92101

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SECTION 00 01 00 - CERTIFICATIONS AND SEALS

PROJECT: **TRI-CITY MEDICAL CENTER**
Surface Parking Lot
4002 Vista Way
Oceanside, California 92056

PROJECT NO.: **16-0409**

ARCHITECT'S CERTIFICATION:

I hereby certify that Divisions 01 through 14 of this Specification were prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of California.

Architect's Firm Name: Cuningham Group Architecture, Inc.

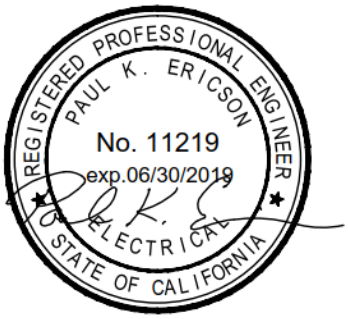
Date: October 13, 2017

Seal

ELECTRICAL ENGINEER'S CERTIFICATION:

I hereby certify that Division 26-28 Sections of this Specification were prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of California.

Engineer's Firm Name: Stantec



Date: October 13, 2017

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SECTION 00 01 03 - PROJECT DIRECTORY

PROJECT:	**TRI-CITY MEDICAL CENTER** **Surface Parking Lot** 4002 Vista Way Oceanside, California 92056
PROJECT NO.:	16-0409
OWNER:	Tri-City Medical Center 4002 Vista Way Oceanside, California 92056
ARCHITECT:	Cuningham Group Architecture, Inc. 1030 G Street San Diego, California 92101 Telephone: (619) 849-1080 Facsimile: (619) 849-1089
CIVIL ENGINEER:	BWE 9449 Balboa Avenue, Suite 270 San Diego, California 92123 Telephone: (619) 299-5550 Facsimile: (619) 299-9934
LANDSCAPE ARCHITECT:	Spurlock 2122 Hancock Street San Diego, California 92110 Telephone: (619) 681-0090
ELECTRICAL ENGINEER:	Stantec 9191 Towne Center Drive, Suite 220 San Diego, California 92122 Telephone: (858) 622-2744

END OF DOCUMENT

SECTION 00 01 10 - TABLE OF CONTENTS

END OF SECTION

SECTION 00 63 25 - SUBSTITUTION REQUEST FORM

CONTRACTOR: _____ **REQUEST NO.:** _____
TO: CGA, ATTN: _____ **SECTION:** _____

Disciplines Impacted: [ ] Structural [ ] Mechanical [ ] Electrical [ ] Architectural
[ ] Civil [ ] Landscape [ ] Foodservice [ ] _____

By submitting substitution, Contractor stipulates the following statements are correct:
Proposed substitution does not alter dimensions or dimensional relationships shown on drawings.
The Architect's costs caused by proposed substitution will be compensated per Section 01 25 00**.**
Proposed substitution does not adversely impact schedule or coordination of work by others.
Proposed substitution will not adversely impact warranty requirements.
Proposed substitution will not adversely impact availability of service, maintenance or replacement parts.
Summary of Proposed Substitution: _____

Reason for Proposed Substitution: _____

Comparison of proposed item to specified per Section 01 25 00.	[ ] Attached	[ ] Under separate cover
Name and location of three similar applications:	[ ] Attached	[ ] Under separate cover
Description of required changes to the drawings and project manual:	[ ] Attached	[ ] Under separate cover
Description of impact on applicable code requirements:	[ ] Attached	[ ] Under separate cover
Name and location of maintenance service and parts supply:	[ ] Attached	[ ] Under separate cover

If Substitution Request is accepted, there will be:

Possible Cost Impact:	[ ] Increase	[ ] Decrease	[ ] No Change	[ ] Unknown
Possible Time Impact:	[ ] Increase	[ ] Decrease	[ ] No Change	[ ] Unknown

Action on this Substitution Request is requested as soon as possible, but no later than _____ **[ ] Priority Attention Required**

_____ Copies to: _____
Contractor's Representative _____

Architect's Response: Date: _____
[ ] Increase [ ] Decrease [ ] No Change [ ] Unknown

_____ Copies to: _____
Cuningham Group Representative

_____ Copies to: _____
Owner's Representative

END OF SECTION

SECTION 01 10 00 - SUMMARY

PART 1 GENERAL

1.1 PROJECT

A. Project Name: Tri-City Medical Center Surface Parking Lot

B. Owner's Name: Tri-City Medical Center.

C. Architect's Name: Cuningham Group Architecture, Inc..

D. The Project consists of the construction of an additional parking lot to the west of the existing parking lot.

1.2 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is shown on drawings and specified in Section 02 41 00.

B. Scope of alterations work is indicated on drawings.

C. Plumbing/Irrigation: Alter existing system and add new construction, keeping existing in operation.

D. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.

1.3 WORK BY OWNER

A. Items noted NIC (Not in Contract) will be supplied and installed by Owner after Substantial Completion.

B. Owner will supply and install items indicated as OF/OI (Owner Furnished, Owner Installed) or OF/VI (Owner Furnished, Vendor Installed). Coordinate access to site as required.

C. Owner will supply items indicated as OF/CI (Owner Furnished, Contractor Installed) for installation by Contractor. Coordinate installation.

1.4 OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent portions of the premises during the entire construction period.

B. Owner intends to occupy the Project upon Substantial Completion.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule the Work to accommodate Owner occupancy.

1.5 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others.
   3. Work by Owner.
   4. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Existing building spaces may not be used for storage.

E. Time Restrictions:
   1. Limit conduct of especially noisy, malodorous, and dusty exterior work to hours specified by Owner and in compliance with City regulations.

F. Utility Outages and Shutdown:

1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
2. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values.

B. Procedures for preparation and submittal of applications for progress payments.

C. Documentation of changes in Contract Sum and Contract Time.

D. Change procedures.

E. Correlation of Contractor submittals based on changes.

F. Procedures for preparation and submittal of application for final payment.

1.2 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Project record documents.

1.3 SCHEDULE OF VALUES

A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values per schedule defined in General Conditions, modified per Supplementary Conditions and as specified.

E. Identification: Include on Schedule of Values the following:
   1. Project name and location.
   2. Name of Architect.
   3. Architect's project number.
   4. Contractor's name and address.
   5. Date of Submittal.
   6. Name of subcontractor.
   7. Name of manufacturer or fabricator where applicable.
   8. Name of supplier where applicable.

F. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
   1. Include Change Order amounts allocated to the line item.
   2. Include total dollar value of item. Round amounts to nearest dollar.
   3. Indicate percentage of Contract Sum represented by item, rounded to nearest one hundredth of one percent, adjusted to total 100 percent. The total of the amounts of all scheduled line items shall equal the Contract Sum.

G. Correlate line items with terms and identification used in other administrative work items, including schedules, list of subcontractors, list of products and suppliers, and submittal schedule.

H. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

I. Where Application For Payment includes requests for equipment, components or materials purchased, stored or fabricated, but not yet installed, provide separate line item in Schedule of Values for such items. Break down such items to include component, equipment, or material cost for each phase or sequence of construction, with associated staging, transport and installation cost.

J. Revise schedule to list approved Change Orders and Construction Change Directives, with each Application For Payment.

K. The amounts shown on Schedule of Values may be used by Owner to determine the true value for additive or deductive change orders.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Applications for Progress Payments as follows:
1. Submit initial rough draft of payment application to Architect and Owner for review.
2. Architect will return initial rough draft of payment application to Contractor following review.
3. Submit adjusted payment application to Architect.

E. For each item, provide a column for listing each of the following:
1. Item Number.
2. Description of work.
3. Scheduled Values.
4. Previous Applications.
5. Work in Place under this Application.
6. Authorized Change Orders.
7. Total Completed to Date of Application.
8. Percentage of Completion.
9. Balance to Finish.
10. Retainage.

F. Complete every entry on the form, and execute notarized certification by signature of authorized officer. Incomplete applications will be returned without action.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed .
1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.

H. List each authorized Change Order and Construction Change Directive issued prior to the last day of the construction period covered by the application as a separate line item, listing Change Order or Construction Change Directive number and dollar amount as for an original item of Work.

I. Submit one electronic and three hard-copies of each Application for Payment unless agreed upon otherwise.

J. Include the following with the application:
1. Transmittal letter as specified for submittals in Section 01 30 00.
2. Construction progress schedule, revised and current as specified in Section 01 32 16.
3. Current construction photographs specified in Section 01 30 00.
4. Conditional lien releases for work covered by current application, and unconditional releases for work covered by previous month's billings.
5. Project record documents as specified in Section 01 78 00, for review by Owner which will be returned to the Contractor.

K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.5 MODIFICATION PROCEDURES

A. General
1. Contractor shall establish measures as needed to assure familiarity of the Contractor’s staff and employees with procedures for processing changes to the Contract Documents.
2. The Contractor shall maintain and coordinate a Register of RFI’s, Architect's Supplemental Instructions, Contractor Change Order Requests, Construction Change Directives, and

Change Orders at the job site, accurately reflecting current status of all pertinent data as submitted by the Contractor.

3. Architect will provide a single copy of all documents issued under this article for transmission to Contractor. Contractor shall prepare copies as required for distribution to subcontractors, suppliers and others at no cost to Owner.

B. Architect's Supplemental Instructions (ASI): The Architect will advise of minor changes in the Work that do not involve an adjustment to Contract Sum or Contract Time by issuing supplemental instructions on AIA Form G710 or other Architect-issued document.
   1. If Contractor considers the minor change does represent a change in the Contract, Contractor shall immediately notify the Architect of Contractor's intention to make a claim.

C. Proposal Request (PR): The Architect may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised drawings and specifications.
   1. Analyze the described change and its impact on costs and time. Submit response within 10 days. If accepted by Owner, Architect will prepare Change Order.
   2. When requested, meet with the Architect as required to explain costs and, when appropriate, determine other acceptable ways to achieve the desired objective.
   3. Alert pertinent personnel and subcontractors as to the impending change and, to the maximum extent possible, avoid such work as would increase the Owner’s cost for making the change, advising the Architect in writing when such avoidance no longer is practicable.
   4. Following review, and if accepted by Owner, Architect will prepare Change Order.

D. Change Order Request (COR):
   1. Contractor may submit a COR to the Architect for changes in conditions, Owner changes, or other direction from the Architect, jurisdictional authority or Owner's Inspector.
   2. Document the proposed change and its complete impact, including its effect on the cost and schedule of the work.
   3. Present total cost and schedule impacts in documentation, including all markups permitted by General Conditions. Provide detailed substantiating documentation as required by Architect, including supplier costs, subcontractor labor time and rates, and all other data deemed necessary by Architect for Owner’s and Architect’s review of COR.
   4. Following final review by Architect and Owner of original and supplemental information, and if COR is accepted, no additional cost or schedule adjustments will be included.
   5. Architect will review COR. If accepted, Architect will prepare a Change Order or Construction Change Directive.

E. Change Order (CO): Change Orders and Construction Change Directives will be issued by the Architect in accordance with procedures established in General Conditions.
   1. Execution of Change Orders: Architect will issue Change Orders for signatures of Owner, Architect, and Contractor as provided in the General Conditions of the Contract.

F. Construction Change Directives (CCD): CCD's will be issued by the Architect in those cases where contract cost or time for the modification is in dispute..
   1. Construction Change Directive Forms: AIA G714 Construction Change Directive Form, current edition, or other format as selected by Architect.
   2. Execution of Construction Change Directive: Architect will issue CCD with Owner's signature. Proceed with work as defined by CCD.
   3. Unless otherwise agreed, maintain detailed records of work done under the direction of a CCD on Time and Material basis. Provide full information required to substantiate costs for changes in the Work.
   4. Following agreement on cost of the work, a Change Order will be prepared.

G. Substantiation of Costs: Provide full information required for evaluation.
   1. Provide the following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.

2. Support each claim for additional costs with additional information:
   a. Origin and date of claim.
   b. Dates and times work was performed, and by whom.
   c. Time records and wage rates paid.
   d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
   a. No payment on Time and Materials basis will be made without signature of Owner's Inspector certifying time spent and materials used. Architect and Owner's Inspector shall establish documentation and reporting procedure for Time and Material certification.

H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

J. Promptly enter changes in Project Record Documents.

1.6 PAYMENT FOR CONTRACT DOCUMENT MODIFICATIONS

A. The Contractor shall compensate the Owner, by Owner-Contractor Contract adjustment, for the Architect reasonable costs to modify Contract Documents required by work not performed in accordance with approved Contract Documents.

1.7 OWNER'S INSPECTOR PAYMENT PROVISIONS

A. In the event Contractor's performance of the work activities requires the Owner's Inspector to work overtime, holidays or weekends, Inspector's cost shall be reimbursed by Contractor to Owner by deductive contract adjustment.

1.8 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01 70 00.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

A. Section 00 63 25 - Substitution Request Form: Required form for substitution requests.

B. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.

C. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

D. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Restrictions on emissions of indoor substitute products.

1.3 DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
   1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
      a. Unavailability.
      b. Regulatory changes.
   2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
      a. Substitution requests offering advantages solely to the Contractor will not be considered.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
      a. Consideration of whether a substituted product is equal to that specified will include all characteristics of the specified product, based on published data available from the specified manufacturer, whether listed in the specification or not.
      b. Where the substituted manufacturer's standard product is not equal to that specified, the substituted manufacturer shall provide custom or non-standard products, system components, fabrication, and configuration as necessary to comply with specified criteria, whether or not such criteria are the substituted manufacturers standard or stock item.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
   4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
   5. Waives claims for additional costs or time extension that may subsequently become apparent.
   6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
      a. The Contractor shall pay the Architect and its Consultants for all services rendered for drawings, calculations, review time, and/or agency plan check time for each substitution request.

b. Compensation shall be made by an adjustment to the Contract amount.
c. Compensation as agreed upon shall be paid by the Contractor regardless of whether the substitution is approved or rejected.
d. Review of substitutions shall proceed upon agreement and approval of fees.
e. Where required by authorities having jurisdiction, Contractor shall pay all plan check fees or fees required to obtain approval.

B. A Substitution Request for specified installer constitutes a representation that the submitter:
1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.

C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.

D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. Use form indicated in the Project Manual for this purpose or other agreed upon form. Contractor's Substitution Request documentation must include the following:
a. Project Information:
1) Official project name and number, and any additional required identifiers established in Contract Documents.
2) Owner's, Architect's, and Contractor's names.
b. Substitution Request Information:
1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
2) Indication of whether the substitution is for cause or convenience.
3) Issue date.
4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
5) Description of Substitution.
6) Reason why the specified item cannot be provided.
7) Differences between proposed substitution and specified item.
8) Description of how proposed substitution affects other parts of work.
(a) Include coordination information, including a list of changes or modifications needed to other parts of the work and to construction performed by the Owner and separate contractors, that will become necessary to accommodate the proposed substitution.
c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
1) Physical characteristics.
2) In-service performance.
3) Expected durability.
4) Visual effect.
5) Sustainable design features.
6) Warranties.
7) Other salient features and requirements.
8) Include, as appropriate or requested, the following types of documentation:
(a) Product Data:
(b) Samples.
(c) Certificates, test, reports or similar qualification data.
(d) Drawings, when required to show impact on adjacent construction elements.
d. Impact of Substitution:
1) Savings to Owner for accepting substitution.
2) Change to Contract Time due to accepting substitution.
(a) Include a statement indicating the substitution's effect on the Construction Progress Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.

E. Limit each request to a single proposed substitution item.
   1. Submit an electronic document, combining the request form with supporting data into single document.

F. Where substitution request is rejected, provide submittal for specified product within five days of receipt of notice rejection.

G. Where decision cannot be made within the time required for orderly and uninterrupted work progress, provide the specified product.

H. No product may be substituted without a prior submittal to and approval by the Architect.

I. Unauthorized and unapproved substitution of material shall be removed from the Site and replaced with specified material at no additional cost to the Owner.

J. A maximum of one substitution request shall be submitted for any one item.

K. Substitutions with material effect on the project will be submitted for approval of authorities having jurisdiction prior to fabrication or installation.

3.2 SUBSTITUTION PROCEDURES DURING BIDDING PHASE

A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.

3.3 SUBSTITUTION PROCEDURES AFTER BIDDING PHASE

A. Architect will consider requests for substitutions only within 90 days after date established in Notice to Proceed.

B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.

C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
   1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
   2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
   3. Bear the costs engendered by proposed substitution of:
      a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
      b. Other construction by Owner.
      c. Other unanticipated project considerations.

D. Substitutions will not be considered under one or more of the following circumstances:
   1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
   2. Without a separate written request.

3.4 RESOLUTION

A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

B. Architect will notify Contractor in writing of decision to accept or reject request.
   1. Architect's decision following review of proposed substitution will be noted on the submitted form.
   2. Consideration of whether a substituted product is equal to that specified is solely the decision of the Architect.

3.5 ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General administrative requirements.
B. Preconstruction meeting.
C. Progress meetings.
D. Progress photographs.
E. Submittals for review, information, and project closeout.
F. Number of copies of submittals.
G. Requests for Information (RFI) procedures.
H. Submittal procedures.
I. Deferred Approvals.

1.2 RELATED REQUIREMENTS

A. Section 01 32 16 - Construction Progress Schedule: Form, content, and administration of schedules.
B. Section 01 30 00.01 - Request for Information Form.
C. Section 01 60 00 - Product Requirements: General product requirements.
D. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
E. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Conform to requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
B. Make the following types of submittals to Architect:
   1. Requests for Information (RFI).
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Design data.
   6. Manufacturer's instructions and field reports.
   7. Applications for payment and change order requests.
   8. Progress schedules.
   9. Coordination drawings.
   10. Correction Punch List and Final Correction Punch List for Substantial Completion.
   11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

A. Schedule meeting after Notice of Award.
B. Attendance Required:
   1. Owner.
   2. Architect.

3. Contractor and major subcontractors, including assigned Superintendent and Foreman. Obtain Architect's prior approval of major subcontractors' attendance.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
4. Designation of personnel representing the parties to Contract, Owner and Architect.
5. Organizational structure of project and other project characteristics.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling, including coordination of work by others.
8. Use of premises by Owner and Contractor.
9. Owner's requirements and partial occupancy.
10. Construction facilities and controls provided by Owner.
11. Temporary utilities considerations.
12. Security and housekeeping procedures.
13. Procedures for testing.
14. Procedures for maintaining record documents.
15. Requirements for start-up of equipment.
16. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within five days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.2 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.
1. Contractor shall assign the same staff members to represent and act on behalf of the Contractor at all progress meetings.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required:
1. Contractor.
2. Owner.
3. Architect.
4. Special consultants.
5. Contractor's superintendent.
6. Major subcontractors and suppliers.
7. Others as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of RFIs log and status of responses.
7. Review of off-site fabrication and delivery schedules.
8. Maintenance of progress schedule.
9. Corrective measures to regain projected schedules.
10. Planned progress during succeeding work period.
11. Coordination of projected progress.
12. Maintenance of quality and work standards.
13. Effect of proposed changes on progress schedule and coordination.

14. Other business relating to work.

E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.
   1. Minutes shall record discussion, actions taken, and issues assigned to parties responsible for resolution.
   2. Published minutes will be accepted as properly stating the activities and decision of the Meeting unless they are challenged in writing prior to the next regularly scheduled Progress Meeting.
      a. Persons challenging published minutes are responsible to reproduce and distribute copies of challenge to all recipients of the particular minutes being challenged.
      b. Settle any challenges as priority items of 'old business' at the next regularly scheduled meeting.

3.3 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 32 16

3.4 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than 5 days maximum prior to submission of application for payment.

B. Photography Type: Digital; electronic files.

C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.

D. In addition to periodic, recurring views, take photographs of each of the following events:
   1. Structural framing in progress and upon completion.
   2. Final completion, minimum of ten (10) photos.

E. Take photographs as evidence of existing project conditions as follows:
   1. Interior views: Two.
   2. Exterior views: Three.

F. Views:
   1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
   2. Consult with Architect for instructions on views required.
   3. Provide factual presentation.
   4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

G. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification, including orientation.
   3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
   4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.5 REQUESTS FOR INFORMATION (RFI)

A. Definition: A request seeking one of the following:
   1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
   2. A resolution to an issue which has arisen due to field conditions and affects design intent.

B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
   1. Prepare a separate RFI for each specific item.
      a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers. RFIs submitted by subcontractors or suppliers will not be reviewed.
      b. Do not forward requests which solely require internal coordination between subcontractors.
   2. Prepare in a format and with content acceptable to Owner.
      a. Use form indicated in the Project Manual for this purpose or other agreed upon form.
   3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.

C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
   1. Include in each request Contractor's signature attesting to good faith effort to determine from the Contract Documents information requiring interpretation.
   2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
      a. Approval of submittals (use procedures specified elsewhere in this section).
      b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
      c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
      d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
   3. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
   4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response.
      a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.

D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
   1. Official Project name and number, and any additional required identifiers established in Contract Documents.
   2. Owner's, Architect's, and Contractor's names.
   3. Discrete and consecutive RFI number, and descriptive subject/title.
   4. Issue date, and requested reply date.
   5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
   6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
   7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.

E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
   1. Indicate current status of every RFI. Update log promptly and on a regular basis.
   2. Note dates of when each request is made, and when a response is received.
   3. Highlight items requiring priority or expedited response.

4. Highlight items for which a timely response has not been received to date.
5. Identify and include improper or frivolous RFIs.

G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 3:00 PM on Mondays through Thursdays will be considered as having been received on the following regular working day; RFIs received after 9:00 AM on Fridays will be considered as having been received on the following Monday at 8:00 AM.
   1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
   1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
   2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
   3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
   4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.6 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format.
   1. Submit at the same time as the preliminary schedule specified in Section - 01 32 16 - Construction Progress Schedule.
   2. Coordinate with Contractor's construction schedule and schedule of values.
   3. Format schedule to allow tracking of status of submittals throughout duration of construction.
   4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
   5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
      a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.7 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
      a. Using manufacturer's standard sample delivery system, submit two sets of samples of colors and finishes, textures, and patterns from the manufacturer's full range; include custom finish information if specified.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
   1. Architect's review of submittals shall not relieve Contractor of compliance with the Contract Documents, or of responsibility for deviations from Contract Documents.
   2. In review of submittals, Architect will not provide dimensions or elevations for field conditions, or for conditions available from a detailed review of documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. Include identification on each sample for verification, with full Project information.

E. After review, distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.8 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Sustainability certification related submittals and reports.
   3. Certificates.
      a. Certificates may be recent or based on previous test results, but must address current regulatory requirements and be acceptable to Architect.
   4. Test reports.
   5. Inspection reports.
   6. Manufacturer's instructions.
   7. Manufacturer's field reports.
   8. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.9 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in conformance to requirements of Section 01 78 00 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.10 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect. If a quantity is not specified in an individual section, submit the number required for Contractor's use, plus one for Architect and one for Owner. Architect will not review more than six samples.
   1. Retained samples will not be returned to Contractor unless specifically so stated.

3.11 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Maintain a complete and current submittal log, indicating status of all submittals and re-submittals. Provide summary of submittal status at pay request meeting.
   2. Use a single transmittal for related items in a specification section.
   3. Do not combine data from more than one specification section or drawing component into a single submittal. Such submittals will be returned without action for re-submittal in the proper form.
   4. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
   5. Transmit using approved form.
   6. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.

7. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
8. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
9. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    a. Send submittals in electronic format via email to Architect, except deliver samples to Architect at business address.
    b. Upload submittals in electronic form to Electronic Document Submittal Service website when this type of service is used.
10. Schedule submittals to expedite the Project, and coordinate submission of related items.
    a. Failure to make timely submittals will not be a reason for extension of Contract time.
    b. Where no time period for submittals is established, provide submittals no later than the midpoint between notice of award and scheduled start date of the work related to the submittal. Where submittals are not submitted within specified limits, the Architect may delay certification of Payment Request until submittals are received.
        1) Asphalt Paving, including mix designs: No later than 14 days after Notice to Proceed.
        2) Concrete, including Mix Designs: Submit no later than 14 days after Notice to Proceed.
    c. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
    d. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
11. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
    a. Clearly identify, with bold clouding or other graphic notation, all deviations from Contract Documents. Provide boxed note at clouded deviation specifically requesting approval of proposed change. Provide documentation of proposed change, including additional graphics and data as requested by Architect.
12. Provide space for Contractor and Architect review stamps.
13. When revised for resubmission, identify all changes made since previous submission.
14. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
15. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
16. Submittals not requested will be recognized, and will be returned "Not Reviewed",

B. Product Data Procedures:
1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Do not submit (Material) Safety Data Sheets for materials or products.
4. Proposed Products: Mark each copy to identify applicable products, models, options, and other data. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate. Supplement manufacturer's standard data to provide information unique to this Project. Mark out items that are not applicable to the project.
    a. Where specified in individual sections, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number for each product and supporting product data.
    b. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
5. Identify conflicts between manufacturer's instructions and Contract Documents.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
2. Do not reproduce the Contract Documents to create shop drawings.
3. Electronic Documents for Contractor's Use:
   a. At Architect's sole discretion, Architect will provide a file containing selected electronic backgrounds for Contractor's use in shop drawing preparation.
   b. Contractor shall sign Architect-provided release form regarding such electronic file information.
   c. Electronic files will be provided in AutoCAD format, in the Architect's current version, as background views only, without dimensions, doors, notes, or similar information. No seals, title blocks, or other approval stamps will be included on backgrounds.
   d. Unless otherwise established, and at Architect's sole discretion, only plan and sections views of architectural, structural, mechanical, and electrical documents will be provided. Under no circumstances will the complete project AutoCAD file be provided.
   e. The Architect will provide a single CD-based file or appropriate file transfer containing backgrounds for all disciplines for the Contractor's use. Contractor shall be responsible for distribution of background files to subcontractors and vendors.
   f. The Architect will prepare a cost for preparation of electronic file package. If the Contractor agrees to such cost, the cost will be processed as a deductive change order to the contract.
4. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:
1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

3.12 SUBMITTAL REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.

D. Architect's and his consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
   a. "Approved", or language with same legal meaning.
   b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
   c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
      1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
2. Not Authorizing fabrication, delivery, and installation:
   a. "Revise and Resubmit".
      1) Resubmit revised item, with review notations acknowledged and incorporated.
      2) Non-responsive resubmittals may be rejected.
   b. "Rejected".
      1) Submit item complying with requirements of Contract Documents.

E. Architect's and his consultants' actions on items submitted for information:

1. Items for which no action was taken:
   a. "Received" - to notify the Contractor that the submittal has been received for record only.
2. Items for which action was taken:
   a. "Reviewed" - no further action is required from Contractor.

3.13 DEFERRED APPROVALS

A. Where shown on drawings and as specified in individual sections, submit documentation as required to obtain Authorities Having Jurisdiction approval of all deferred approval work.

B. Submit deferred approval documentation under the provisions of this section and as specified in the respective individual section.
   1. Submit documentaion bearing seal and signature of applicable responsible engineer licensed to practice in the State in which the Project is located. All structural deferred approvals shall be prepared by a Structural Engineer licensed to practice in the State in which the Project is located.
      a. Architect will review and mark with notation indicating that the deferred submittal documents have been reviewed and that they have been found to be in general conformance with the design of the project.
   2. Clearly identify all deviations and proposed alternates to materials and systems shown on drawings and specified in this Project Manual.
   3. Drawings: Produce drawings on substantial bond paper using media of archive quality. Indicate dimensional locations of the various parts of the construction, sizes and type of members, connections, attachments, and openings.
   4. Specifications: Provide specifications in an approved format illustrating materials and systems proposed for use in design.
   5. Structural Calculations: Where required, produce calculations in booklet form, 8-1/2 x 11 inch size, minimum of three wet signed and sealed copies.
   6. Provide sufficient information with respect to design criteria, analysis methodology and material capacity to adequately evaluate documentation for compliance with applicable sections of applicable code.

C. Deferred Approval Submittal Procedure:
   1. Submit completed documentation in accordance with scheduling criteria where defined in contract documents.
   2. The documents will be reviewed by Architect for consistency with specified criteria. If necessary, Architect will return submittal to Contractor for corrections. Any corrections, if any, shall be made by Contractor and returned to Architect within seven days.
   3. No contract time extensions will be granted for document modification caused by nonconformance with specified criteria.

D. Samples: Provide samples as specified in each Section.

E. Manufacturer's Data: Provide descriptive data on all accessory items and operation.

F. Installation Data: Submit descriptive data on installation procedures.

END OF SECTION

SECTION 01 30 00.01 - REQUEST FOR INFORMATION FORM

CONTRACTOR: _____ **REQUEST NO.:** _____
TO: CGA, ATTN: _____ **SECTION:** _____

Disciplines Impacted: [ ] Structural [ ] Mechanical [ ] Electrical [ ] Architectural
[ ] Civil [ ] Landscape [ ] Foodservice [ ] _____
Reference: Drawing(s) _____ Spec Section(s) _____ Other _____

Please clarify or provide the following information:

Possible Cost Impact: [ ] Increase [ ] Decrease [ ] No Change [ ] Unknown
Possible Time Impact: [ ] Increase [ ] Decrease [ ] No Change [ ] Unknown

This information is required as soon as possible, but no later than _____

[ ] Priority Attention Required

_____ Copies to: _____
Contractor's Representative

Architect's Response: Date: _____

_____ Copies to: _____
Cuningham Group Representative

END OF SECTION

SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, with network analysis diagrams and reports.

C. Short Interval Schedules.

1.2 REFERENCE STANDARDS

A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.

B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; O'Brien; 2006.

1.3 SUBMITTALS

A. Within 30 days after date established in Notice to Proceed, submit preliminary schedule.

B. If preliminary schedule requires revision after review, submit revised schedule within five days after joint review.

C. Submit updated schedule every 30 days.

D. Submit Short Interval Schedule at each construction progress meeting

E. Final CPM Schedule at Completion of Contract: At the completion of the contract and prior to the release of any bonds or final payment by the Owner, the Contractor shall submit to the Owner, with copy to the Architect for approval, a final CPM schedule, showing the actual job history.

1.4 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.5 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: 24 x 36 inches .

C. Sheet Size: Multiples of 8-1/2 x 11 inches.

D. Scale and Spacing: To allow for notations and revisions.

1.6 EARLY COMPLETION OF PROJECT

A. In the event the Contractor wishes to complete work earlier than the specified contract completion date, and the Owner and/or Architect approve such earlier completion, the following conditions apply:
   1. The contract completion date shall not be amended by the Owner's approval of Contractor's proposed earlier completion date.
   2. Contractor shall not, under any circumstances, receive additional compensation from the Owner for indirect, general, administrative or other forms of overhead costs, for the period between the time or earlier completion proposed by the Contractor and the official contract completion date.

1.7 TIME EXTENSION REQUESTS

A. The monthly Updated construction schedules submitted by the Contractor shall not show a completion date later than the Contract Time, subject to any time extensions granted by the Owner.

B. If the Contractor believes that it is entitled to an extension of the Contract Time due to a Change Order of delay/disruption, the Contractor, within ten (10) workdays of the qualifying event(s), shall submit:
   1. A Time Extension Request notification letter with a detailed narrative justifying the time extension requested;
   2. Fragmentary Network (Fragnet) Analysis of the delay impact, identifying all schedule activities that are impacted by the subject occurrence;
   3. Tabular report of the qualifying update of the CPM schedule the analysis is based on; and
   4. A schedule analysis entitled "Time Extension Request Schedule" that incorporates the findings of the Fragnet analysis into the latest (qualifying) update of the CPM schedule;
   5. The Fragnet and time extension request schedules shall be time scaled, utilizing a computer generated network analysis unless otherwise approved by the Owner.

C. The time extension request shall forecast the adjusted project completion date and impact to any intermediate milestones.

D. Float is not for the exclusive use or benefit of either the Owner or Contractor. Contract time extensions shall be granted only to the extent the equitable time adjustments to the activity or activities affected by a change order of delay/disruption exceed the total float of a critical activity (or path) and extend the Contract Completion Date.

E. When Contractor does not submit a Time Extension Request within ten working days, it is mutually agreed that the particular Change Order (including Proposed Change Order) or delay/disruption does not impact the construction schedule and hence no time extension is due to the Contractor.

F. The Owner shall not have any obligation to consider any time extension request unless the requirements of the contract documents are complied with. The Owner shall not be responsible or liable to the Contractor for any constructive acceleration due to failure of the Owner to grant time extensions under the terms of this contract, should Contractor fail to comply with the time extension submission and justification requirements stated herein.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a preliminary network diagram.

3.2 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Identify work of separate stages and other logically grouped activities.

D. Provide sub-schedules to define critical portions of the entire schedule.

E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

G. Indicate delivery dates for owner-furnished products.

H. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.

I. Provide legend for symbols and abbreviations used.

3.3 NETWORK ANALYSIS

A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.

B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.

C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description and area of work.
   3. Estimated duration of activity, in maximum 20 day intervals. Exception: Fabrication and procurement activities and other activities approved by Owner.
      a. Activity durations shall be the total number of actual days required to perform the work, including consideration of weather impacts.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
      a. Float time is defined as the amount of time between the earliest start date and the latest start date of the earliest finish date and the latest finish date of a scheduled activity.
      b. Float time is not for the exclusive use or benefit of either the Contractor or the Owner. The Contractor acknowledges and agrees that actual delays affecting path of activities containing float, will not have any effect upon the Contract completion date, provided that the actual delay does not exceed the float time associated with those activities.
   11. Monetary value of activity, keyed to Schedule of Values (cost loading). Cost loading should cumulatively equal the Contract Sum. Mobilization, bond and insurance costs may be shown separately; however, general requirements costs, such as overhead and profit, shall be prorated through all activities.
   12. Percentage of activity completed.
   13. Responsibility.
      a. The Contractor shall identify the labor requirement anticipated to complete each work activity. The labor requirement shall be assigned to each schedule activity requiring resources using the resource management capabilities of the scheduling software. For activities involving a number of trades, a written summary of manpower allocation by trade shall be submitted with the schedule.

D. Codes: Activities shall be coded by Responsibility and Area of work. Area codes shall distinguish construction activities related to individual buildings or areas within buildings and site work.

E. Analysis Program: Capable of accepting revised completion dates, and recomputation of all dates and float.
   1. Contractor shall use Primavera Project Planner software version 5.0 or better or have the means of providing the Owner's Representative with files on CD-ROM Windows formatted floppy disks, in a form that can be completely restored into Primavera without requiring the use of a conversion program or utilizing other software.

F. Required Reports: List activities in sorts or groups:
   1. By preceding work item or event number from lowest to highest.
   2. By amount of float, then in order of early start.
   3. Contractor's periodic payment request sorted by Schedule of Values listings.
   4. Listing of basic input data that generates the report.
   5. Listing of activities on the critical path.

3.4 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Owner and Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within five days.

D. Upon acceptance by the Owner, the approved preliminary schedule will become the project Baseline Contract Schedule. The Baseline Schedule shall not be revised without written approval of the Owner.

E. The Owner shall have the right to withhold progress payments from the Contractor at its discretion if the Contractor fails to finalize and obtain approval for the Baseline Contract Schedule within the prescribed period.

F. Failure of the Contractor to incorporate all elements of work required for the performance of the contract or any inaccuracy in the Baseline Contract Schedule shall not excuse the Contractor from performing all work required for a completed project within the specified contract time period, notwithstanding the Owner's acceptance of the Baseline Contract Schedule.

3.5 UPDATING SCHEDULE

A. Submit updated schedules on a monthly basis. The schedule shall be submitted no later than five workdays from the status date.

B. Maintain schedules to record actual start and finish dates of completed activities. Updating the schedule to reflect actual progress shall not be considered to be a revision of the Schedule.

C. Indicate progress of each activity to date of revision, with projected completion date of each activity.

D. Update diagrams to graphically depict current status of Work, including estimated percentages of completion for each activity in progress.

E. Identify errors, if any, and activities modified since previous submittal, major changes in Work, and other identifiable changes.

F. Indicate changes required to maintain Date of Substantial Completion.

G. Submit reports required to support recommended changes.

H. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors. Reports shall also include:
   1. Bar chart showing the previous month's work and a projected three month "look-ahead" of the work. The data included on the bar chart shall consist of the activity number, activity description, early start and finish date, original duration, remaining duration, percent complete, resource units per day, and total float.

I. The Owner shall have the right to withhold progress payments from the Contractor at its discretion until the required monthly updates are submitted and approved.

J. If, during the process of schedule updating, it becomes apparent that the Construction Schedule no longer represents the actual prosecution and progress of the work, the Owner may require the Contractor to submit a revised schedule at no additional cost to the Owner. The Owner shall have the right to withhold progress payments from the Contractor at its discretion, if the Contractor fails to submit a timely, detailed and workable recovery schedule.

3.6 DISTRIBUTION OF SCHEDULE

A. Distribute digital and hard copies of preliminary and updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties in both published and native file formats.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

3.7 SHORT INTERVAL SCHEDULES

A. Short Interval Schedules (SIS) shall be submitted to the Owner Representative with copy to the Architect during construction progress meetings.

B. The SIS interval shall be three weeks and shall include the past week, the week submitted and the week thereafter; the SIS may be hand generated.

C. The SIS shall be based on the Contract Schedule and shall be in bar chart form. The SIS shall be in sufficient detail to evaluate the Contractor's performance in the preceding week and planned progress in upcoming weeks vis a vis the Contract Schedule and Updates thereof.

D. Following review and revisions as necessary, the SIS will be accepted by the Owner.

END OF SECTION

SECTION 01 35 53 - SECURITY PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Security measures including formal security program, entry control, personnel identification, and miscellaneous restrictions.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: use of premises and occupancy.

B. Section 01 50 00 - Temporary Facilities and Controls: Temporary lighting.

1.3 SECURITY PROGRAM

A. Protect Work and Owner's operations from theft, vandalism, and unauthorized entry.

B. Initiate program in coordination with Owner's existing security system at project mobilization.

C. Maintain program throughout construction period until Owner occupancy.

1.4 ENTRY CONTROL

A. Restrict entrance of persons and vehicles into Project site .

B. Allow entrance only to authorized persons with proper identification.

C. Maintain log of workers and visitors, make available to Owner on request.

D. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.5 PERSONNEL IDENTIFICATION

A. Provide identification badge to each person authorized to enter premises.

B. All Contractor's staff, subcontractors, and suppliers shall wear badges at all times. In addition, wear orange safety vests or other approved shirt design at all times.

C. Badge To Include: Personal photograph, name, assigned number, expiration date and employer.

D. Require return of badges at expiration of their employment on the Work.

1.6 RESTRICTIONS

A. Do not enter patient or staff rooms at any time without approval of staff.

B. All Contractor's staff, subcontractors, and suppliers shall avoid interaction, contact, and communication with staff and patients. Under no circumstances shall Contractor's staff, subcontractors, and suppliers be in contact with the aforementioned without Owner staff present.

C. All work, including work of subcontractors, shall be conducted under the observation of the Contractor’s supervisory personnel.

D. Remove all radio or other music-generating devices operated sufficiently loud so as to be objectionable, as determined solely by the Owner or Owner’s operations.

E. Dogs and other pets are not permitted on site.

F. No smoking or use of any tobacco products is permitted on Owner’s property.

G. All Contractor staff, subcontractors, and suppliers shall present a professional and civil manner to staff and the Public. Use of language or behavior judged offensive, obscene, or suggestive by the Owner is not permitted. Clothing that is suggestive, is marked with images that suggest or promote drug, alcohol, or tobacco use, or represents behavior judged offensive, obscene, or suggestive by the Owner is not permitted. Immediately remove from site any Contractor personnel exhibiting such behavior.

H. Persons under the influence of or engaged in the use of drugs or controlled substances shall be immediately removed from site.

I. Use of alcoholic beverages is prohibited on site. Persons under the influence of or engaged in the use of alcoholic beverages shall be immediately removed from site.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittals.
B. Quality assurance.
C. References and standards.
D. Testing and inspection agencies and services.
E. Control of installation.
F. Tolerances.
G. Manufacturers' field services.
H. Defect Assessment.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.
B. Section 01 42 16 - Definitions.
C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).
B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.
C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.
D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.
F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.
G. ICC/CBSC (CBC) - California Building Code; 2016.
H. CSI/CSC MF - Masterformat; 2014.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
    1. Include:
        a. Date issued.
        b. Project title and number.
        c. Name of inspector.
        d. Date and time of sampling or inspection.
        e. Identification of product and specifications section.
        f. Location in the Project.
        g. Type of test/inspection.

h. Date of test/inspection.
i. Results of test/inspection.
j. Conformance with Contract Documents.
k. When requested by Architect, provide interpretation of results.

2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit report in duplicate within five days of observation to Architect for information.
2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

G. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications:
1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

1.6 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
1. Unless the Contract Documents or applicable regulatory requirements include more stringent requirements, applicable reference 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. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.
1. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the Contractor to submit additional copies as necessary for use by others in the enforcement of requirements.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

1. 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 the requirements. Refer uncertainties to Architect for a decision before proceeding.

F. Referenced standards take precedence over standards that are not referenced but recognized in the construction industry as applicable.

G. Non-referenced standards are not directly applicable to the Work, except as a general requirement of whether the Work complies with recognized construction industry standards.

H. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

I. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the United States." Contact Architect regarding any questions regarding such abbreviations and acronyms.

1.7 PROJECT MANUAL AND SPECIFICATIONS

A. Format and structure
1. Specifications are organized into Divisions and Sections based on the CSI/CSC MF numbering system.
2. The sections are placed in the Project Manual in numeric sequence; however, this sequence is not complete and the Table of Contents of the specifications must be consulted to determine the total listing of sections.
3. The section title is not intended to limit the meaning or content of the section, nor to be fully descriptive of the requirements specified within the Section.
4. The organization of the specifications shall not control the division of the work among subcontractors or establish the extent of work to be performed by any trade.

B. Definitions
1. Related Work Described Elsewhere: The caption "Related Requirements," "Related Sections," or "Related Work Described Elsewhere" identifies some Sections of the Specifications which may involve work involving coordination or general relationships to the work of the Section at hand. The omission of a Section from "Related Requirements," "Related Sections," or ""Related Work Described Elsewhere" does not limit the Contractor's obligation to perform all portions of the Work with all appropriate and reasonable coordination.
2. Section Includes: The caption "Section Includes" or "Description" or "Summary" paragraph is intended to be a broad, general statement of the work covered by an individual section. The listing of principal items of work shall not be construed as an exhaustive or complete list.

C. Language
1. Specification Language and Intent: The words "the," "shall," "will," and "all" may be omitted in specification Sections. Where such words as "perform," "install," "erect," "test," or words of similar import are used, it shall be understood such words include the meaning of the phrase "the Contractor shall." The requirements indicated and specified apply to all work of the same kind, class, and type, even though the word "all" is not stated.
2. Specifications use certain conventions regarding style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are:
a. Language used in Specifications and other Contract. Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable to maintain the context of the Contract Document indicated.

b. Imperative and streamlined language is generally used in the Specifications. Requirements expressed in the imperative mode are to be performed by the Contractor. Subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
c. The words “shall be” are implied wherever a colon (:) is used within a sentence or phrase.

1.8 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing and inspection.
   1. Unless specified as the Owner's responsibility, all other testing, mix design preparation, and related quality control and certification requirements shall be paid by Contractor at no additional cost to Owner.
   2. All concrete mix design shall be prepared at Contractor's cost and in compliance with Section 03 30 00 - Cast-in-Place Concrete.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:
   1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740 as applicable.
   2. Inspection agency: Comply with requirements of authorities having jurisdiction.
   3. Laboratory: Authorized to operate in the State in which the Project is located and approved by Authorities Having Jurisdiction.
   4. Laboratory Staff: Maintain a full time registered Engineer or specialist, as applicable, on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.
   6. Welding Inspectors: Certified in accordance with AWS QC1 Standard for AWS Certification of Welding Inspectors.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.3 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Testing Agency Duties:
   1. Test samples of mixes submitted by Contractor.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   6. Perform additional tests and inspections required by Architect.
   7. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   7. Each signed and certified testing report shall be copied to the Owner, Architect, Structural Engineer, Contractor, and Inspector of Record.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.4 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and installation conditions as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect 30 days in advance of required observations.
   1. Observer subject to approval of Architect.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.5 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. The Owner reserves the right to reject materials and workmanship which are deemed defective or require correction.

C. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 41 00 - REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY OF REFERENCE STANDARDS

A. Perform all Work in accordance to the latest enforced Statutes, Ordinances, Laws, Rules, Codes, Regulations, Standards, and Lawful Orders of all Public Authorities Having Jurisdiction.

B. Regulatory requirements applicable to this project are the following:

C. California Occupational Safety and Health Regulations (Cal/OSHA), Title 8, Chapter 3.2, California Code of Regulations; current edition; as a work place.

D. City of Oceanside amendments to some or all of the following.

E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

F. CBSC/ICC (CFC) - California Fire Code (Part 9 of Title 24, California Code of Regulations); 2016.

G. CBSC/ICC (CBC) - California Building Code (Part 2 of Title 24, California Code of Regulations); 2016.

H. CBSC/IAPMO (CPC) - California Plumbing Code (Part 5 of Title 24, California Code of Regulations); 2016.

I. CBSC/IAPMO (CMC) - California Mechanical Code (Part 4 of Title 24, California Code of Regulations); 2016.

J. CBSC/NFPA (CEC) - California Electrical Code (Part 3 of Title 24, California Code of Regulations); 2016.

K. CBSC - California Energy Code (Part 6 of Title 24, California Code of Regulations); 2016.

L. CBSC - California Green Building Standards Code (Part 12 of Title 24, California Code of Regulations); 2016.

M. CBSC - California Referenced Standards Code (Part 12 of Title 24, California Code of Regulations); 2016.

N. County of San Diego Air Pollution Control District (SDAPCD) Rules and Regulations.

1.2 RELATED REQUIREMENTS

A. Section 01 40 00 - Quality Requirements.

1.3 QUALITY ASSURANCE

A. Designer Qualifications: Where delegated engineering design is to be performed under the construction contract provide the direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 42 16 - DEFINITIONS

PART 1 GENERAL

1.1 SUMMARY

A. This section supplements the definitions contained in the General Conditions.

B. Other definitions are included in individual specification sections.

1.2 DEFINITIONS

A. Approved: The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

B. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.

C. Experienced: The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

D. Furnish: To supply, deliver, unload, and inspect for damage.

E. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.

F. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.

G. Installer: An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.

H. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.

I. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.

J. Provide: To furnish and install.

K. Regulations: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

L. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 45 33 - CODE-REQUIRED SPECIAL INSPECTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Code-required special inspections.

B. Testing services incidental to special inspections.

C. Submittals.

D. Manufacturers' field services.

E. Fabricators' field services.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Section 01 40 00 - Quality Requirements.

C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.3 DEFINITIONS

A. Code or Building Code: City of Oceanside Amendments to the 2016 Edition of the California Building Code and, more specifically, Chapter 17 - Structural Test and Special Inspections, of same.

B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.

C. Special Inspection:

1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

1.4 REFERENCE STANDARDS

A. CBSC/ICC (CBC) - California Building Code; 2016.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency shall:

1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
2. Submit copy of report of testing agency facilities inspection made by NIST Construction Materials Reference testing agency during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
3. Submit certification that Special Inspection Agency is acceptable to AHJ.

C. Testing Agency Qualifications: Prior to the start of work, the Testing Agency shall:

1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
2. Submit copy of report of testing agency facilities inspection made by NIST Construction Materials Reference testing agency during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
3. Submit certification that Testing Agency is acceptable to AHJ.

D. Manufacturer's Qualification Statement: Manufacturer shall submit documentation of manufacturing capability and quality control procedures.

E. Fabricator's Qualification Statement: Fabricator shall submit documentation of fabrication facilities and methods as well as quality control procedures.

F. Special Inspection Reports: After each special inspection, Special Inspector shall promptly submit two copies of report; one to Architect and one to the AHJ.
   1. Include:
      a. Date issued.
      b. Project title and Cuningham Group Architecture, Inc. project number.
      c. AHJ Application number.
      d. Name of Special Inspector.
      e. Date and time of special inspection.
      f. Identification of product and Specifications section.
      g. Location in the Project.
      h. Type of special inspection.
      i. Date of special inspection.
      j. Results of special inspection.
      k. Conformance with Contract Documents.
   2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.

G. Fabricator Special Inspection Reports: After each special inspection of fabricated items at the Fabricator's facility, Special Inspector shall promptly submit two copies of report; one to Architect and one to AHJ.
   1. Include:
      a. Date issued.
      b. Project title and Cuningham Group Architecture, Inc. project number.
      c. AHJ Application number.
      d. Name of Special Inspector.
      e. Date and time of special inspection.
      f. Identification of fabricated item and Specifications section.
      g. Location in the Project.
      h. Results of special inspection.
      i. Verification of fabrication and quality control procedures.
      j. Conformance with Contract Documents.
      k. Conformance to referenced standard(s).

H. Test Reports: After each test or inspection, promptly submit two copies of report; one to Architect and one to AHJ.
   1. Include:
      a. Date issued.
      b. Project title and Cuningham Group Architecture, Inc.'s project number.
      c. AHJ Application number.
      d. Name of inspector.
      e. Date and time of sampling or inspection.
      f. Method of obtaining sample.
      g. Identification of product and Specifications section.
      h. Location in the Project.
      i. Type of test or inspection.
      j. Date of test or inspection.
      k. Results of test or inspection.
      l. Conformance with Contract Documents.
      m. Indicate samples taken but not tested.
   2. When requested by Architect, provide interpretation of results.

I. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Architect and AHJ, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect and AHJ.

J. Manufacturer's Field Reports: Submit reports to Architect and AHJ.
   1. Submit report in duplicate within 30 days of observation to Architect for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

K. Fabricator's Field Reports: Submit reports to Architect and AHJ.
   1. Submit report in duplicate within 30 days of observation to Architect for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.6 SPECIAL INSPECTION AGENCY

A. Owner or Architect will employ services of a Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by the building code.
   1. Unless specified as the Owner's responsibility, all other testing, mix design preparation, and related quality control and certification requirements shall be paid for by the Contractor at no additional cost to the Owner.
   2. The Contractor shall reimburse the Owner, through Contract adjustment, for inspection and testing costs caused by the following Contractor actions:
      a. All testing costs incurred after initial test established non-conformance with contract requirements.
      b. Inspection costs caused by Contractor's scheduling of work requiring inspections of less than 4 hours duration.
      c. Inspection costs caused by Contractor's failure to complete work requiring inspection within the scheduled duration period shown on Contractor's initial construction schedule.
      d. Inspection costs caused by Contractor's failure to order sufficient or required quantity of material.
      e. Inspection costs of items repaired following damage caused by Contractor.
      f. Inspection costs caused by Contractor's substitution of material, system or process, where such inspection and testing is required by the Architect, Owner or jurisdictional authority to demonstrate compliance with specified criteria.
      g. Inspection costs caused by Contractor's use of batch plant that does not comply with criteria waiving batch plant inspection.
      h. Inspection costs caused by Contractor's use of a supplier or subcontractor requiring inspection services to be performed at a location exceeding a 100 mile radius of project site.
      i. Inspection costs caused by Contractor's failure to complete work within normal hours and days, requiring overtime costs.

B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

C. Only local legally constituted public AHJ and the Owner or Owner's Representative shall be authorized to direct testing and inspection to determine compliance or noncompliance with the requirements of the Work.

1.7 TESTING AND INSPECTION AGENCIES

A. Owner may employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code.

B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.8 QUALITY ASSURANCE

A. Special Inspection Agency Qualifications:
   1. Independent firm specializing in performing testing and inspections of the type specified in this section.

B. Testing Agency Qualifications:
   1. Independent firm specializing in performing testing and inspections of the type specified in this section.

C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 SPECIAL INSPECTIONS, GENERAL

A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
   1. Continuous Special Inspection: Special Inspection Agency shall be present in the area where the work is being performed and observe the work at all times the work is in progress.
   2. Periodic Special Inspection: Special Inspection Agency shall be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

3.2 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

A. Special Inspection Agency shall:
   1. Verify samples submitted by Contractor comply with the referenced standards and the approved contract documents.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified reference standards.
   4. Ascertain compliance of materials and products with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-conformance of work or products.
   6. Perform additional tests and inspections required by Architect.
   7. Submit reports of all tests or inspections specified.

B. Limits on Special Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the work.

C. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

D. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.3 TESTING AGENCY DUTIES AND RESPONSIBILITIES

A. Testing Agency Duties:
   1. Test samples submitted by Contractor.

2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Architect and Contractor of observed irregularities or non-conformance of work or products.
6. Perform additional tests and inspections required by Architect.
7. Submit reports of all tests or inspections specified.

B. Limits on Testing or Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the work.

C. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

D. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.4 CONTRACTOR DUTIES AND RESPONSIBILITIES

A. Contractor Responsibilities, General:
1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
2. Cooperate with agency and testing agency personnel; provide access to the work, to manufacturers' facilities, and to fabricators' facilities.
3. Provide incidental labor and facilities:
a. To provide access to work to be tested or inspected.
b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
c. To facilitate tests or inspections.
d. To provide storage and curing of test samples.
4. Notify Architect and testing agency 24 hours prior to expected time for operations requiring testing or inspection services.
5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

B. Contractor Responsibilities, Seismic Force-Resisting Systems: Submit written statement of responsibility for each item listed to AHJ and Owner prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.

C. Contractor Responsibilities, Wind Force-Resisting Systems: Submit written statement of responsibility for each item listed to AHJ and Owner prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.

3.5 MANUFACTURERS' AND FABRICATORS' FIELD SERVICES

A. When specified in individual specification sections, require material suppliers, assembly fabricators, or product manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, to test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect 30 days in advance of required observations.
1. Observer subject to approval of Architect.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

END OF SECTION

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary utilities.
B. Temporary fire protection.
C. Temporary telecommunications services.
D. Temporary sanitary facilities.
E. Temporary Controls: Barriers, enclosures, and fencing.
F. Security requirements.
G. Vehicular access and parking.
H. Waste removal facilities and services.
I. Field offices.

1.2 RELATED REQUIREMENTS

A. Section 01 35 53 - Security Procedures

1.3 TEMPORARY UTILITIES

A. Owner will provide the following:
   1. Electrical power , consisting of connection to existing facilities.
      a. Exercise measures to conserve energy.
      b. Provide all required disconnects, overcurrent protection devices, branch circuits, power cords, and outlets as required for the Work.
      c. Where approved by Architect, permanent convenience outlets may be used during construction.
   2. Water supply, consisting of connection to existing facilities.
      a. Exercise measures to conserve water, including use of trigger-operated hoses.
      b. Use of on-site existing water service for potable drinking water is acceptable. Coordinate point of connection with Owner.
B. Provide and pay for all lighting, heating and cooling, and ventilation required for construction purposes.
   1. Provide all lighting required for safety and security of paths and areas affected by construction.
   2. Provide and maintain, at all times, temporary lighting and exit light/path devices in corridor areas as required by applicable codes.
   3. Maintain temperatures as required by occupational safety regulations.
   4. Owner will pay cost of energy used. Exercise measures to conserve energy.
C. Existing facilities may not be used.
D. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.4 TEMPORARY FIRE PROTECTION

A. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241 and CFC Section 3311; manage fire-prevention program.
   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   3. Develop and supervise an overall fire-prevention and -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.

4. 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.

1.5 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:
   1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer/photocopier with the following capabilities and functions: copying/scanning up to 11 by 17 inch size paper; scanning up to 300 dpi; exporting scans to PDF and email.
   2. Internet Connections: Minimum of one; DSL modem or faster.

1.6 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Provide two toilet facilities at site, one each for male and female employees, or as required for all Contractor and subcontractor forces on site, whichever is greater.

C. Locate toilet facilities as directed by Owner. Relocate when required.

D. Use of existing facilities is not permitted.

E. Maintain daily in clean and sanitary condition.

1.7 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
   1. When regulated by codes, such legal requirements for protection shall be considered as minimum requirements. Provide protective measures in excess of such minimum requirements as specified or required.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.8 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.9 SECURITY - SEE SECTION 01 35 53

1.10 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Maintain parking lots, drives and walkways free of dust, mud and debris when Owner takes beneficial occupancy of a portion of project prior to final completion.

F. Designated existing on-site roads may be used for construction traffic.

G. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

H. Existing parking areas designated by Owner may be used for construction parking.

I. Do not permit parking on adjacent public streets.

1.11 WASTE REMOVAL

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
   1. Use cleaning materials which do not create hazards to health or property and which will not damage surfaces. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
   2. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
   3. Schedule operations so that dust and other contaminants resulting from cleaning procedures or construction operations will not fall on wet or newly-coated surfaces.
   4. Provide watering, dust palliative admixture or other methods as required to minimize dust generation during work. Where required by Owner, provide dust screen netting at property line temporary fencing.

C. Provide containers with lids. Remove trash from site weekly.

D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

F. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

1.12 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

C. Furnish, install and maintain tool cribs, sheds and storage units for the Contractor's use as necessary for the proper execution of the work.
   1. Provide all necessary barricades, warning devices, and enclosures required to protect and direct visitors and staff around tool and equipment located in passageways and corridors.
   2. Return all small tools and secure in locked compartments or cribs at close of work day.
   3. Safe-off or lock all equipment and large tools. Disable from malicious or accidental start-up and operation.
   4. Storage facilities shall provide protection of all products from damage due to environmental conditions, abuse, or theft.

D. Comply with requirements of regulatory agencies having jurisdiction. Obtain and apply for permits required by governing authorities.

E. Locate offices as directed by Owner and as required to avoid interference with Work. Relocate temporary structures as required by job progress.

F. Maintain on site one copy of Project Record Documents, also called Record Job Set, as specified in Section 01 78 00 - Closeout Submittals. Stamp set "RECORD JOB SET - DO NOT REMOVE." During the course or construction, use this set to record actual revisions to the Work.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General product requirements.
B. Re-use of existing products.
C. Transportation, handling, storage and protection.
D. Product option requirements.
E. Substitution limitations.
F. Procedures for Owner-supplied products.
G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

A. Section 01 25 00 - Substitution Procedures: Substitutions made during and after the Bidding/Negotiation Phase.
B. Section 01 40 00 - Quality Requirements: Product quality monitoring.
C. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
D. Section 01 74 19 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting packaging and substitutions.

1.3 REFERENCE STANDARDS

A. 16 CFR 260.13 - Guides for the Use of Environmental Marketing Claims; Federal Trade Commission; Recycled Content; Current Edition.
B. C2C (DIR) - C2C Certified Products Registry; Cradle to Cradle Products Innovation Institute; www.c2ccertified.org/products/registry.
C. EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; 2012.
D. GreenScreen (LIST) - GreenScreen for Safer Chemicals List Translator; Clean Production Action; www.greenscreenchemicals.org.
E. GreenScreen (METH) - GreenScreen for Safer Chemicals Method v1.2; Clean Production Action; www.greenscreenchemicals.org.
F. HPDC (Tool) - Create an HPD On-Line Tool; Health Product Declaration Collaborative; http://www.hpd-collaborative.org/.
G. ISO 14025 - Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures; 2006.
H. ISO 14040 - Environmental management -- Life cycle assessment -- Principles and framework; 2006.
I. ISO 14044 - Environmental management -- Life cycle assessment -- Requirements and guidelines; 2006.
J. ISO 21930 - Sustainability in building construction -- Environmental declaration of building products; 2007.
K. NEMA MG 1 - Motors and Generators; 2014.
L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Notice to Proceed.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.5 QUALITY ASSURANCE

A. Cradle-to-Cradle Certified: End use product certified Cradle-to-Cradle v2 Basic or Cradle-to-Cradle v3 Bronze, minimum, as evidenced by C2C (DIR).

B. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
   1. Good: Product-specific; compliant with ISO 14044.
   2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
   3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
   4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.

C. GreenScreen Chemical Hazard Analysis: All ingredients of 100 parts-per-million or greater evaluated using GreenScreen (METH).
   1. Good: GreenScreen (LIST) evaluation to identify Benchmark 1 hazards; a Health Product Declaration includes this information.
   2. Better: GreenScreen Full Assessment.
   3. Best: GreenScreen Full Assessment by GreenScreen Licensed Profiler.
   4. Acceptable Evidence: GreenScreen report.

D. Health Product Declarations (HPD): Complete, published declaration with full disclosure of known hazards, prepared using HPDC (Tool); HPD's with "unknown" listed for any hazard will not be considered acceptable.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

D. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is prohibited unless explicitly indicated on the drawings on in the specifications.

2.2 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. DO NOT USE products having any of the following characteristics:
   1. Made using or containing CFC's or HCFC's.
   2. Made of wood from newly cut old growth timber.
   3. Containing lead, cadmium, asbestos.

C. Where all other criteria are met, Contractor shall give preference to products that:
   1. If used on interior, have lower emissions, as defined in Section 01 61 16.
   2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.
   3. Are extracted, harvested, and/or manufactured closer to the location of the project.
   4. Have longer documented life span under normal use.
   5. Result in less construction waste.
   6. Are made of recycled materials.
   7. Are Cradle-to-Cradle Certified.
   8. Have a published Environmental Product Declaration (EPD).
   9. Have a published Health Product Declaration (HPD).
   10. Have a published GreenScreen Chemical Hazard Analysis.

2.3 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Equals: Submit a request for substitution for any manufacturer not named. It is the Contractor's responsibility to demonstrate proposed substitution is equal to that specified. Products that are not deemed equal by the Architect will be rejected.

D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.4 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site unless directed otherwise; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

A. See Section 01 25 00 - Substitution Procedures.

3.2 OWNER-SUPPLIED PRODUCTS

A. See Section 01 10 00 - Summary for identification of Owner-supplied products.

B. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Do not store products directly on the ground.

J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 61 16 - VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements for VOC-Content-Restricted products.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Section 01 40 00 - Quality Requirements: Procedures for testing and certifications.

C. Section 01 60 00 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.3 DEFINITIONS

A. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Exterior paints and coatings.
   2. Exterior adhesives and sealants, including flooring adhesives.
   3. Wet-applied waterproofing.
   4. Other products when specifically stated in the specifications.

B. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

C. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.4 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).

C. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.

D. GreenSeal GS-36 - Commercial Adhesives; 2011.

E. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

G. County of San Diego Air Pollution Control District (SDAPCD) Rules and Regulations.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.6 QUALITY ASSURANCE

A. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.
      b. Published product data showing compliance with requirements.
      c. Certification by manufacturer that product complies with requirements.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.1 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
   2. Aerosol Adhesives: GreenSeal GS-36.
   3. Joint Sealants: SCAQMD 1168 Rule.
   4. Paints and Coatings: Each color; most stringent of the following:
      a. 40 CFR 59, Subpart D.
      b. SCAQMD 1113 Rule.
      c. CARB (SCM).
   5. Wet-Applied Waterproofing: Comply with requirements for paints and coatings.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.
B. Requirements for alterations work, including selective demolition.
C. Pre-installation meetings.
D. Cutting and patching.
E. Surveying for laying out the work.
F. Cleaning and protection.
G. Demonstration and instruction of Owner personnel.
H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
I. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
B. Section 01 30 00 - Administrative Requirements: Submittals procedures.
C. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
D. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
E. Section 01 50 00 - Temporary Facilities and Controls: Temporary interior partitions.
F. Section 01 74 19 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.
G. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
H. Section 01 79 00 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
I. Section 02 41 00 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.
J. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.
   2. Limitations on cutting structural members.

1.3 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.
C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.

2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate Contractor.
6. Include in request:
a. Identification of Project.
b. Location and description of affected work.
c. Necessity for cutting or alteration.
d. Description of proposed work and products to be used.
e. Alternatives to cutting and patching.
f. Effect on work of Owner or separate Contractor.
g. Written permission of affected separate Contractor.
h. Date and time work will be executed.

E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.5 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.
1. Minimum of two years of documented experience.

B. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

D. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.6 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
1. Minimize amount of bare soil exposed at one time.
2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.

H. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.7 COORDINATION

A. See Section 01 10 00 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
   1. All products shall be new, unless specifically noted otherwise.
   2. Do not use products containing asbestos or other hazardous materials.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

1. Locate and identify existing utility, service and irrigation system components affected by work of this contract. Review existing record drawings, conduct site investigations, contact Underground Service Alert and other qualified on-site cable/pipe/line locator services, and implement all other means necessary to define the location of underground systems.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of examination, preparation and installation procedures.
2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that established by Owner provided survey.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

H. Utilize recognized engineering survey practices.

I. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.

J. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
2. Grid or axis for structures.
3. Building foundation, column locations, ground floor elevations.

K. Periodically verify layouts by same means.

L. Maintain a complete and accurate log of control and survey work as it progresses.

M. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.5 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 in locations indicated on drawings.
   2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Advise Architect of any rotted wood, corroded metals, deteriorated masonry and concrete, or other deficiencies, damage or degradation in existing structure, including in plumbing, heating, ventilating, air conditioning, and electrical systems, and obtain direction for further action.
   2. Remove items indicated on drawings.
   3. Relocate items indicated on drawings.
   4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

D. Services (Including but not limited to Plumbing and Electrical): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Prior to beginning any cutting or patching affecting identified utilities, properly disconnect all water, gas and electrical power supply at appropriate disconnect locations. Obtain all necessary releases and approvals from serving utility companies.
      b. Prior to disconnect, obtain Owner's written acknowledgment that such system does not impact facilities or systems beyond the extent of this contract.
      c. Disable existing systems only to make switchovers and connections; minimize duration of outages.

d. See Section 01 10 00 for other limitations on outages and required notifications.
e. Provide temporary connections as required to maintain existing systems in service.

4. Verify that abandoned services serve only abandoned facilities.
5. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
6. Mark location of disconnected systems. Identify and indicate stub-out locations on Project Record Documents.

E. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.

F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
3. Where a change of plane of 1/4 inch or more occurs in existing work along the indicated Path of Travel, submit recommendation for providing a smooth transition for Architect review and request instructions.

G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

H. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

I. Clean existing systems and equipment.

J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

K. Do not begin new construction in alterations areas before demolition is complete.

L. Comply with all other applicable requirements of this section.

3.7 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.8 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.9 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Take all means required to prevent damage to project resulting from inclement weather, water, wind or other environmental impacts. Provide temporary coverings or enclosures as required for all roof and wall penetrations. Where condensation moisture, rain, or high winds is forecast or present, Contractor shall take all means to eliminate or prevent damage to the Work and to adjacent property, including covering unprotected surfaces, making all openings weathertight, removing loose materials, tools, or equipment from exposed locations, and removing or securing scaffolding.

C. Provide special protection where specified in individual specification sections.

D. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

E. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

F. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

G. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.

H. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

I. Prohibit traffic from landscaped areas.

J. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.10 DEMONSTRATION AND INSTRUCTION

A. See Section 01 79 00 - Demonstration and Training.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
B. Use only cleaning materials recommended by the manufacturers of the items being cleaned and comply with manufacturer's instructions for items being cleaned.
C. Use cleaning materials that are nonhazardous.
D. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
E. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
F. Wet wipe painted and prefinished surfaces. Do not leave residue or wipe marks.
G. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
H. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
I. Clean filters of operating equipment.
J. Clean debris from gutters, overflow drains, area drains, and drainage systems. Do not discharge volatile, harmful or dangerous materials into drainage systems.
K. Clean site; sweep paved areas, rake clean landscaped surfaces.
L. Clean all sealant joints and similar applications.
M. Remove asphalt and seal coat splatter from curb faces.
N. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Owner.
B. Accompany Owner's Representative on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's comprehensive list of items to be completed or corrected.
C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection. Submit written notice containing Contractor's Correction Punch List.
D. The Architect and Architect's Consultants will then conduct an inspection in order to determine the acceptance of work and identify remaining items to complete. The Architect will prepare a Punch List of such items and transmit to Contractor.
E. If Architect determines that punch list items remaining are sufficiently minor and that Owner can occupy work and use it for its intended purpose, then Architect will prepare a Certificate of Substantial Completion for Owner's signature. Owner will occupy building as specified in Section 01 10 00.
   1. If work is not substantially complete, Contractor shall continue construction until such time as project status justifies subsequent inspection. Costs incurred from subsequent inspections by Architect and Architect's Consultants shall be paid by Contractor through Owner-Contractor contract adjustment.
F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's final inspection.
H. Upon receipt of request for final inspection, Architect will perform a Final Inspection and recommend actions as defined by the General Conditions.

I. If Architect determines work is acceptable under the Contract Documents, Contractor shall submit Final Application for Payment and closeout submittals in accordance with the General Conditions.
   1. Contractor shall submit Final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

E. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

F. The following sources may be useful in developing the Waste Management Plan:
1. State of California's Department of Resources Recycling and Recovery (CalRecycle), at www.calrecycle.ca.gov/condemo/.
2. The Whole Building Design Guide Construction Waste Management Database: https://www.wbdg.org/tools/cwm.php.
3. City of Oceanside: www.ci.oceanside.ca.us/gov/water/services_programs/recycling/

G. Methods of trash/waste disposal that are not acceptable are:
1. Burning on the project site.
2. Burying on the project site.
3. Dumping or burying on other property, public or private.
4. Other illegal dumping or burying.
5. Incineration, either on- or off-site.

H. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: List of items to be salvaged from the existing building for relocation in project or for Owner.

B. Section 01 30 00 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. Section 01 50 00 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

D. Section 01 60 00 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

E. Section 01 70 00 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

F. Section 31 10 00 - Site Clearing: Handling and disposal of land clearing debris.

1.3 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Submit Waste Management Plan within 30 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.

C. Waste Management Plan: Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
      a. List each material proposed to be salvaged, reused, or recycled.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
   5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
   6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.

D. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
   1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
   2. Submit Report on a form acceptable to Owner.

3. Landfill Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
   c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
4. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
   c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
5. Material Reused on Project: Include the following information for each:
   a. Identification of material and how it was used in the project.
   b. Amount, in tons or cubic yards.
   c. Include weight tickets as evidence of quantity.
6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 2 PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

A. See Section 01 60 00 - Product Requirements for substitution submission procedures.

B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 60 00:
   1. Relative amount of waste produced, compared to specified product.
   2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
   3. Proposed disposal method for waste product.
   4. Markets for recycled waste product.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

A. See Section 01 10 00 for list of items to be salvaged from the existing building for relocation in project or for Owner.

B. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.

D. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.

E. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.
   4. Job safety meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. As a minimum, provide:
      a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
      b. Separate dumpsters for each category of recyclable.
      c. Recycling bins at worker lunch area.
   2. Provide containers as required.
   3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
   4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
   5. Locate enclosures out of the way of construction traffic.
   6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
   8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 78 00 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Maintenance materials.

D. Warranties and bonds.

1.2 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Section 01 50 00 - Temporary Facilities and Controls: Record Job Set required to be maintained at field office.

C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.

D. Individual Product Sections: Specific requirements for operation and maintenance data.

E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit two copies of completed documents 15 days prior to final inspection. One copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 15 days after final inspection.

C. Maintenance Materials: Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

D. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Record Job Set: Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.

3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Neatly and accurately transfer data from Record Job Set specified above.
2. Measured depths of foundations in relation to finish first floor datum.
3. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
4. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
5. Field changes of dimension and detail.
6. Details not on original Contract drawings.

G. Sign and date Record Job Sets and Record Drawings, certifying that the information and data added is accurate and complete.

H. Record Drawings not complying with specified criteria shall be rejected.

I. Prior to Final Application for Payment, review Record Set with Architect and obtain approval of the scope of transfer. Following approval, submit Record Job Set and Record Set to Architect with Final Application for Payment.

3.2 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.
2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports.

P. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants,Contractorand subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

J. Arrangement of Contents: Organize each volume in parts as follows:
   1. Project Directory.
   2. Table of Contents, of all volumes, and of this volume.
   3. Operation and Maintenance Data: Arranged by system, then by product category.
      a. Source data.
      b. Product data, shop drawings, and other submittals.
      c. Operation and maintenance data.
      d. Field quality control data.
      e. Photocopies of warranties and bonds.
   4. Design Data: To allow for addition of design data furnished by Architect or others, provide a tab labeled "Design Data" and provide a binder large enough to allow for insertion of at least 20 pages of typed text.

3.6 MAINTENANCE MATERIALS

A. Package in clearly labeled containers; identify manufacturer, product, pattern, color, lot number, date of manufacture, date of installation, and locations used.

B. Deliver to Project site as directed by Owner; obtain receipt prior to Application for Final Payment.

3.7 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Assemble all Manufacturer’s Warranties and Guarantees with the Owner named as the Beneficiary, including all extended Warranties.

C. Verify that documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Retain warranties and bonds until time specified for submittal.

F. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and nameb of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

A. Demonstration of products and systems where indicated in specific specification sections.

B. Training of Owner personnel in operation and maintenance is required for:
   1. Electrical systems and equipment.
   2. Landscape irrigation.
   3. Items specified in individual product Sections.

C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
   1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
   2. Finishes, including flooring, wall finishes, ceiling finishes.
   3. Fixtures and fittings.
   4. Items specified in individual product Sections.

1.2 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Operation and maintenance manuals.

B. Other Specification Sections: Additional requirements for demonstration and training.

1.3 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Architect for transmittal to Owner.
   2. Submit not less than four weeks prior to start of training.
   3. Revise and resubmit until acceptable.
   4. Provide an overall schedule showing all training sessions.
   5. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such a slides, hand-outs, etc.
      h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.
   2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
   3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:
   1. Identification of each training session, date, time, and duration.
   2. Sign-in sheet showing names and job titles of attendees.
   3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
   1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
   2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.

B. Demonstration may be combined with Owner personnel training if applicable.

C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.
   2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
   1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.2 TRAINING - GENERAL

A. Conduct training on-site unless otherwise indicated.

B. Owner will provide classroom and seating at no cost to Contractor.

C. Provide training in minimum two hour segments.

D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.

E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

F. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
   3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
   4. Provide hands-on training on all operational modes possible and preventive maintenance.
   5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
   6. Discuss common troubleshooting problems and solutions.
   7. Discuss any peculiarities of equipment installation or operation.

8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
9. Review recommended tools and spare parts inventory suggestions of manufacturers.
10. Review spare parts and tools required to be furnished by Contractor.
11. Review spare parts suppliers and sources and procurement procedures.

G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02 41 00 - DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Selective demolition of built site elements.

1.2 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

C. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.

E. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

F. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

G. Section 31 10 00 - Site Clearing: Vegetation and existing debris removal.

1.3 REFERENCE STANDARDS

A. California Occupational Safety and Health Regulations (Cal/OSHA), Title 8, Chapter 3.2, California Code of Regulations; current edition; as a work place.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Vegetation to be protected.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary and permanent placement of removed materials.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of three years of documented experience.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.1 SCOPE

A. Remove items as indicated and as required to accomplish new work.

B. Remove other items indicated, for salvage.

C. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with other requirements specified in Section 01 70 00.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.

E. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

F. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

G. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

H. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

I. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Unused underground piping may be abandoned in place, provided it is completely drained and capped; remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

C. Services (Including but not limited to Plumbing and Electrical): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. See Section 01 10 00 for other limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities before removal.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.5 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Construction Waste Management and Disposal.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 26 01 26 - ACCEPTANCE TESTING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 EQUIPMENT AND DEVICE TESTS

A. Perform all equipment and device testing after installation and prior to substantial completion or owner occupancy, allowing enough time for corrective action of all deficiencies.

B. Review manufacturer's installation instruction and confirm that equipment is installed in accordance with manufacturer's instructions.

C. Prior to performing tests confirm that the equipment is clean and free of construction debris and dust.

D. Phase Relationship Tests: Check connections to all new and existing three-phase equipment for proper phase relationship. Disconnect all devices which could be damaged by the application of voltage or reversed phase sequence.

E. Test the open/close or energize/de-energize operation of each switch, circuit breaker, contactor and other item of electrical control with the systems fully energized and operating. Each shall be tested three times. Test report shall include a list of equipment tested and the signed initials of the electricians performing the test on a device by device basis.

F. Test new electrical equipment Inspect and test entire electrical systems provided by this contract to verify equipment and controls are correctly operating.

1.3 SUBMITTALS

A. General
   1. Provide submittal information in accordance with Division 1 - General Requirements, Section 260500 - Common Work Results For Electrical and requirements described in this section.

B. Test Report
   1. The contractor shall maintain a written record of all tests and shall assemble and certify a final test report indicating all equipment tested and the results found for each. Any system, material, or workmanship which is found to have abnormal operation, shall be specifically identified.

1.4 QUALITY ASSURANCE

A. The contractor shall submit proof of company qualifications and personnel qualifications. Include resumes of recent experience (within the last three years) for the firm, engineers and technicians that will be assigned to the project. Include references with current phone numbers in the resume. The testing company shall have been regularly engaged in the testing of electrical materials, devices, installations, and systems for a minimum of five years.

B. Test Equipment: The contractor shall have a calibration program, and test instruments used shall be calibrated in accordance with NETA ATS. Provide a complete list of test equipment utilized in all of the testing. Include manufacturer, model number, current calibration date, next calibration date and age of equipment.

C. Testing, inspection, calibration and adjustments shall be performed by an engineering technician, certified by NETA or the National Institute in Engineering Technologies with a minimum of five years experience testing, calibrating electrical distribution and generation equipment, systems, and devices.

1.5 CLOSEOUT

A. Operational and Maintenance Manuals
   1. All approved submittal information
   2. Full test report in the O&M Manual
   3. Completed form for each item of equipment tested

B. One electronic version of the test report on CD and in the latest version of Microsoft Word.

C. Schedule of recommended testing frequency for all equipment tested under this contract

D. Testing company test stamps or stickers on all tested equipment. Indicate testing company name, testing date and expiration date.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. The contractor shall provide all apparatus and material required for testing. The contractor shall use installation tools and test equipment which are designed for the specific task and shall use this equipment per the manufacturer's instructions. All test equipment shall have current calibration certification by a third party calibration laboratory, and shall have a signed and dated calibration sticker affixed to the device. Calibration shall be traceable to the National Bureau of Standards and be less than 6 months since last calibration. Defective test equipment and installation tools shall not be used. Installation tools such as torque wrenches shall be calibration certified.

PART 3 - EXECUTION

3.1 ACCEPTANCE TESTS AND INSPECTIONS

A. The contractor shall perform acceptance tests and inspections. Test methods, procedures, and test values shall be performed and evaluated in accordance with NETA ATS, the manufacturer's recommendations, and as required by each applicable specification section. Equipment shall be placed in service only after completion of required tests and evaluation of the test results has been completed. The following testing shall be performed:

1.	Section 26 05 19	Low Voltage Electrical Power Conductors and Cables
2.	Section 26 05 26	Grounding and Bonding for Electrical Systems
3.		
4.	Section 26 27 26	Wiring Devices
5.		

3.2 SCHEDULE

A. Perform all testing after installation and before energizing. All primary systems shall pass tests prior to placing in service. Notify Architect 10 working days prior to performance of any test.

3.3 TEST REPORTS

A. The contractor shall prepare test reports including description of project, description of equipment tested, description of test, test results, conclusions and recommendations, retesting results and list of test equipment used and calibration date.

B. One copy of each test report shall be delivered directly to the electrical engineer and Owner within 7 calendar days of the test.

C. Insert a copy of each test report in the operation and maintenance manuals.

3.4 RETESTING

A. Any fault in material or in any part of the installation revealed by these tests shall be investigated, replaced or repaired by the Contractor and the same test repeated at Contractor's expense until no fault appears.

3.5 LABELS

A. Upon completion of the tests, a label shall be attached to all serviced devices. These labels shall indicate date serviced and the testing company.

3.6 OBSERVATIONS BY ENGINEER

A. Contractor shall remove and replace covers of electrical equipment, open manholes and remove/replace ceiling tiles to permit engineer to observe equipment and wiring provided. For

manholes: Furnish OSHA safety compliant equipment and personnel, including ventilation, safety harness, ladder and flashlight.

3.7 TROUBLESHOOTING

A. If a system or device provided under this contract does not operate per manufacturers specifications contractor shall provide qualified men with tools and test equipment to find and repair problem at contractor's expense.

3.8 SYSTEM ACCEPTANCE

A. Final acceptance of the system is contingent upon satisfactory completion of acceptance tests and inspections.

END OF SECTION

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes general electrical requirements for all Division 26 work and is supplemental and in addition to the requirements of Division 1.

B. It is the intention of this Division of the Specifications and the Contract Drawings to describe and provide for the furnishing, installing, testing and placing in satisfactory and fully operational condition all equipment, materials, devices and necessary appurtenances to provide a complete electrical system. Provide all materials, appliances and apparatus not specifically mentioned herein or shown on the drawings, but which are necessary to make a complete, fully operational installation of all electrical systems shown on the contract drawings or described herein. Connect equipment and devices furnished and installed under other Divisions of this specification (or the Owner) under this Division.

C. Workmanship shall be of the best quality and competent and experienced electricians shall be employed and shall be under the supervision of a competent and experienced foreman.

D. The drawings and specifications are complimentary and what is called for (or shown) in either is required to be provided as if called for in both.

1.3 WORK IN OTHER DIVISIONS

A. See all other specifications for other work which includes but is not limited to:
   1. Cutting and Patching
   2. Electronic Safety and Security
   3. Equipment Wiring

1.4 CODES, PERMITS, INSPECTION FEES

A. The following codes and standards are referenced in the Division 26 specifications. Perform all work and provide materials and equipment in accordance with the latest referenced codes and standards of the following organizations:
   1. American National Standards Institute (ANSI)
   2. National Electrical Manufacturer's Association (NEMA)
   3. National Fire Protection Association (NFPA)
   4. Underwriter's Laboratories (UL)

B. Install the electrical systems based on the following:

NFPA 70	National Electrical Code as adopted and amended by the Local Jurisdiction.
IBC	International Building Code as adopted and amended by the Local Jurisdiction.

C. The referenced codes establish a minimum level of requirements. Where provision of the various codes conflict with each other, the more stringent provision shall govern. If any conflict occurs between referenced codes and this specification, the codes are to govern. Compliance with code requirements shall not be construed as relieving the Contractor from complying with any requirements of the drawings or specifications which may be in excess of requirements of the governing codes and rules and not contrary to same.

D. Arrange for inspection of work by the inspectors and give the inspectors all necessary assistance in their work of inspection.

1.5 COORDINATION

A. Coordinate work with that of the other Contractors and/or other trades doing work on the projectObtain submittals and shop drawings of all equipment with electrical connections furnished under other divisions of the specification and by the Owner. Provide all wiring in accordance with specific equipment requirements. Immediately advise the Architect of any changes which may affect the contract price.

B. Special attention is called to the following items. Coordinate all conflicts prior to installation:
1. Door swings such that switches will be located on the "strike" side of the door.
2. Location of grilles, pipes, sprinkler heads, ducts and other mechanical equipment so that all electrical outlets, lighting fixtures and other electrical outlets and equipment are clear from and in proper relation to these items.
3. Location of cabinets, counters and doors so that electrical outlets, lighting fixtures and equipment are clear from and in proper relation to these items.
4. Recessing and concealing electrical materials in CMU walls, concrete construction and precast construction.
5. At each switchboard, panelboard and motor control center location the Contractor shall monitor the work of all trades to assure that the space and clearance requirements of code are met.

C. Furnish, install and place in satisfactory condition all raceways, boxes, conductors and connections and all other materials required for the electrical systems shown or noted in the contract documents to be complete, fully operational and fully tested upon completion of the project. Raceways, boxes and ground connections are shown diagrammatically only and indicate the general character and approximate location. The layout does not necessarily show the total number of raceways or boxes for the circuits required, nor are the locations of indicated runs intended to show the actual routing of the raceways.Consult the architectural drawings for the exact height and location of all electrical equipment not specified herein or shown on the drawings. Make any minor changes (less than 6'-6" horizontal) in the location of the raceways, outlets, boxes, devices, wiring, etc., from those shown on the drawings without extra charge, where coordination requires or if so directed by the Architect before rough-in.

D. Provide inserts or sleeves for outlet boxes, conductors, cables and/or raceways as required. Coordinate the installation thereof with other trades.

1.6 WARRANTY

A. Refer to General Conditions of the Contract.

B. Within one year after the date of Substantial Completion of the work, the Contractor shall correct any work found to be not in conformance with the Contract Documents promptly after written notice from the owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. This obligation shall survive acceptance of the work under this Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

1.7 SUBMITTALS AND SHOP DRAWINGS

A. Submittals and Shop Drawings: Schedule so as not to delay construction schedule and no later than 60 days after award of contract, submit common brochure(s) with index and divider tabs by specification section, containing all required catalog cuts. Allow two weeks for review for each submittal and resubmittal. Incomplete submittals and shop drawings which do not comply with these requirements will be returned for correction, revision and resubmittal. See General Conditions for format, quantity, etc.

B. Submit in a three ring binder with hardboard covers. Submittals shall show:
   1. Indicate listing by UL or other approved testing agency.
   2. Highlight with yellow or blue marker adequate information to demonstrate materials being submitted fully comply with contract documents.
   3. Review and check all material prior to submittal and stamp "Reviewed and Approved".

C. Shop drawings shall show:
   1. Ratings of items and systems.
   2. How the components of an item or system are assembled, interconnected, function together and how they will be installed on the project.
   3. System layout floor plans with complete device layout, point-to-point wiring connection between all components of the system, wire sizes and color coding.
   4. Coordinate with other division shop drawings and submittals. Identify interface points and indicate method of connection.

D. The Contractor agrees:
   1. Submittals and shop drawings processed by the Architect are not change orders.
   2. The purpose of submittals and shop drawings by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept.
   3. Submittals demonstrate equipment and material Contractor intends to furnish and install and indicate detailing fabrication and installation methods Contractor intends to use.
   4. To accept all responsibility for assuring that all materials furnished under this Division of the specifications meet, in full, all requirements of the contract documents.

E. The Engineer's review is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Corrections or comments made during this review do not relieve contractor from compliance with the requirements of the drawings and specifications. Contractor is responsible for: Dimensions which shall be confirmed and correlated at the job site; fabrication process and techniques of construction; coordination of his work with that of all other trades; performing his work in a safe and satisfactory manner.

F. Submittals and shop drawings are required per the submittals schedule at the end of this Section.

1.8 PROJECT CLOSE-OUT

A. Coordinate with close-out provisions in Division 01 - General Requirements.

1.9 ELECTRICAL EQUIPMENT OPERATION AND MAINTENANCE (O&M) MANUALS

A. Provide O&M manuals required in Division 01 - General Requirements plus one manual for Sparling for all equipment furnished under Division 26 - Electrical of the specifications. Submit a preliminary copy, complete except for the bound cover, 60 days prior to completion of the project for checking and review. Deliver final bound corrected copies as noted in Division 1 - General Requirements plus a copy to Stantec 20 days prior to scheduled instruction periods. Obtain a receipt for the manuals and forward a copy of the receipt to the Engineer with the Job Completion Form.

B. The information included must be the exact equipment installed. Where sheets show the equipment installed and other equipment, the installed equipment shall be neatly and clearly identified on such sheets.
   1. These O&M manuals shall contain all the information needed to operate and maintain all systems and equipment provided in the project. Present and arrange information in a logical manner for efficient use by the Owner's operating personnel. Equipment manufacturer, make, model number, size, nameplate data, etc.
   2. Description of system configuration and operation including component identification and interrelations. A master control schematic drawings(s) may be required for this purpose.
   3. Dimensional and performance data for specific unit provided as appropriate.
   4. Manufacturer's recommended operation instructions.
   5. Manufacturer's recommended lubrication and servicing data including frequency.
   6. Complete parts list including reordering information, recommended spares and anticipated useful life (if appropriate). Parts lists shall give full ordering information assigned by the original parts manufacturer. Relabeled and/or renumbered parts information as reassigned by equipment supplier not acceptable.
   7. Shop drawings.
   8. Wiring diagrams.
   9. Signal equipment submittals shall contain step-by-step circuit description information designed to acquaint maintenance personnel with equipment operation in each mode of operation.
   10. A complete list of local (nearest) manufacturer representative and distributor contacts for each type of equipment and manufacturer. Include name, company, address, phone, fax, e-mail address, and web site.

C. Furnish complete wiring diagrams for each system for the specific system installed under the contract. "Typical" line diagrams will not be acceptable unless revised to indicate the exact field installation.

D. Group the information contained in the manuals in an orderly arrangement by specification index. Provide a typewritten index and divider sheets between categories with identifying tabs. Bind the completed manuals with hard board covers not exceeding 5" thick. (Provide two or more volumes if required.) Signal and communication systems shall be in separate volumes. Imprint the covers with the name of the job, Owner, Architect, Electrical Engineer, Contractor and year of completion. Imprint the back edge with the name of the job, Owner and year of completion. Hard board covers and literature contained may be held together with screw post binding.

1.10 INSTRUCTION PERIODS

A. After substantial completion of the work and 20 days after the O&M manuals have been delivered to the owner and after all tests and final inspection of the work by the Authority(s) Having Jurisdiction; demonstrate the electrical systems and instruct the Owner's designated operating and maintenance personnel in the operation and maintenance of the various electrical systems. The Contractor shall arrange scheduled instruction periods with the Owner. The Contractor's representatives shall be superintendents or foremen knowledgeable in each system and suppliers representatives when so specified.

B. Include in each instruction session an overview of the system, presentation of information in maintenance manuals with appropriate references to drawings. Conduct tours of the building areas with explanations of maintenance requirements, access methods, servicing and maintenance procedures, equipment cleaning procedures and adjustment locations.

C.

C. Factory trained suppliers representatives shall provide instruction for lighting control/dimming, power generation & transfer switches, paralleling low voltage switchgear, static uninterruptible power supply and transient voltage suppression system(s).

1.11 RECORD DRAWINGS

A. Continually record the actual electrical system(s) installation on a set of prints kept readily available at the project during construction. These prints shall be used for this purpose alone.
   1. Mark record prints with red erasable pencil. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown.
   2. Accurately locate with exact dimensions all underground and underslab raceways and stub-outs.
   3. Note changes of directions and locations, by dimensions and elevations, as utilities are actually installed.
   4. Include addenda items and revisions made during construction.
   5. Erase conditions not constructed or "X-out" and annotate "not constructed" to clearly convey the actual "as constructed" condition.
   6. Organize record drawings sheets in manageable sets, bind and print suitable titles, dates and other identification on the cover of each set.

1.12 ABBREVIATIONS AND DEFINITIONS

A. When the following abbreviations and definitions are used in relation to the work for Division 26 they shall have the following meanings:

Item	Meaning
AHJ	Authority Having Jurisdiction.
Boxes	Outlet, Junction or Pull Boxes.
Code	All applicable codes currently enforced at project location.
Compression	Compressed using a leverage powered (hydraulic or equivalent) crimping tool.
Connection	All materials and labor required for equipment to be fully operational.
Exterior Location	Outside of or penetrating the outer surfaces of the building weather protective membrane.
Fully Operational	Tested, approved, and operating to the satisfaction of the AHJ, manufacturer and contract documents.
Furnish	Deliver to the jobsite

Install	To enter permanently into the project and make fully operational.
Kcml	Thousand circular mils (formerly MCM).
Mfr.	Manufacturer.
NEC	National Electrical Code, National Fire Protection Association, Publication #70.
Noted	Shown or specified in the contract documents.
Provide	Furnish and install.
Required	As required by code, AHJ, contract documents, or manufacturer for the particular installation to be fully operational.
Shown	As indicated on the drawings or details.
Wiring	Raceway, conductors and connections.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials and equipment installed shall have been tested and listed by Underwriters Laboratories or other approved testing organization and shall be so labeled unless otherwise permitted by the Authority Having Jurisdiction (Inspector).

B. All materials to be new, free from defects and not less than quality herein specified. Materials shall be designated to insure satisfactory operation and operational life in the environmental conditions which will prevail where they are being installed.

C. Each type of materials furnished shall be of the same make, be standard products of manufacturers regularly engaged in production of such materials and be the manufacturer's latest standard design.

PART 3 - EXECUTION

3.1 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft. Handle all equipment carefully to prevent damage, breakage, denting, and scoring of finishes. Do not install damaged equipment.

B. Store products subject to damage by the elements above ground, undercover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instruction.

3.2 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire rated floor and wall assemblies to maintain fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 7 section "Firestopping".

3.3 EQUIPMENT CONNECTION

A. For equipment furnished under this or other Divisions of the specifications, or by owner, provide complete all electrical connections necessary to serve such equipment and provide required control connections to all equipment so that the equipment is fully operational upon completion of the project. Provide disconnect switch as required by code whenever an equipment connection is shown on the drawings.Investigate existing equipment to be relocated and provide new connections as required.

3.4 CLEAN UP

A. Contractor shall continually remove debris, cuttings, crates, cartons, etc., created by his work. Such clean up shall be done daily and at sufficient frequency to eliminate hazard to the public, other workmen, the building or the Owner's employees. Before acceptance of the installation, Contractor shall carefully clean cabinets, panels, lighting fixtures, wiring devices, cover plates, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces of apparatus shall be removed and new finish equal to the original applied.
   1. Wipe surfaces of electrical equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

3.5 Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent, high pressure sodium, metal halide, and mercury vapor fixtures to comply with requirements for new fixtures.TESTING AND DEMONSTRATION

A. Demonstrate that all electrical equipment operates as specified and in accordance with manufacturer's instructions. Perform tests in the presence of the Architect, Owner or Engineer. Provide all instruments, manufacturer's operating instructions and personnel required to conduct the tests. Repair or replace any electrical equipment that fails to operate as specified and or in accordance with manufacturer's requirements.

3.6 GENERAL POWER SYSTEM REQUIREMENTS

A. Existing suite service is a 400amp 480y/277v, 3phase 4 wire sytem.

B. Provide seismic supports for installation of electrical equipment including lighting fixtures, cable tray, conduits, and panelboards.

C. Circuit breakers shall be bolt-on type. Handle ties and dual, quad or tandem breakers are not acceptable. Mounting hardware, accessories, faceplates, enclosures, etc., shall be provided as required.

D. Safety switches shall be heavy duty 600 volt type, externally operated, quick-make, quick-break knife switches, fused or non-fused as required, number of poles and ampere rating. Fused switches shall have Class “R” rejection features. All safety switches shall have a U.L. listed short circuit withstand rating of 200,000 amperes RMS symmetrical. Switches in interior dry location shall have NEMA 1 enclosures. Switches in damp or exterior locations shall have NEMA 3R rain tight enclosures, as indicated. Switches shall be horsepower rated, handle lockable in the “off” position.

E. Fuses shall be installed so that the rating is clearly visible without removing fuse. Provide a spare fuse for each fuse installed.

F. Provide a nameplate on each disconnect switch.

G. Fuses shall be Class “RK” rejection type.

H. Fuses serving switch or circuit breaker distribution panels, lighting panel boards and other non-motor loads need not be time delay type, but shall be current limiting with the interrupting capacity of 200,000 amperes RMS symmetrical minimum.

I. 20 amp circuits shall be limited to a maximum of 1620 watts per 120V circuit, and 4100 watts per 277V circuit for lighting, and 7 receptacles per 20 amp circuits.

J. Provide 90min battery backup power for egress lights and exit signs.

K. Install equipment circuits to comply with characteristics of the equipment served.

L. Armored cable, type HCF or MC cable with ground wire are acceptable.

M. Conduit shall be galvanized, sherardized rigid conduit (GRS), steel, or E.M.T. Conduit shall be new and delivered to the job site in standard lengths. Provide insulated throat bushings on each end of conduit.

N. The metallic circuit from source to outlet must be continuous and of the lowest possible resistance. Bends and offsets shall present a neat, symmetrical appearance and shall be rigidly secured in place. Use threaded fittings for GRS conduit and compression type for EMT.

O. Fixture wire and wire running through fixture channels shall be Type RHW or THHN. All electrical supply shall be in walls or above ceiling.

P. Wire shall be copper type THHN in interior dry locations, THWN in damp/wet location, XHHW for underground feeders. Wire smaller than #8 AWG shall be solid and #8 AWG and above shall be stranded. User minimum #12 wire. All wire shall be new.

Q. Conduit for roof mounted equipment shall be run inside the equipment’s curb, and shall be GRS.

R. Conduit or boxes shall not be exposed except in Mechanical rooms. All junction boxes shall be identified as to what circuits are inside.

S. All electrical rough-ins shall be labeled with voltage, phase and capacity.

T. Wiring shall be color-coded per 210-4(d) of the NEC. A uniform system shall be utilized and documented at panels for future installation.

U. ‘P’ rated cable may be used for telephone and other low voltage systems in the plenum areas without conduit where permitted by Code.

V. The use of “MC Cable” in lieu of conduit for mechanical and branch wiring as permitted by Code is allowed. Use only MC cable with green ground wire.

W. All wiring devices and wall plates shall be specification grade, white in color.

X. Exterior receptacles shall be ground fault type and shall have weatherproof while in use covers.

3.7 GENERAL EMERGENCY POWER REQUIREMENTS

A. Provide 90min battery backup for egress lighting and exit signs.

3.8 GENERAL GROUNDING SYSTEM REQUIREMENTS

A. Grounding system shall consist of a UFER system with two (2) sets of 20' 4/0 copper in the foundation of the building with two (2) 4/0 connections to a ground bus located in the main electrical room. All equipment and transformers shall connect to this ground bus. Building steel and all piping systems shall be bonded to this ground bus within 5' of where service enters building.

3.9 GENERAL POWER LOCATION REQUIREMENTS

A.

B. Use minimum 4” SQ galvanized steel outlet boxes, 2 1/8” deep.

3.10 GENERAL LIGHTING REQUIREMENTS

A. Lighting levels will be in accordance with Illuminating Engineering Society of North America handbook recommendation and with Local, State and Federal Energy Codes.

3.11 GENERAL FIRE LIFE SAFETY REQUIREMENTS

A. Provide complete and operational fire alarm system per local Building and Fire Department Plan Check authorities. Installation shall conform to local and state NFPA requirements.

END OF SECTION

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SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Building wire and cable
2. Remote control and signal circuits
3. Splices, connectors, and terminations
4. Armored cable type AC and metal clad cable type MC

B. Substitutions: Substitute products will be considered only under the terms and conditions of Section 260500 - Common Work Results For Electrical.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM).

B. National Electrical Manufacturers Association (NEMA).

C. Underwriter’s Laboratories, Inc. (UL).

1.4 SUBMITTALS

A. Make submittals in accordance with Section 260500 - Common Work Results for Electrical. Submit product data for type AC and MC cables, connectors and manufacturer's recommended sheath cutting procedure including special tools.

PART 2 - PRODUCTS

2.1 WIRE AND CABLE

A. General

1. Copper conductor, single insulated wire.
2. ASTM B1 solid conductors; ASTM B8 for stranded conductors
3. 600 volt insulation class, 90°C maximum operating temperature for dry and wet locations

B. Thermoplastic Insulated Wires and Cables
Type THHN/THWN, UL 83 listed, comply with NEMA WC5.

C. Rubber Insulated Wires and Cables
Type XHHW-2, UL 44 listed, comply with NEMA WC3.
Type USE-2, UL 44 listed, comply with NEMA WC3.

2.2 REMOTE CONTROL AND SIGNAL CIRCUITS

A. Class 1
1. Copper conductor, single insulated wire
2. Insulation type THHN/ THWN (90°C), 600 volt insulation class
3. Type XHHW for ambient temperature less than 0°C
4. UL 83 listed, ASTM B1 solid conductors; ASTM B8 for stranded conductors

B. Class 2 and 3
1. Copper conductor, multiple twisted conductors covered with an overall non-metallic jacket unless otherwise noted
2. 300 volt XLPE insulation rated 105°C
3. UL listed for use in the space in which circuits will be installed

2.3 SPLICES, CONNECTORS & TERMINALS

A. Splices
1. Electrical Tape: 7 mil thick, PVC backing with flexibility and adhesion at 0°F.
2. Pre-Stretched Tubing: EPR pre-stretched tubular rubber sleeve suitable for insulation of voltages up to 600 volts. 3M PST series or equivalent.
3. Heat Shrink Tubing: Thermally stabilized cross-linked polyolefin with 3 to 1 expansion and internal adhesive sealant. Thomas & Betts Shrink-Kon, Raychem, or equivalent.
4. Resin Filled Insulators: Plastic mold body with pourable insulating and sealing compound. 3M Scotchcast 82 or 90 series or equivalent.

B. Connectors
1. No. 10 AWG and Smaller: Pre-insulated with integral spring, or WAGO style connectors with insulated housing per UL 486C. Manufacturers: Ideal, Thomas & Betts, or 3M
2. No 8 AWG and Larger: Bolt or compression set type per UL 486C. Provide two hole compression set connectors for ground bus applications. Manufacturers: Thomas & Betts, O.Z. Gedney, or Equal.

C. Terminals
1. Stranded Conductors #10 and Smaller: Comply with UL 486A
2. Heavy wall thickness copper, tin plated with nylon insulation
3. Thomas & Betts Sta-Kon Terminals

4. Cable ties - nylon locking type. Thomas & Betts Ty-Rap

2.4 TERMINATIONS

A. Compression set, bolted, or screw type lug or direct to bolted or screw type terminal.

2.5 PLASTIC CABLE TIES

A. Nylon or approved, locking type.

PART 3 - EXECUTION

3.1 WIRE & CABLE

A. Sizing
1. Use stranded conductors for #8 AWG and larger. Conductors of #10 and #12 AWG may be solid or stranded at the contractor's option.
2. Minimum power and lighting branch circuit requirement of #12 AWG.
3. Oversize neutral conductors for receptacle circuits using common neutrals, including those to power poles and powered furniture partitions for possible non-linear loads. See drawings for sizing criteria.

B. Color Coding
1. Color code wire in accordance with the coding shown below:

	208Y/120V	480Y/277V
A Phase (Left bus in panel):	Black	Brown
B Phase (Center bus in panel)	Red	Orange
C Phase (Right bus in panel)	Blue	Yellow
Neutral	White	Gray
Equipment Ground	Green	Green
Isolated Ground	Grn/Yel*	Grn/Yel*

2. If large conductors cannot be purchased with the correct insulation color, color code the conductors with wire and cable markers of the appropriate color. Completely encircle the conductor with color coding tape for a minimum length of 6 inches at all accessible locations.
3. In the event that separate neutrals are specified with each phase conductor, provide a white neutral conductor with a tracer of the same color as the corresponding phase conductor.

C. Installation
1. Utilize type THHN/THWN wire for all power, lighting circuits except where the ambient temperature is below 0°C, use Type XHHW installation.
2. Install all wiring in a raceway system unless otherwise specified.

3. Install wire only after building interior has been protected from the weather.
4. Install wire only after mechanical work likely to damage wire has been completed.
5. Completely and thoroughly swab exterior raceways before installing wire.
6. Pull all conductors into a common raceway simultaneously.
7. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
8. Neatly train and lace wiring inside boxes, equipment and panelboards.
9. Provide conductor vertical supporting device as required by NEC 300-19.
10. Conductors from one system shall not be intermixed in the same raceway as another system unless shown otherwise. Examples of circuits not be to be intermixed are 480Y/277 with 208Y/120 volt circuits, emergency power, line voltage circuits with low voltage wiring, etc.
11. Lighting control wiring rated 600V will be allowed in common raceway with the lighting circuit.

3.2 REMOTE CONTROL & SIGNAL CIRCUITS

A. Sizing - #16 AWG minimum.

B. Installation:
1. Install cables in cable tray and cable rings.
2. Provide protection for exposed cables where subject to damage.
3. Support cables above accessible ceilings; do not rest on ceiling tiles.
4. Use suitable cable fittings and connectors.

3.3 SPLICES, CONNECTORS & TERMINALS

A. Splices
1. Do not make splices without the approval of the engineer.
2. Splice wires and cables only in accessible locations such as within junction boxes.
3. Make splices to carry full capacity of conductors with no perceptible temperature rise.
4. Make below-grade splices in manholes and handholes watertight with pre-stretched or heat shrinkable insulating tubing, or resin filled insulator.

B. Connectors
1. Use bolt or compression-set type with application of insulating tape, pre-stretched or heat shrinkable insulating tubing for splices and taps of #8 AWG copper conductors and larger.
2. Torque conductor connections to manufacturer’s recommended values.
3. Use pre-insulated connectors with integral spring, or WAGO style connectors, for splices and taps of #10 AWG copper conductors and smaller.

C. Terminals
1. Insulate ends of spare conductors with electrical tape and identify spare circuit number where appropriate.

2. Eye type crimped terminal for removable screw type terminal. Forked torque terminal when screw terminal cannot be removed.
3. Train wires to eliminate fanning of stands, crimp with proper tool and die.
4. Torque screw termination per manufacturer's recommended values.
5. Cable ties: neatly bundle conductors and cables together for support. Size cable ties sufficiently to accommodate the multiple cables being supported.

END OF SECTION

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SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 DESCRIPTION

A. Grounding systems shall be provided for service neutral power ground and for equipment grounds and bonding as required by code.

PART 2 - PRODUCTS

2.1 GROUNDING CONDUCTORS AND CONNECTORS

A. Copper only, sized per code. Bare or green insulated in sizes #10 AWG or larger. Green insulated for size #12 AWG.

PART 3 - EXECUTION

3.1 GROUNDING, GENERAL

A. Provide all grounding for electrical systems and equipment as required by codes and as specified herein.

B. Branch Circuit Grounding: All branch circuits in patient areas shall include an insulated green ground wire connected between the branch circuit panelboard ground bus and the wiring device (or equipment) ground terminal that the branch circuit serves. One ground wire in each branch circuit raceway, looped between ground terminals, is required. For the purposes of this code requirement, the entire project area up to a height of eight feet above the floor shall be considered to be a patient occupied area. Green tape identification (in lieu of green insulation) on ground wires is not acceptable.

3.2 SIZE OF GROUND WIRE

A. As required by National Electric Code. Where ground wire is exposed to physical damage protect with rigid non-ferrous conduit as permitted by applicable code.

3.3 CONNECTION TO THE POWER GROUND BUS

A. Furnish and install connections in accordance with the codes; including but not limited to:

1. Raceway system
2. Switchboard
3. Service neutral
4. "Separately derived system" (transformer or emergency power supply)
5. Electrically operated equipment and devices.

B. No device or equipment shall be connected for electrical service which has a neutral conductor connected to a grounding conductor or to the frame within the device or equipment.

3.4 METHOD OF CONNECTIONS

A. Make all ground connections and ground cable splices by set type connectors U.L. listed for grounding purposes. Grounding lugs, where provided as standard manufacturer's items on equipment furnished, may be used.

3.5 EXPANSION FITTINGS

A. In conduit runs requiring an expansion fitting, a bonding jumper shall be installed around the fitting to maintain continuous ground continuity.

3.6 TESTING

A. Conform to Section 260126 - Maintenance Testing of Electrical Systems

3.7 GROUNDING FOR PANELBOARD FEEDERS

A. Provide a grounding bushing with ground conductor sized in accordance with NEC table 250.122 to the grounding bus in the panelboard and switchboards.

END OF SECTION

SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Related Sections
   1. Section 260529 - Hangers and Supports for Electrical Systems
   2. Section 270528.33 - Conduits and Backboxes For Communication Systems

1.2 SUMMARY

A. Section includes raceways, fittings, boxes, enclosures and cabinets for electrical wiring.

1.3 REFERENCES

A. American National Standards Institute (ANSI)

B. National Electrical Manufacturers Association (NEMA)

C. Underwriters Laboratories, Inc. (UL)

D. National Fire Protection Association (NFPA)

1.4 SUBMITTALS

A. Make submittals in accordance with Section 260500 - Common Work Results For Electrical. Submit product data only for surface raceways and fittings, wireways, enclosures and cabinets.

1.5 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 RIGID METAL CONDUIT (RMC)

A. Rigid Steel Conduit: ANSI C80.1, UL 6.

B. Intermediate Metal Conduit: ANSI C80.6, UL 1242.

C. Fittings: NEMA FB1, UL 514B, galvanized malleable iron or non-corrosive alloy threaded fittings. Erickson and watertight split couplings are permitted.

2.2 ELECTRIC METALLIC TUBING (EMT)

A. Hot dip galvanized, electrogalvanized or sherardized, steel tubing, ANSI C80.3, UL 797.

B. Fittings: NEMA FB1 UL 514B, steel or malleable iron, compression or set screw. Indentor, drive-on, or pressure cast fittings not permitted.

2.3 FLEXIBLE METAL CONDUIT (FMC)

A. UL 1, galvanized, or zinc coated flexible steel or aluminum for dry locations. Flexible metallic tubing not permitted. Fittings: malleable iron or steel.

B. Liquidtight Flexible Metal Conduit. UL 360, PVC weatherproof cover over flexible steel conduit. Fittings: galvanized or zinc coated.

2.4 SURFACE RACEWAY

A. Surface Metal Raceway: Galvanized steel with snap on covers. Manufacturer's standard ivory or buff painted finish. UL 5.

B. Surface Nonmetallic Raceway: 2-piece construction manufactured of rigid PVC compound with matte texture and manufacturer's standard ivory color. UL 5A.

C. Types, sizes, and channels as indicated on drawings and required for each application with fittings that match and mate with raceways.

D. Manufacturers: Subject to compliance with the requirements, manufacturers offering products that may be incorporated into the work include:
   1. Surface Metal Raceways: Airey-Thompson Co., Inc.; A-T Power Systems, American Electric; Construction Materials Group, Butler Manufacturing Co.; Walker Division, Wiremold Co. (The); Electrical Sales Division, Mono Systems, Hubbell Wiring Systems Inc.
   2. Surface Nonmetallic Raceways: Anixter Brothers, Inc., Butler Manufacturing Co.; Walker Division, Hubbell, Inc.; Wiring Device Division, JBC Enterprises, Inc.; Enduro Fiberglass Systems, Lamson & Sessions; Mono Systems, Carlon Electrical Products, Panduit Corp., Thermotools Co., United Telecom; Premier Telecom Products, Inc., Wiremold Co. (The); Electrical Sales Division, Hubbell Wiring Systems Inc.

2.5 RIGID NON-METALLIC CONDUIT (RNC)

A. Schedule 40 and 80: UL 651.

B. Type EB and B: UL 651, NEMA TC6.

C. Fittings: NEMA TC3.

2.6 ELECTRICAL NON-METALLIC TUBING (ENT)

A. NEMA TC-13.

2.7 LIQUIDTIGHT FLEXIBLE NON-METALLIC CONDUIT (LFNC)

A. UL 1660

2.8 EXPANSION FITTINGS

A. Malleable iron, hot dip galvanized allowing 4”(100mm) (+/- 2” (50mm)) conduit movement. OZ/Gedney AX Series or equivalent

2.9 RACEWAY PENETRATION SEALS

A. Thruwall and Floor Seals: New construction - OZ/Gedney FSK Series. Existing construction - OZ/Gedney CSM Series or equivalent

2.10 RACEWAY SEALING FITTINGS

A. For one through four conductors: OZ/Gedney CSB Series.

B. For greater than four conductors: OZ/Gedney EYA Series with sealing compound.

C. Low temperature or hazardous locations: OZ/Gedney EYA Series with sealing compound.

2.11 VERTICAL CABLE SUPPORTS

A. Factory-fabricated assembly consisting o threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables. Body shall be malleable iron.
   1. OZ/Gedney Type S or equivalent

2.12 METAL WIREWAYS

A. Material: Sheet metal, size and shape as indicated. Manufacturer’s standard finish. UL 870.

B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Manufacturer: Subject to compliance with the requirements, manufacturers offering products that may be incorporated into the work include: Hoffman Engineering Co., Keystone/Rees, Inc., Square D Co., Circle AW, B-Line.

D. Wireway Covers: Screw-cover type.

2.13 ENCLOSURES AND CABINETS

A. Enclosures: NEMA 250, Type 1, with cover and
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

B. Cabinets: NEMA 250, Type 1, galvanized steel box. Include metal barriers to separate wiring of different systems and voltage, and include accessory feet where required for freestanding equipment.

2.14 OUTLET JUNCTION AND PULL BOXES

A. Interior Wiring:
   1. Outlet and Pull Boxes. Pressed steel, zinc coated with plaster ring where applicable. NEMA OS1, UL 514A.
   2. Large Junction and Pull Boxes. Fabricated sheet steel, zinc coated or baked enamel finish, with return flange and screw retained cover.
   3. Concrete and Masonry. Specifically designed boxes for casting in concrete or mounting in masonry walls for that purpose.
   4. Mounting. Provide boxes with fan side box support Caddy J1A series or Caddy quick mount H series.

B. Exterior Wiring:
   1. Above Grade:
      a. Outlet and junction boxes: Cast or malleable iron or cast of corrosion resistant alloy, complete with conduit hubs, compatible with raceway to which it is connected. NEMA FB1.
      b. Pull boxes: Fabricated steel and hot dipped galvanized complete with malleable iron hubs.
      c. All boxes labeled for damp (NEMA 3R) or wet (NEMA 4) locations as applicable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS

A. Interior: Use the following wiring methods:
   1. Exposed: Electric Metallic Tubing.
   2. Exposed Subject to Damage (i.e. from vehicles, carts and moving pallets including stubups in concrete): Rigid Steel or Intermediate Metal Conduit.
   3. Concealed: Electric Metallic Tubing.
   4. Connection to Vibrating Equipment (including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): Flexible Metal Conduit, (except in wet or damp locations, use Liquidtight Flexible Metal Conduit) with 90° loop, maximum 6 feet long.

3.3 INSTALLATION

A. Install raceways level and square and at proper elevations. Provide not less than 6'-6" (200cm) headroom. Where raceways are installed in exit pathways provide not less than 7'-0" headroom. Do not block access to junction boxes, valves, mechanical equipment or prevent removal of ceiling panels, etc.

B. Use raceway fittings compatible with raceways and suitable for use and location.
   1. Run parallel or banked raceways together, on common supports where practical.
   2. Make bends in parallel or banked runs from same centerline to make bends parallel.

C. Join raceways with fittings designed and approved for the purpose and make joints tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.

D. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box. Provide bushings on all raceways 1-1/2" (40mm) and larger.

E. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

F. Size raceways not sized on the drawings per manufacturers shop drawings, applicable standards or other section of this specification.

G. Maintain 12” (300mm) minimum clearance to high temperature (greater than 90°c) surfaces.

H. When construction involves masonry work, assemble and install raceways at the same time as the wall is erected. Avoid surface cut masonry units whenever such units are to remain unplastered or uncovered in completed construction.

3.4 RIGID METAL AND INTERMEDIATE METAL CONDUIT

A. All connections watertight.

3.5 SURFACE METAL RACEWAY

A. Verify exact mounting and locations with Architect prior to rough-in. Install parallel to a building surface (i.e., wall, ceiling, floor) and fasten to surface as recommended by manufacturer. Mount so raceway is in the least obvious location. Provide all required boxes, extensions, fittings, elbows and devices for a complete installation. Ream all cuts smooth and provide bushings in ends of ½" (15mm) and ¾" (20mm) runs at all boxes and devices.

3.6 RIGID NONMETALLIC CONDUIT

A. May be used where permitted by code and as specified in 3.2 above.

3.7 RACEWAY PENETRATION SEALS

A. Exterior wall surfaces above grade: Provide watertight seal around all raceways. For concrete construction above ground level, cast raceway in wall or core drill wall and hard pack with a mixture of equal parts of sand and cement. For other types of construction use method acceptable to Architect.

B. Exterior surfaces below grade: Provide watertight seal around all raceways. Cast raceway into wall (or floor) or use manufactured seal assembly.

C. Roofs: Provide flashed and hot mopped weatherproof seal, or a pitch pan filled and sealed to be weatherproof where raceway penetrates roof membrane. Provide a weatherhead on all raceway stubups penetrating roof.

3.8 RACEWAYS SEALING FITTINGS

A. Provide watertight seal in the interior of all raceways which pass through building roof, ground floor slab or through outside walls of the building above or below grade. Seal on the end inside the building, using raceway sealing fittings manufactured for the purpose. Locate fittings at suitable accessible locations. For concealed raceways install each fitting in a flush steel box with a blank coverplate to match finish of adjacent plates or surfaces.
Exception: Sealing fittings are not required on raceways through the floor slab when the raceway does not extend beyond the building footprint.

B. Provide sealing fittings or duct seal in j-box for all raceways entering freezers and refrigeration units.

3.9 HANGERS FOR RACEWAYS

A. Raceways 1" and larger: Provide lay-in pipe hangers on 1/4" (6mm) or larger all threaded rods attached to metal ceiling inserts or to structural members at not greater than 10'-0" (3m) on center and within 12" (300mm) of each change in direction.

B. When more than two raceways will use the same routing, group together on a channel trapeze support system supported by 3/8" (9.5mm) (minimum) threaded rods attached to metal ceiling inserts or structural members.

C. Suspended ceiling systems: Do not attach raceways to ceiling suspension system hangers. Raceways 3/4" (20mm) and smaller serving equipment located within ceiling cavity or mounted on or supported by the ceiling grid system may be supported by dedicated #12 ga. galvanized, soft annealed mild steel wire hangers. Two raceways maximum per hanger. Attach raceways with clips manufactured for the purpose.

3.10 VERTICAL CABLE SUPPORTS

A. Provide cable support for vertical cable runs as required by NFPA 70.

3.11 STUB-UP CONNECTIONS

A. Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches (150 mm) above the floor. For future equipment connections install threaded plugs flush with floor.

3.12 OUTLET AND JUNCTION BOXES

A. Firmly anchor boxes directly or with concealed bracing to building studs or joists. Boxes must be so attached that they will not "rock" or "shift" when devices are operated.

B. Flush Mounting: Install front edge (box or plaster ring) even with the finished surface of the wall or ceiling, except for those mounted above accessible ceilings or where drawings indicate surface mounting is permitted.

C. Do not mount flush boxes back-to-back. Provide 6" (150mm) minimum horizontal separation between closest edges of the boxes. When boxes are installed in fire resistive walls and partitions provide 24” (600mm) horizontal separation between boxes on opposite sides of a wall in accordance with IBC 712.3.2. In addition, limit penetrations to 16 square inches (103 square centimeters) per penetration and not to exceed a total of 100 square inches per 100 square feet (9.3 square meters) of wall area.

3.13 ELECTRICAL OUTLETS

A. General: Coordinate the work of this Section with the work of other Sections and trades.

3.14 Vertical and Horizontal Relationships: Align outlets exactly on center lines horizontally or vertically where more than one outlet is shown or specified to be at the same elevation or one above the other.

3.14 CONNECTION TO EQUIPMENT

A. Provide outlet boxes of sizes and at locations necessary to serve equipment furnished under this or other Divisions and provide final connections to all equipment.

B. Outlet box required if equipment has pigtail wires for external connection, does not have space to accommodate circuit wiring or requires a wire with insulation rating different from circuit wiring used.

C. Study equipment details to assure proper coordination.

3.15 DEVICE BOXES CONTAINING EMERGENCY AND NORMAL DEVICES

A. Permitted only with steel barrier manufactured especially for the purpose of dividing the box into two completely separate compartments.

3.16 DEVICE BOXES CONTAINING MULTIPLE DEVICES AND WIRING RATED OVER 150 VOLTS TO GROUND AND OVER 300 VOLTS BETWEEN CONDUCTORS

A. Permitted only with steel barrier manufactured especially for the purpose of dividing the box into separate compartments for each device having exposed live parts.

3.17 JUNCTION OR PULL BOXES

A. Pull and junction boxes: Install as shown, or as necessary to facilitate pulling of wire and to limit the number of bends within code requirements.

B. Permanently accessible.

C. Do not intermix conductors from one system in same junction box or pull box as another system unless shown or specifically authorized otherwise.

D. In suspended ceiling spaces: Support from structure independently from ceiling suspension system.

E. The drawings do not necessarily show every pull or junction box required. Add all required boxes.

END OF SECTION

SECTION 26 05 40 - ELECTRICAL SITE WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Comply with OSHA standards and criteria.

1.2 DESCRIPTION

A. Provide all excavation, trenching, backfill and surface restoration required for the electrical work.

B. Coordinate electrical system placement with new and existing utilities.

1.3 REFERENCES

A. APWA - American Public Works Association

B. ASTM C150 - Portland Cement

PART 2 - PRODUCTS

2.1 CONCRETE MIXES

A. Concrete shall be APWA Class 3000, manufactured with 1/2 inch aggregate and ASTM C150 Type 1 or Type 11 cement.

2.2 ASPHALT

A. Asphalt shall match the standard specifications of the local municipality for public roads adjoining the site.

2.3 CRUSHED ROCK

A. Crushed rock shall be 1 1/4" minus unless smaller is required for bedding material.

2.4 SAND

A. Sand shall be clean and washed building sand.

2.5 TOPSOIL

A. Finish course of topsoil shall be adequate to support replanted or replacement vegetation.

2.6 SOD

A. New sod shall be mature, densely rooted grass 99 percent free of weeds and objectionable grasses.

2.7 PLANTS

A. Plants shall be obtained from a local commercial nursery and be of the same type and maturity as the existing plants.
   1. Use native, non-invasive and drought resistant plants to reduce water use and limit negative impact on surrounding existing species.
   2. From a green nursery that limits use of fertilizers.

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to completion of work Contractor shall return site to the condition it was in before work commenced.

B. Where existing materials must be removed to support electrical site work replacement materials shall be of the same type and quality, unless type and quality are defined herein.

3.2 EXISTING UTILITIES

A. The existing utilities shown on the contract drawings have been plotted from available records. No guarantee is made to the accuracy of the locations indicated, and is shown for whatever benefit the Contractor may derive therefrom.

B. Contact all serving utilities and have them locate their lines prior to commencing work. Forty-eight (48) hours prior to commencing work telephone "Call Before You Dig" at 1-800-424-5555. The Contractor shall also have the Owner locate all utility lines prior to commencing work.

C. Protect shown, visible and located utilities from damage. Promptly repair all active shown, visible and located utilities damaged by construction. This repair shall be made solely at the expense of the Contractor.

D. When despite all care and caution damage occurs to active utilities not visible, located or shown on the contract documents, the Contractor shall immediately obtain a decision as to repair. When so directed the repair shall be made immediately by the Contractor whose trade is involved. The contract price shall not change when the conditions outlined above and utmost possible care and caution have not been followed.

E. Adjust the depth of electrical utilities to avoid existing utilities with no change to contract price.

F. Use metal detectors to search for unknown utilities in proposed route of electrical systems.

3.3 SECURING SITE WORK

A. The Contractor is solely responsible for securing all electrical site work with adequate barriers, warning indicators and shoring.

3.4 TRENCHING

A. Trenching shall be to depths as required by code, the particular installation, or as shown on the drawings. Trench width and length as required by the installation or as shown.

B. Trench bottom shall be free of debris and graded smooth. Where trench bottom is rock, or rocky, or contains debris larger than 1", or material with sharp edges, Contractor shall over excavate 3" and fill with 3" of sand or backfill with native materials passed through one inch sieve.

C. Provide 1'-0" minimum separation between new electrical utilities and other utilities, except gas lines shall be 1'-0" both vertical and horizontal and shall be 3'-0" (horizontal) for all water service lines.

D. All crossings of concrete or asphalt shall be performed only after the surface material has been saw cut to required width and removed.

3.5 EXCAVATIONS

A. Provide excavations as required for installation intended or as shown.

B. Excavation bottom shall be free of debris and graded smooth. Where bottom is rock, or rocky, or contains debris larger than 1 inch, or material with sharp edges, over excavate 6 inch and fill with 6 inch sand or backfill with native materials passed through one inch sieve..

C. Conform to utility requirements for excavation and vault installation in addition to contract document requirements where excavations are for installing utility companies' vaults.

3.6 DEWATERING

A. Provide, operate and maintain all pumps or other dewatering equipment required for control of water in trenches and excavations for electrical site work during the entire construction period.

3.7 SHORING

A. Provide as required by trenching and excavating to secure site work.

3.8 BACKFILL, BEDDING AND COMPACTION

A. Backfill around raceways per 260533.

B. Bedding and backfill around precast vaults and handholes shall be in accordance with manufacturer's recommendations.

C. Where manufacturer has no recommendations provide 6 inch of ½ inch minus pea gravel or sand bedding for all vaults, and any handholes larger than 3 feet x 3 feet. For handholes smaller than 3 feet x 3 feet provide 3 inch pea gravel or sand. Backfill shall extend at least 6 inch from structure.

D. All other backfill shall be free of organic debris and inorganic materials larger than 6 inch in diameter.

E. Place all backfill material so as to obtain a minimum degree of compaction of 95 percent of the maximum density at optimum moisture content. Moisten backfill material as required to obtain proper compaction.

F. Broken pavement, concrete, and vegetative materials shall not be used for backfill.

G. Within the one year guarantee period, re-fill, compact and re-finish all settled areas to grade.

3.9 WASTE MATERIAL DISPOSAL

A. Promptly remove from the site and legally dispose of all materials from trenching and excavation which are remaining after backfill and compaction.

3.10 SURFACE REFINISHING

A. Refinish every disturbed surface to its' original condition and elevation. Preserve sod and topsoil removed during excavation and reinstall after backfilling is completed. Replace sod that is damaged or unusable with sod of equal or better quality to that removed. When the surface is disturbed in a newly seeded area, re-seed the restored surface with the same quantity and formal of seed as that used in the original seeding, Provide topsoil, fertilizer, liming, seeding, sodding, sprigging or mulching as required to match existing original condition.

B. Replace all planted materials not surviving 90 days after contract acceptance at Contractor's own expense.

C. Return after one year and refinish all settled areas to grade.

3.11 CARE OF PLANTS AND TREES

A. Unless specifically noted for demolition, remove and safely store all plants and trees in trenching or excavation areas prior to commencing site work.

B. Where plants and trees fail to survive storage replace with like kind, quality, and maturity.

3.12 PAVED SURFACE REPAIRS

A. Where trenches, pits or other excavations are made in existing roadways and other areas of pavement where surface treatment of any kind exists, restore such surface treatment or

pavement to the same thickness and in the same kind as originally existed. Match and tie into the adjacent and surrounding existing surfaces.

END OF SECTION

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SECTION 26 09 23 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following lighting control devices:
   1. Multipole contactors
   2. Control Relays

B. Related Sections include the following:
   1. Section 260519 Copper Conductors and Cables
   2. Section 262726 Wiring Devices for light switches and wall-box dimmers
   3. Section 260943 Network Lighting Controls

1.3 DEFINITIONS

A. LED: Light-Emitting Diode

B. PIR: Passive Infrared

C. DT: Dual Technology

1.4 SUBMITTALS

A. Make submittals in accordance with Section 260500 - Common Work Results For Electrical.

B. Product Data: Provide clearly marked and legible data sheets for each item of equipment being installed on the project. This shall include each major replaceable component that is part of a larger assembly. Data sheets should clearly indicate:
   1. Equipment manufacturer, make, model number, size, nameplate data, etc.
   2. Dimensional and performance data for specific unit provided as appropriate
   3. Required environmental operating parameters
   4. UL, FM and ETL listing and category
   5. Manufacturer contact information including address, telephone number, facsimile number, email address, web site address and contact person or persons.
   6. Local manufacturer's representative contact information including address, telephone number, facsimile number, email address, web site address and contact person or persons.

C. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Lighting plan showing location, orientation, and coverage area of each sensor. This plan shall take into consideration the size and use of each space as well as the specific capabilities of submitted manufacturer's equipment to provide proper coverage to the areas of control.
2. Interconnection diagrams showing field-installed wiring.

D. Label List: Submit list of proposed text for all labels prior to manufacturing for review and approval by Owner's representative.

E. Warranty: Submit a copy of product warranty that complies with contract document requirements. Where these requirements exceed manufacturer's standard warranty include cost of extended warranty in contract price.

F. Maintenance Requirements: Submit maintenance requirements manual or guidelines. This document should detail the requirements necessary to comply with the warranty. This is required for the submittal process and is in addition to the O&M requirements.

G. Samples: Provide sample devices and finishes plus other samples when requested, as part of the submittal process.

H. Commissioning Checklist: Submit a copy of the standard commissioning checklist to be utilized for this project.

1.5 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.6 QUALITY ASSURANCE

A. Qualifications
1. Manufacturer shall have been in the business of manufacturing and providing service for lighting control equipment for similar capabilities and size, under the same name and ownership, for a minimum of three years preceding bid date of the project.
2. All components and assemblies shall be factory pre-tested prior to installation.
3. Factory trained technicians shall be available for telephone support twenty four (24) hours a day, seven (7) days a week.

B. Regulatory Requirements
1. Underwriters Laboratories: Provide U.L. listed lighting control equipment.
2. Code of Federal Regulations: 47 CFR - FCC All assemblies are to be in compliance with FCC emissions standards specified in Part 15 for Class A application.

1.7 WARRANTY

A. Manufacturer's Warranty: The manufacturer shall provide a written warranty agreeing to provide parts to replace any portion of the lighting control system equipment that fails due to material or workmanship for a period of twelve months from warranty commencement.

B. Warranty Commencement: Warranty shall begin at the point of substantial completion of the system installation, which is defined as the date when commissioning and owner training has been completed and the owner obtains beneficial use of the system.

C. Warranty Replacement Parts: The manufacturer shall be able to ship replacement parts within 48 hours for any component that that fails due to material or workmanship during the warranty period.

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY SENSORS

A. Subject to compliance with the contract documents, provide products from one of the following manufacturers:
1. Greengate (Cooper Controls)
2. Hubble
3. Leviton
4. Lightolier
5. Lutron
6. Novitas, Inc.
7. Sensor Switch
8. Wattstopper
9. Or Equal

B. General Operation
1. The Occupancy Sensor system shall sense the presence of human activity within the desired space and fully control the on/off function of the loads automatically. Sensors shall turn on the load within 2 feet of entrance and shall not initiate "on" outside of entrance.
2. Upon detection of human activity by the detector, a Time Delay shall be initiated to maintain the light on for a field adjustable pre-set period.
3. Mounting
   a. Sensor: Suitable for mounting in any position on a standard outlet box.
   b. Relay (when required): Externally mounted through a 1/2 inch knockout in a standard electrical enclosure.
   c. Time Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
4. Line Voltage Sensors
   a. Sensor shall be a self-contained dual voltage device capable of directly switching loads upon detection of human activity.
   b. Sensor must be rated for 800 watts at 120 VAC, suitable for incandescent light fixtures, fluorescent light fixtures with magnetic or electronic ballasts, or 1/6 hp motors or rated for 1000 watts at 277 VAC, suitable for fluorescent light fixtures with magnetic or electronic ballasts, or 1/3 hp motors minimum. Sensor shall be capable of parallel wiring for 3-way switching applications.
   c. Sensor Time Delay shall be factory set for typical applications, and field adjusted during commissioning. Sensor must provide a LED motion indicator.
5. Low Voltage Sensor
   a. Sensors must be designed to work in conjunction with remote power packs, relays, or other control systems. Sensors must operate with a Class 2, low voltage wiring

strategy. Sensors must be capable of being parallel wired for multi-sensor applications.

b. Sensor must provide a transistor output, returning the voltage input rectified to DC, to control remote power packs, relays, or other control systems. Sensor must have optional single pole, double throw signal relay capable of being wired open on occupancy, or closed on occupancySensor Time Delay shall be factory set for typical applications, and field adjusted during commissioning. Sensor must provide a LED motion indicator.

C. Switch-Box Occupancy Sensors

1. General
   a. Sensor must not protrude out from the cover plate more than 0.37 inches, and recess into the switch box more than 1 inch. Sensor must surface mount to single gang switch box, and accept accessory plates for multi-gang installations. Sensor must provide an Off/Auto override switch, (2 switches if 2-pole device).
   b. Optional 2-Pole units must be available. Manual or Auto ON shall be configurable for both poles.
2. Dual Technology (DT)
   a. Sensing must incorporate PIR with ultrasonic monitoring. Both PIR and Ultrasonic motion sensing shall initiate an ON condition and either technology sensing motion shall keep the ON state.
   b. Either technology shall be able to be disabled during commissioning if necessary for the specific application.

D. Ceiling Occupancy Sensors

1. General
   a. Sensor shall be ceiling mounted device, mounted to either a single gang enclosure, or surface mounted to a round surface raceway pancake box.
   b. Time delay shall be set during commissioning and field adjustable.
2. Dual Technology (DT)
   a. Sensing must incorporate PIR with Ultrasonic. Both PIR and Ultrasonic motion sensing shall initiate an ON condition and either technology sending motion shall keep the ON state.

E. Wall Mount Occupancy Sensors (low voltage)

1. General
   a. Sensor must be designed for large spaces where the occupants work area is up to 40 feet from the sensor. Sensor must be mounted 8 to 10 feet above the floor, out of occupants reach. Sensor shall be mounted either flat against the wall or in a corner. For pendant mount fixture applications, sensor must be mounted below the level of the fixture.
   b. Sensor time delay shall be set during commissioning and shall be capable of being field modified if necessary.
   c. Sensors must be capable of parallel wiring for multi-sensor applications.

2.2 POWER PACKS AND SLAVE PACKS

A. Manufacturer: Same as 2.2 A.

B. Power Packs and Slave Packs must be designed to power and accept signals from remote Low Voltage Sensors, or other control devices, and directly switch the line voltage of the desired load controlled.

C. Power Packs must accept 120, 240, or 277 VAC utilizing a dual tap transformer.

D. Power Pack and Slave Pack relay switching shall not require more than 3 milliamps of current at 15 to 30 VDC.

E. Power Pack and Slave Pack relay switching shall be performed with a mechanical relay in parallel with an AC Semiconductor to allow relay contacts to switch under a no load condition. Switching capacity shall be 20 amps of all types of loads: Incandescent, Electronic Ballast, Magnetic, or Motor.

F. Power Packs shall be available in combination 2-Pole units capable of switching two independent loads, 20 amps each.

2.3 TIME SWITCHES (TIME CLOCKS)

A. Subject to compliance with the contract documents, provide products from one of the following manufacturers:
1. Area Lighting Research
2. Intermatic, Inc.
3. Leviton
4. Lithonia Lighting
5. Paragon Electric Co.
6. Square D
7. Tork
8. Touch-Plate, Inc.
9. Wattstopper
10. Or Equal

B. Digital Time Switches: Electronic, solid-state programmable units with alphanumeric display complying with UL 917.
1. Contact Configuration: SPST
2. Contact rating: 30A inductive or resistive, 240 Vac.
    a. Program: Single channel, 2 on-off set points on a 24-hour schedule, allowing different set points for each day of the week and an annual holiday schedule that overrides the weekly operation on holidays.
    b. Circuitry: Allow connection of a photoelectric relay to substitute for on and off function of a program.
    c. Astronomical Time: All channels.
    d. Battery Backup: For schedules and time clock.

2.4 MULTIPOLE CONTACTORS

A. Manufacturer: Subject to compliance with the contract documents, provide products from one of the following manufacturers
1. ASCO Power Technologies
2. Eaton Electrical, Inc.
3. GE Industrial Systems

4. Hubbell Lighting
5. Lithonia Lighting
6. Square D
7. Tork
8. Touch-Plate, Inc.
9. Wattstopper
10. Or Equal

B. Description: Electrically operated and mechanically held, complying with NEMA ICS 2 and UL 508.
   1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballasts (ballast with 15 percent or less total harmonic distortion of normal load current).
   2. Control-Coil Voltage: 120V
   3. Enclosure: [Indoor NEMA 1]

2.5 CONTROL RELAYS

A. Industrial Control Relays: Rated 600V, 20A convertible contacts. Square D Class 8501 XMO series.

B. General Purpose Relays: Rated 120/ 240 volt, 10A. Square D Class 8501 Type K plug in series with screw terminal socket.

2.6 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG, complying with Section 260519 - Conductors and Cables.

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded copper conductors not smaller than No. 22 AWG, complying with Section 260519 - Copper Conductors and Cables.

C. Class 1 Control Cable: Multiconductor cable with stranded copper conductors not smaller than No. 18 AWG, complying with Section 260519 - Copper Conductors and Cables.

D. Install unshielded, twisted-pair cable for control and signal transmission conductors, complying with Section 260519 - Copper Conductors and Cables.

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve at least 90 percent coverage of areas indicated. Install sensors in accordance with manufacturer's instructions. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 WIRING INSTALLATION

A. Wiring Method: Comply with Section 260519 - Copper Conductors and Cables.

B. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

3.3 IDENTIFICATION

A. Identify components and power and control wiring according to Section 260553 - Identification For Electrical Systems.

B. Label time switches and contactors with a unique designation.

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with manufacturers' commissioning checklist and section 260126 Maintenance and Testing of Electrical Systems.
   2. Operational Test: Verify actuation of each sensor and adjust time delays.

B. Remove and replace lighting control devices where test results indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 SYSTEM STARTUP AND COMMISSIONING

A. Commissioning shall take place prior to demonstration of system to Owner. After the system has been installed the Contractor shall provide manufacturer’s recommended commissioning with factory trained and authorized technicians on-site, to:
   1. Verify that the contractor has properly installed and interconnected all necessary components.
   2. Verify correct operation of all system components.
   3. Verify that all switch and contact inputs are in compliance with contract requirements.
   4. Aim and adjust all occupancy sensors and photocell devices for proper operation.
   5. Submit completed verification checklist.

3.6 OWNER’S INSTRUCTIONS AND SYSTEM DEMONSTRATION

A. System Demonstration
   1. Schedule demonstration a minimum of two-weeks prior to system turn over and substantial completion. Schedule with owner’s representative and electrical engineer.
   2. Demonstrate complete system operation and contract compliance to designated owner’s representative and engineer to prove system is functional and ready for comprehensive training.

B. System Instruction

1. The Contractor shall after one week (minimum) written notification to Architect conduct an instruction session during which all maintenance and operational aspects of the system will be described and demonstrated to personnel selected by the Owner. O & M manual information regarding the system shall be turned over to the Architect prior to scheduling the instruction session.
2. Training shall utilize the following draft documents:
   a. Draft O&M Manual
   b. Contractor's record drawings
3. The training effort shall validate the O&M Manual and record drawing documentation.

END OF SECTION

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes switches, receptacles, dimmers, device plates and multi-outlet assemblies.

B. Related sections include Section 260923 - Lighting Control Devices.

1.3 REFERENCES

A. National Electrical Manufacturers Association (NEMA).

B. Underwriters Laboratories (UL).

1.4 SUBMITTALS

A. Make submittals in accordance with Section 260500 - Common Work Results For Electrical. Submit product data for each device utilized in the project.

1.5 COORDINATION

A. Provide receptacles to match plug configurations for Owner furnished equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURE

A. Subject to compliance with requirements, provide products by one of the manufacturers listed in the following paragraphs. All devices utilized on the project shall be from the same manufacturer.

2.2 SWITCHES

A. "Specification Grade", Federal Specification WS-896, back and side wired, rated 277 volt, 20 amp. Single pole, double pole, keyed, 3-way, pilot light, locking type as required or as noted. Bryant 4901-I, Cooper 1221V, Hubbell 1221-I, Leviton 1221-I, Pass & Seymour PS20AC1-I.

B. Interchangeable type rated same as above.

C. Momentary Contact Line Voltage Switches: Single pole, double throw, 3-wire, spring return to open. Rating same as above.

D. Pilot light switches: Lighted handle when "ON", or with separate pilot light.

E.

1.

2.3 DEVICE PLATES

A. Configuration: Single and combination type to match corresponding wiring devices.

B. Attachment Screws: Metal with head color to match plate finish.

C. Interior Recessed Boxes: Plastic type with white finish.

D. Interior Surface Boxes: Pressed raised steel to match size of outlet box.

E. Exterior: Weather resistant hinged cover, Hubbell Bell 5028-0, Leviton 4992 ,Cooper 996. For other receptacles provide cover to match receptacle.

F. Exterior: Raintight while in use hinged cover, Hubbell Bell 5752-0, Leviton 5977-CL, Cooper 4966. For other receptacles provide cover to match receptacle.

G. Identification
1. The electrical contractor shall be responsible to have faceplates on all owner furnished equipment and equipment furnished under other divisions engraved with circuit number, and "EMERGENCY" (where applies) as specified in this section. This includes but is not limited to: headwalls, gas columns and booms, patient consoles, medical rail systems, custom casework with electrical devices, etc.

PART 3 - EXECUTION

3.1 ORIENTATION

A. Set switches with handle operating vertically, up position "ON". Set receptacles vertically with ground pin up or when construction requires horizontal mounting with ground pin left.

3.2 DEVICE PLATES

A. Provide for wiring devices, telephone and signal outlets. Plate to cover cutout for device outlet box.

B. Provide exterior rain tight while in use covers for exterior receptacles in wet locations. Otherwise provide weather resistant covers.

3.3 MULTIOUTLET ASSEMBLIES AND POWER COMMUNICATION RACEWAYS

A. Rigidly fasten assemblies to the cabinet, wall, casework, or modular casework as indicated. Provide a chase nipple extension between outlet box in the wall and the raceway when the raceways are mounted to the support channels for the modular casework.

3.4 DIMMERS

A. Install wall box dimmers to achieve circuit rating after derating for ganging as required by manufacturer.

B. Do not share neutral conductor on load side of dimmers.

END OF SECTION

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SECTION 26 56 00 - EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Exterior luminaires with lamps and ballasts.
   2. Luminaire-mounted photoelectric relays.
   3. Poles and accessories.
   4. Luminaire lowering devices.
   5. Foundations

B. Substitutions:
   1. Bidders requesting approval to provide products other than those specifically listed in the Light Fixture Schedule shall submit requests in writing to the Architect and Lighting Designer ten days prior to the close of the bid period. Approval will be in the form of an addendum to the specifications issued to all registered plan holders. No requests for substitution will be considered after this date.
   2. Substitution request shall include all information required under paragraph 1.5 SUBMITTALS. Requests for approval shall be accompanied by a working fixture sample (including lamps and a cord and plug). Provide the name of at least one installation where each proposed substitute has been installed for at least six months along with the name and phone number of the Architect, Owners representative and the Lighting Designer of Record. If required by the Architect, the proposed substitutes must be installed at the bidder's expense in a location selected by the Architect.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color-rendering index.

C. HID: High-intensity discharge.

D. LER: Luminaire efficacy rating.

E. Luminaire: Complete lighting fixture, including ballast, reflector, wiring and housing.

F. Pole: Luminaire support structure, including tower used for large area illumination.

G. Standard: Same definition as "Pole" above.

1.4 REFERENCES

A. National Electrical Manufacturer's Association (NEMA) LE5-1993:
   1. Procedure for determining Luminaire efficiency ratings.

B. Underwriters Laboratories, Inc. (UL):

UL 48	Electrical Discharge Lighting Systems (Cold Cathode)
UL 496:	Edison Base Lampholders
UL 542:	Lampholders, Starter Holders for Fluorescent Lamps
UL 676:	Underwater Lighting Fixtures
UL 924:	Emergency Lighting and Power Equipment
UL 935:	Fluorescent Lamp Ballasts
UL 1012	Power Units Other Than Class 2
UL 1029:	HID Lamp Ballasts
UL 1310	Class Power Units
UL 1570:	Fluorescent Lighting Fixtures
UL 1571:	Incandescent Lighting Fixtures
UL 1572:	High Intensity Discharge Lighting Fixtures
UL 1598	Luminaires
UL 1838	Low Voltage Landscape Lighting Systems
UL 1994	Luminous Egress Path Marking Systems

1.5 SYSTEM DESCRIPTION

A. Light fixture schedule series numbers are a design series reference and do not necessarily represent the exact catalog number, size, voltage, wattage, type of lamp, ballast, finish trim, ceiling type, mounting hardware, ceiling trim or special requirements as specified hereinafter or as required by the particular installations. Provide complete fixtures to correspond with the number of lamps, wattage, light distribution and/or size specified.

B. If there are discrepancies between fixture illustrations and the written description in the fixture schedule, the written description in the fixture schedule shall take precedence.

C. Light fixture voltage shall match voltage of circuit serving the light fixture.

1.6 SUBMITTALS

A. For standard catalog items, provide original product sheets, -neatly and clearly marked- to indicate that light fixture, ballasts and lamps fully comply with contract documents. Include photometric report by an independent certified testing laboratory when required in fixture schedule. Manufacturer's test report is not acceptable.

B. Submittals shall have fixture types and project name clearly indicated and shall be prepared by the authorized manufacturer's representative serving the project area. A list of manufacturer's representatives (including address, telephone and fax numbers) identifying which light fixture types they represent shall be included with submittals. Submittals or requests for substitutions not meeting these requirements will be rejected.

C. For linear light sources (cold cathode or neon), submit scale plans and details of the lamp layout, method of installation of the lampholders, lamps, reflectors, transformer housings and locations, secondary feeds and a complete bill of materials. Field dimensions required to be furnished by

the contractor shall be shown on shop drawings. Shop drawings shall be revised after receipt of field dimensions to show exact location of lamps and lamp holders. A copy of the final complete shop drawings shall be included in the Operation and Maintenance Manuals.

D. For custom or modified fixtures, submit scaled drawings prepared by the manufacturer showing details of construction, lengths of runs, pendant and power feed locations, accessory pieces, finishes, and list of materials. Contractor to provide manufacturer with field dimensions where required.

E. For fiber optic systems, submit scale plans showing cable layout, number and type of fiber bundles, light box location and a complete bill of materials. Show field dimensions on shop drawings.

F. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements in AASHTO LTS-5-E and that load imposed by luminaire and attachments has been included in design. The certification shall be based on design calculations by a professional engineer.

G. Product Samples, complete with housing, trim with 8’ cord, plug, and specified lamp shall be submitted if requested in the fixture schedule.

1.7 QUALITY ASSURANCE

A. Fixtures and components shall be new and listed by Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratory (NRTL) acceptable to the local Authority Having Jurisdiction (AHJ).

1.8 WARRANTY

A. Ballasts: Provide manufacturer’s warranty for a period of not less than five years. Warranty shall include parts and labor to replace defective ballasts.

B. Exit Signs Utilizing LED Lamp Technology: Provide manufacturer’s warranty for a period of not less than five years including parts and labor for full replacement of defective product.

C. LED Luminaires: Provide manufacturer's warranty for a period of not less than three years for repair or replacement of defective electrical parts, including light source, drivers and power supplies.

1.9 MOCKUPS

A. Where required in the contract documents, provide a mock-up of the lighting systems. The mock-up shall be erected in a time period and location that is acceptable to the Architect. The contractor shall assume that the mock-up will be off the project site but within a 30-mile radius of the project. Include the following types in the mock-up: <**List each fixture type that will need to be provided by the electrical contractor during this mockup**>

B. The mock-up installation shall closely conform with the conditions of the actual installation as to: height, distance from the [**soffit**][**ground**] [**wall**], number and type of lamps, materials, colors, etc. Submit a drawing of the mock-up condition for approval prior to commencing construction.

C. The purpose will be to study the general appearance and performance of the systems. Minor modifications may be required as a result of the mock-up to meet the specified performance criteria. These modifications and others that do not materially effect the cost of the installation, shall be incorporated at no additional cost to the owner.

1.10 PROTOTYPES

A. All custom fixtures require a prototype to be submitted prior to commencement of final fabrication. The purpose of the prototype will be to review finishes, lamp placement within the fixture, lamp type and reflector shape or size. Modifications may be required as a result of the prototype review. These modifications and others that do not materially affect the cost of the fixture shall be incorporated at no additional cost to the owner.

1.11 EXTRA MATERIALS

A. Ballasts, LED power supplies and transformers: Provide one case or 10% (whichever is less) of each type used on the project. Turn over to Owner and obtain signed receipt.

B. Lamps: Provide one case or 10% (whichever is less) of each type used on the project. Turn over to Owner and obtain signed receipt.

C. Fuses: Provide one case or 10% (whichever is less) of each type used on the project. Turn over to Owner and obtain signed receipt.

D. Adjustable Accent Lights (recessed or surface mounted): Provide additional lenses, color filters and other accessories to be used during final focusing, as follows:
   1. 20% or one case (whichever is less) of each lamp type (type, beam spreads, and wattages to be determined by the lighting designer). A spot and a flood lamp of the same wattage are considered to be two different lamp types.
   2. 10% or one dozen each, (whichever is less) lenses, color filters and louvers (to be determined by the lighting designer).

PART 2 - PRODUCTS

2.1 GENERAL MATERIAL REQUIREMENTS

A. Finish mounting hardware and accessories to prevent corrosion and discoloration to adjacent materials.

B. For weatherproof or vaportight installations, painted finishes of fixtures and accessories shall be weather resistant enamel using proper primers or galvanized and bonderized epoxy, so that the entire assembly is completely corrosion resistant for the service intended. Where aluminum parts come into contact with bronze or steel parts, apply a coating material to both surfaces to prevent corrosion.

C. Non-vapor tight fixtures to have 1/8" dia. weep holes as required for proper drainage. Weep holes to be configured to prevent light leaks.

D. Fixtures shall be free of light leaks and designed to provide sufficient ventilation of lamps to provide the photometric performance required. Ballasts and transformers shall be adequately vented.

E. Lampholders shall hold lamps securely against normal vibrations and maintenance handling.

F. Reflector Cones:
   1. Provide minimum 45° lamp and lamp image cut-off for all vertically mounted lamps. For horizontal lamps provide minimum 33° cut-off. There shall be no visible lamp flashing in the cone.
   2. Plastic materials shall not be used for reflector cones, unless noted otherwise in the Light Fixture Schedule.
   3. Reflector cones shall not be riveted or welded to housing and shall be removable without tools. Retention devices shall not deform the cone in any manner. Trim shall be flush with finished ceiling without gaps or light leaks. Where the flange trim is separate from the cone, it shall have the same finish as the cone.
   4. Reflector cones shall be of uniform gauge, not less than 0.032-inch thick, high purity aluminum Alcoa 3002 alloy, free of spin marks or other defects.
   5. Manufacture reflector under the Alzak process. Refer to fixture schedule for cone color and specular or diffuse finish requirements. For fixtures using compact fluorescent lamps, provide additional finish equivalent to Color-Chek that eliminates iridescence. Submit one sample of each cone type for review when required in the fixture schedule.

G. For adjustable fixtures, provide positive locking devices to fix aiming angle. Fixture shall be capable of being relamped without adjusting aiming angle.

H. Safety: Provide safety devices for removable fixture elements (cones, reflectors, lenses, etc.) to support removable elements when not in normal operating position. Safety devices shall be detachable if necessary and shall not interfere with fixture performance, maintenance or the seating of any fixture element, and not be visible during normal fixture operation. Safety device shall be made of corrosion resistant materials.

I. Finishes:
   1. Painted surfaces shall have an outdoor life expectancy of not less than 20 years without any visible rust or corrosion.
   2. Finishes to comply with requirements set by the American Architectural Manufacturers Association (AAMA):
      a. Baked on enamel and high performance powder coating finish on aluminum: AAMA 304-05
      b. Anodized aluminum: AAMA 611-98
      c. Clear coat on aluminum: AAMA 612-02
   3. Finish colors shall be as specified.

J. Diffusers: materials shall be UV stabilized.

2.2 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

A. Comply with UL 773 or UL 773A.

B. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on at 1.5 to 3 fc and off at 4.5 to 10 fc with 15-second minimum time delay.[**Relay shall have directional lens in front of photocell to prevent electric light sources from causing false turnoff.**]
   1. Relay with locking-type receptacle shall comply with ANSI C136.10.
   2. Adjustable window slide for adjusting on-off set points.

2.3 LIGHT EMITTING DIODE (LED) FIXTURES:

A. Housing: Rigid aluminum construction.

B. Finish: Visible surfaces. Powder coated paint or natural aluminum as specified in Light Fixture Schedule. Color and finish as selected by architect. Concealed parts, (lamp holders, yokes, brackets, etc.) matte black.

C. Lamp Holder Housing: Cast aluminum with integral heat radiating fins to assure cool lamp base operation, with sufficient heat dissipation to meet device manufacturer's guidelines for junction temperature, certification programs, and test procedures for thermal management.

D. Off-state Power: Luminaires shall not draw power in the off state. Exception: Luminaires with integral occupancy, motion, photo-controls or individually addressable fixtures with external control and intelligence are exempt from this requirement. The power draw for such luminaires shall not exceed 0.5 watts when in the off state.

2.4 WIRING

A. Wiring shall be as required by code for fixture wiring.

B. Flexible cord wiring between fixture components or to electrical receptacle and not in wireways shall have a minimum temperature rating of 105°C.

C. Cords shall be fitted with proper strain reliefs and watertight entries where required by application.

D. No internal wiring shall be visible at normal viewing angles, i.e. above 45° from vertical.

2.5 BALLASTS AND POWER SUPPLIES:

A. LED Power Supplies:
   1. Minimum power factor 90%.
   2. Minimum operating temperature of -20□C.
   3. Output operating frequency shall be minimum 120 Hz.
   4. Power supply shall meet FCC requirements for non-consumer use.
   5. Sound rating: Class A.
   6. Power supply shall comply with IEEE C.62.41-1991, Class A operation.

2.6 LAMPS

A. Each lamp type in the Project shall be manufactured by the same manufacturer.

B. Light Emitting Diode Type:
   1. LED modules/arrays shall have a minimum CRI of 80 unless otherwise specified in the Light Fixture Schedule.
   2. Color temperature variation shall not exceed +/- 100 degrees Kelvin at installation, and +/- 200 degrees Kelvin over the life of the module. Provide CCT as noted in the Light Fixture Schedule.
   3. LED modules/arrays shall deliver at least 70% of initial lumens, when installed in-situ, for a minimum of 50,000 hours.
   4. Mechanically fasten board to heat sink as required to meet LED manufacturer's heat dissipation requirements.
   5. Acceptable manufacturers: Cree, Philips (Lumileds), Nichia, Osram, GE.

2.7 LIGHTING STANDARDS

A. Pole/Luminaire Assemblies and Bollards: Supply luminares, davit arms, brackets, poles, handhole covers, base components and all other accessories for a complete assembly. Manufacturer shall be responsible for proper fitting of all elements and the structural integrity of the unit. Provide assembly to withstand 100 mph steady wind rated poles with 1.3 gust factor.

B. Provide watertight insulating fuse and holder in the base of each lighting standard to individually protect each lighting fixture. Fuse holder similar to Buss style "HEX" (HEB permitted for 120V or 277V), with Buss fuse of appropriate ampacity and voltage. Provide fuse for each hot circuit wire; do not fuse neutral.

2.8 GENERAL REQUIREMENTS FOR POLES AND SUPPORT COMPONENTS

A. Structural Characteristics: Comply with AASHTO LTS-5-E
   1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated in "Structural Analysis Criteria for Pole Selection" Article.
   2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of [**1.1**] <**Insert number**> to obtain the equivalent projected area to be used in pole selection strength analysis.

B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts unless otherwise indicated.

C. Coordinate "Mountings, Fasteners, and Appurtenances" Paragraph below with Drawings.

D. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
   1. Materials: Shall not cause galvanic action at contact points.
   2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.
   3. Anchor-Bolt Template: Plywood or steel.

E. Handhole: Oval-shaped, with minimum clear opening of 2-1/2 by 5 inches, with cover secured by stainless-steel captive screws.

F. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

G. Power-Installed Screw Foundations: Factory fabricated by pole manufacturer, with structural steel complying with ASTM A 36/A 36M and hot-dip galvanized according to ASTM A 123/A 123M; and with top-plate and mounting bolts to match pole base flange and strength required to support pole, luminaire, and accessories.

H. Breakaway Supports: Frangible breakaway supports, tested by an independent testing agency acceptable to authorities having jurisdiction, according to AASHTO LTS-4-M.

I. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied as stated in AASHTO LTS-5-E.

J. Live Load: Single load of 500 lbf distributed as stated in AASHTO LTS-5-E

K. Ice Load: Load of 3 lbf/sq. ft., applied as stated in AASHTO LTS-5-E Ice Load Map.

L. Wind Load: Pressure of wind on pole and luminaire and banners and banner arms, calculated and applied as stated in AASHTO LTS-5-E.
   1. Basic wind speed for calculating wind load for poles 50 feet (15 m) high or less is [**100 mph (45 m/s)**]
      a. Wind Importance Factor: [**1.0**]
      b. Minimum Design Life: [**25 years**]
      c. Velocity Conversion Factors: [**1.0**]
      d. Elevated Locations: Include as required per AASHTO LTS-5-E: 3.8.2.1.
      e. Special Wind Regions: Include as required per AASHTO LTS-5-E: 3.8.2.2.

2.9 STEEL POLES

A. Poles: Comply with ASTM A 500, Grade B, carbon steel with a minimum yield of 46,000 psig (317 MPa); one-piece construction up to 16ft. (12 m) in height with access handhole in pole wall.
   1. Shape: [**Round, straight**
   2. Coordinate "Mounting Provisions" Subparagraph below with Drawings.
   3. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

B. Brackets for Luminaires: Detachable, cantilever, without underbrace.
   1. Adapter fitting welded to pole, allowing the bracket to be bolted to the pole mounted adapter, then bolted together with **galvanized**-steel bolts.
   2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire.
   3. Match pole material and finish.

C. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

D. Intermediate Handhole and Cable Support: Weathertight, 3-by-5-inch (76-by-127-mm) handhole located at midpoint of pole with cover for access to internal welded attachment lug for electric cable support grip.

E. Grounding and Bonding Lugs: Welded 1/2-inch (13-mm) threaded lug, complying with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.

F. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported cable times a 5.0 safety factor.

G. Galvanized Finish: After fabrication, hot-dip galvanize complying with ASTM A 123/A 123M.

H. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or with SSPC-SP 8, "Pickling."
   2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.
      Exterior Surfaces: Galvanized base layer with powder epoxy prime coat. Cover with UV and color stable powder coat top coat. For lower ground embedded area of the pole, use corrocote protection, approximately 40mm thick for moisture and chemical resistance.

      Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.
      a. Color: **As selected by Architect from manufacturer's full range**

2.10 ALUMINUM POLES

A. Poles: Seamless, extruded structural tube complying with ASTM B 429/B 429M, Alloy 6063-T6 with access handhole in pole wall.

B. Poles: ASTM B 209 (ASTM B 209M), 5052-H34 marine sheet alloy with access handhole in pole wall.
   1. Shape: **Round, tapered**
   2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.

C. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

D. Grounding and Bonding Lugs: Welded 1/2-inch (13-mm) threaded lug, complying with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size listed in that Section, and accessible through handhole.

E. Aluminum Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
   2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.

3. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
5. Finish
   a. Color: **As selected by Architect from manufacturer's full range**

2.11 POLE ACCESSORIES

A. Base Covers: Manufacturers' standard metal units, arranged to cover pole's mounting bolts and nuts. Finish same as pole.

PART 3 - EXECUTION

3.1 LIGHTING FIXTURES, GENERAL

A. Provide mounting accessories and trims as required for wall and ceiling construction types shown in Finish Schedule and on Drawings.

B. Verify weight and mounting method of fixtures and provide suitable supports. Fixture mounting assemblies shall comply with local seismic codes and regulations.

C. Refer to landscape architecture, civil, and architectural plans for coordination of lighting fixture locations with other devices and site elements. Where conflicts occur, coordinate with Architect prior to installing any of the systems.

D. Lighting fixtures located in recessed ceilings with a fire resistive rating of 1-hour or more shall be enclosed in an approved fire-resistive rated box equal to that of the ceiling.

E. Adjust aperture rings on all recessed fixtures to be flush with the finished ceiling.

F. For fluorescent lamps operated on dimming ballasts, operate lamps at full output for the number of hours (continuous burn) recommended by the lamp manufacturer before dimming.

G. Adjust variable position lampholders for proper lamp position prior to fixture installation.

H. Blemished, damaged or unsatisfactory fixtures or accessories shall be replaced.

I. For pendant mounted fixtures, mounting height is from finished ceiling to top of pendant light fixture. For wall mounted fixtures, center on outlet box unless otherwise noted. Verify mounting provisions and other requirements prior to order of light fixtures and provide as required.

J. In accessible suspended ceilings, provide 72" flexible conduit wiring connection (flexible tubing not permitted) from a rigidly supported junction box.

K. All finishes shall be unmarred upon project completion. Repair or replace damaged finishes.

L. Replace all burned out or inoperative lamps at the end of the construction prior to Owner occupancy.

3.2 DIFFUSERS AND ENCLOSURES

A. Remove protective plastic covers from lighting fixture diffusers only after construction work, painting and clean-up are completed. Remove all dirty lamps, reflectors and diffusers; clean and reinstall. When cleaning "Alzak" reflectors, use a manufacturer recommended cleaning solution. Reflectors damaged or impregnated with fingerprints shall be replaced at no cost to Owner.

B. For LED fixtures, whether surface mounted or recessed, remove all construction dirt and dust from heat sink fins to ensure proper dissipation of heat.

3.3 ADJUSTMENT OF LIGHT FIXTURES

A. Focus all adjustable light fixtures under the direction of the Lighting Designer during a scheduled period of time prior to the completion of the project, after normal business hours if required. Include all equipment and personnel expenses (including overtime) required for adjustment.

3.4 CEILING LIGHT FIXTURE SUPPORT

A. Where ceiling is of insufficient strength to support weight of lighting fixtures installed, provide additional framing to support as required.

3.5 LIGHTING BOLLARDS

A. Provide galvanized anchor bolts and nuts, and plumb to true vertical using a nut above and below the base plate on the anchor bolts. Provide steel reinforced concrete footing with grout between base plate and concrete footings. Bollard footing shall be flush with grade when located in paved surface. Ground all components.

3.6 POLE INSTALLATION

A. Alignment: Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.

B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features unless otherwise indicated on Drawings:
   1. Fire Hydrants and Storm Drainage Piping: **60 inches (1520 mm)**
   2. Water, Gas, Electric, Communication, and Sewer Lines: **10 feet (3 m)**
   3. Trees: **15 feet (5 m)**] from tree trunk.

C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Division 03 Section "Cast-in-Place Concrete."

D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
   1. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
   2. Grout void between pole base and foundation. Use non-shrink or expanding concrete grout firmly packed to fill space.
   3. Install base covers unless otherwise indicated.
   4. Use a short piece of 1/2-inch- (13-mm-) diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

E. Raise and set poles using web fabric slings (not chain or cable).

3.7 LIGHTING STANDARDS

A. Provide rebar reinforced concrete base. For bolted poles, provide galvanized anchor bolts and nuts and plumb to true vertical using a nut above and below the base plate on the anchor bolts. Pack grout between base plate and concrete base and provide drain hole below base plate to prevent accumulation of moisture inside pole base. Provide two piece or individual covers for nuts exposed above the baseplate of the same color as the pole. Ground pole and light fixture.

3.8 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Division 26 Section "Raceway and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.9 GROUNDING

A. Ground metal poles and support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."
   1. Install grounding electrode for each pole unless otherwise indicated.
   2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

B. Ground nonmetallic poles and support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."
   1. Install grounding electrode for each pole.
   2. Install grounding conductor and conductor protector.
   3. Ground metallic components of pole accessories and foundations.

3.10 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.
   1. Verify operation of photoelectric controls.

C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION

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SECTION 32 84 00 – PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. It is the intent of the specifications and drawings that the finished system is complete in every respect and shall be ready for operation satisfactory to the Owner.

B. The work shall include all materials, labor, services, transportation, and equipment necessary to perform the work as indicated on the drawings, in these specifications, and as necessary to complete the contract.

C. Related Sections:

1. Section 01 74 19 “Construction Waste Management and Disposal”
2. Section 01 81 13.13 “Sustainable Design Requirements – LEED for New Construction and Major Renovations”

1.2 CONSTRUCTION DRAWINGS

A. Due to the scale of the drawings, it is not possible to indicate all offsets, fittings, sleeves, etc. which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc. as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting, and architectural features.

B. All work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications. When an item is shown on the plans but not shown on the specifications or vice versa, it shall be deemed to be as shown on both. The Landscape Architect shall have final authority for clarification.

C. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the Landscape Architect as soon as detected. In the event this notification is not performed, the Irrigation Contractor shall assume full responsibility for any revision necessary.

1.3 QUALITY ASSURANCE

A. Provide at least one English speaking person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and the manufacturer's recommended methods of installation and who shall direct all work performed under this section.

B. Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturer of articles used in this contract furnish directions covering points not shown in the drawings and specifications.

C. All local, municipal, and state laws, rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the Contractor. Anything contained in these specifications shall not be construed to conflict with any of the above rules and regulations of the same. However, when these specifications and drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these specifications and drawings shall take precedence.

D. All materials supplied for this project shall be new and free from any defects. All defective materials shall be replaced immediately at no additional cost to Owner.

E. The Contractor shall secure the required licenses and permits including payments of charges and fees, give required notices to public authorities, verify permits secured or arrangements made by others affecting the work of this section.

1.4 SUBMITTALS

A. Submittals Materials List:

1. After award of contract and before any irrigation system materials are ordered from suppliers or delivered to the job site, submit to the Owner a complete list of all irrigation system materials, or processes proposed to be furnished and installed as part of this contract.
2. The submittals materials list shall include the following information:
    a. A title sheet with the job name, the contractor's name, contractor's address and telephone number, submittal date and submittal number.
    b. An index sheet showing the item number (i.e. 1,2,3, etc.); an item description (i.e. sprinkler head); the manufacturer's name (i.e. Hunter Industries); the item model number (i.e. I-40-ADV/36V); and the page(s) in the submittal set that contain the catalog cuts.
    c. The catalog cuts shall be one or two pages copied from the most recent manufacturer's catalog that indicate the product submitted. Do not submit parts lists, exploded diagrams, price lists or other extra information.
    d. The catalog cuts shall clearly indicate the manufacturer's name and the item model number. The item model number, all specified options and specified sizes shall be circled on the catalog cuts.
    e. Submittals for equipment indicated on the legend without manufacturer names, or "as approved", shall contain the manufacturer, Class or Schedule, ASTM numbers and/or other certifications as indicated in these specifications.
3. Submittal materials list format requirements:
    a. Submittals shall be provided as one complete package for the project. Multiple partial submittals will not be reviewed.
    b. Submittal package shall be stapled or bound in such a way as to allow for disassembly for review processing. Submittals shall not have tabs, tab sheets, spiral binding, or any other type of binding that will interfere with automated copying of submittals.
    c. Submittal package shall have all pages numbered in the lower right hand corner. Page numbers shall correspond with submittal index.
    d. Re-submitted packages must be revised to include only the equipment being re-submitted. Equipment previously reviewed and accepted shall not be re-submitted in the materials list/index sheet or in the catalog cut sheet package.

B. Substitutions: If the Irrigation Contractor wishes to substitute any equipment or materials for those equipment or materials listed on the irrigation drawings and specifications, he may do so by providing the following information to the Landscape Architect or Owner's authorized representative for approval.

1. Provide a written statement indicating the reason for making the substitution.
2. Provide catalog cut sheets, technical data, and performance information for each substitute item.
3. Provide in writing the difference in installed price if the item is accepted.

C. The Landscape Architect or Owner's authorized representative will allow no substitutions without prior written acceptance.

D. Manufacturer's warranties shall not relieve the Contractor of his liability under the guarantee. Such warranties shall only supplement the guarantee.

E. The Landscape Architect or Owner's authorized representative will not review the submittal package unless provided in the format described above.

1.5 EXISTING CONDITIONS

A. The Contractor shall verify and be familiar with the locations, size and detail of points of connection provided as the source of water, electrical supply, and telephone line connection to the irrigation system.

B. Irrigation design is based on the available static water pressure shown on the drawings. Contractor shall verify static water on the project prior to the start of construction. Should a discrepancy exist, notify the Landscape Architect and Owner's authorized representative prior to beginning construction.

C. Prior to cutting into the soil, the Contractor shall locate all cables, conduits, sewer septic tanks, and other utilities as are commonly encountered underground and he shall take proper precautions not to damage or disturb such improvements. If a conflict exists between such obstacles and the proposed work, the Contractor shall promptly notify the Landscape Architect and Owner who will arrange for relocations. The Contractor will proceed in the same manner if a rock layer or any other such conditions are encountered.

D. The Contractor shall protect all existing utilities and features to remain on and adjacent to the project site during construction. Contractor shall repair, at his own cost; all damage resulting from his operations or negligence.

E. The Irrigation Contractor shall coordinate with the General Contractor for installation of required sleeving as shown on the plans prior to paving operations.

F. The Contractor shall verify and be familiar with the existing irrigation systems in areas adjacent to and within the Project area of work.

G. The Contractor shall protect all existing irrigation systems, in areas adjacent to and within the project area of work, from damage due to his operations.

H. Contractor shall notify Owner's Representative if any existing system is temporarily shut off, capped or modified. Provide 48-hour notice, prior to turning off or modifying any existing irrigation system.

I. The Contractor shall repair or replace all existing irrigation systems, in areas adjacent to and within the project area of work, damaged by the construction of this project. Adjacent irrigation systems shall be made completely operational and provide complete coverage of the existing landscaped areas. All repairs shall be complete to the satisfaction of the Owner's Representative.

J. The contractor shall provide bore holes under any existing pavement or paving encountered for the required lateral, mainline and low voltage control wire sleeving. Bore holes under 2 inches in diameter and smaller shall be made with a BulletMole® underground boring tool as manufactured by Dimension Tools, LLC (Contact telephone number (888)-650-5554 or at www.bulletmole.com). Bore holes larger than 2 inches in diameter shall be made with an approved mechanical boring tool. No air jacking or hydraulic boring of any kind shall be allowed.

1.6 INSPECTIONS

A. The Contractor shall permit the Landscape Architect and Owner's authorized representative to visit and inspect at all times any part of the work and shall provide safe access for such visits.

B. Where the specifications require work to be tested by the Contractor, it shall not be covered over until accepted by the Landscape Architect, Owner's authorized representative, and/or governing agencies. The Contractor shall be solely responsible for notifying the Landscape Owner's Representative, Owner, and governing agencies, a minimum of 48 hours in advance, where and when the work is ready for testing. Should any work be covered without testing or acceptance, it shall be, if so ordered, uncovered at the Contractor's expense.

C. Inspections will be required for the following at a minimum:
   1. Pre-construction meeting.
   2. System layout.
   3. Pressure test of irrigation mainline (Four hours at 125 PSI or 120% of static water pressure, whichever is greater.) Mainline pressure loss during test shall not exceed 2 PSI.
   4. Coverage test of irrigation system. Test shall be performed prior to any planting.
   5. Final inspection prior to start of maintenance period.
   6. Final acceptance prior to turnover.

D. Site observations and testing will not commence without the field record drawings as prepared by the Irrigation Contractor. Record drawings must complete and up to date for each site visit.

E. Work that fails testing and is not accepted will be retested. Hourly rates and expenses of the Landscape Architect, Owner's authorized representative, and governing agencies for re-inspection or retesting will be paid by the Irrigation Contractor at no additional expense to Owner.

1.7 STORAGE AND HANDLING

A. Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installation work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Landscape Architect and Owner and at no additional cost to the Owner.

B. Exercise care in handling, loading, unloading, and storing plastic pipe and fittings under cover until ready to install. Transport plastic pipe only on a vehicle with a bed long enough to allow the pipe to lay flat to avoid undue bending and concentrated external load.

1.8 CLEANUP AND DISPOSAL

A. Dispose of waste, trash, and debris in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction. Bury no such waste material and debris on the site. Burning of trash and debris will not be permitted. The Contractor shall remove and dispose of rubbish and debris generated by his work and workmen at frequent intervals or when ordered to do so by the Owner's authorized representative.

B. At the time of completion the entire site will be cleared of tools, equipment, rubbish and debris which shall be disposed of off-site in a legal disposal area.

1.9 TURNOVER ITEMS

A. Record Drawings:
   1. Record accurately on one set of drawings all changes in the work constituting departures from the original contract drawings and the actual final installed locations of all required components as shown below.
   2. The record drawings shall be prepared to the satisfaction of the Owner. Prior to final inspection of work, submit record drawings to the Landscape Architect or Owner's authorized representative.
   3. All record drawings shall be prepared using AutoCAD 2011 drafting software and the original irrigation drawings as a base. No manual drafted record drawings shall be acceptable. The Contractor may obtain digital base files from the Landscape Architect or Owner's authorized representative.
   4. If the Contractor is unable to provide the AutoCAD drafting necessary for the record drawings the irrigation designer does provide record drawing drafting as a separate service.
   5. Prior to final inspection of work, submit record drawings plotted onto vellum sheets for review by the Landscape Architect or Owner's authorized representative. After

acceptance by the Landscape Architect, City Inspector or Owner's authorized representative re-plot the record drawings onto reproducible Mylar sheets. The Contractor shall also provide record drawing information on a digital AutoCAD Release 2011 drawing file. All digital files shall be provided on a compact disc (CD) clearly marked with the project name, file descriptions and date.

a. Record drawing information and dimensions shall be collected on a day-to-day basis during the installation of the pressure mainline to fully indicate all routing locations and pipe depths. Locations for all other irrigation equipment shall be collected prior to the final inspection of the work.

b. Two dimensions from two permanent points of reference such as buildings, sidewalks, curbs, streetlights, hydrants, etc. shall be shown for each piece of irrigation equipment shown below. Where multiple components are installed with no reasonable reference point between the components, dimensioning may be made to the irrigation equipment. All irrigation symbols shall be clearly shown matching the irrigation legend for the drawings. All lettering on the record drawings shall be minimum 1/8 inch in size.

6. Show locations and depths of the following items:

a. Point of connection (including water POC, backflow devices, master control valves, flow sensors, etc.)

b. Routing of sprinkler pressure main lines (dimensions shown at a maximum of 100 feet along routing)

c. Isolation valves

d. Automatic remote control valves (indicate station number and size)

e. Quick coupling valves

f. Drip air relief and flush valves

g. Routing of control wires where separate from irrigation mainline

h. Irrigation controllers (indicate controller number and station count)

i. Related equipment (as may be directed)

B. Controller Charts:

1. Provide one controller chart for each automatic controller. Chart shall show the area covered by the particular controller. The areas covered by the individual control valves shall be indicated using colored highlighter pens. A minimum of six individual colors shall be used for the controller chart unless less than six control valves are indicated.

2. Landscape Architect or Owner's authorized representative must approve record drawings before controller charts are prepared.

3. The chart is to be a reduced copy of the actual "record" drawing. In the event the controller sequence is not legible when the drawing is reduced, it shall be enlarged to a readable size.

4. When completed and approved, the chart shall be hermetically sealed between two pieces of plastic, each piece being a minimum 20 mils in thickness.

C. Operation and Maintenance Manuals:

1. Two individually bound copies of operation and maintenance manuals shall be delivered to the Landscape Architect or Owner's authorized representative at least 10 calendar days prior to final inspection. The manuals shall describe the material installed and the proper operation of the system.

2. Each complete, bound manual shall include the following information:

3. Index sheet stating Contractor's address and telephone number, duration of guarantee period, list of equipment including names and addresses of local manufacturer representatives.

a. Operating and maintenance instructions for all equipment.

b. Spare parts lists and related manufacturer information for all equipment.

D. Equipment:

1. Supply as a part of this contract the following items:

a. Two (2) wrenches for disassembly and adjustment of each type of sprinkler head used in the irrigation system.

b. Three 30-inch sprinkler keys for manual operation of control valves.

c. Two keys for each automatic controller.

d. Two quick coupler keys with a 3/4" bronze hose bib, bent nose type with hand wheel and two coupler lid keys.

e. One valve box cover key or wrench.

f. Six extra sprinkler heads of each size and type.

g. For specified ball valves if required: One (1) 5-foot long valve handle for use with the specified ball valves.

2. The above equipment shall be turned over to Owner's authorized representative at the final inspection.

1.10 COMPLETION

A. At the time of the pre-maintenance period inspection, the Landscape Architect, Owner's authorized representative, and governing agencies will inspect the work, and if not accepted, will prepare a list of items to be completed by the Contractor. Punch list to be checked off by contractor and submitted to Landscape Architect or Owner’s Authorized representative prior to any follow-up meeting. This checked off list to indicate that all punch list items have been completed. At the time of the post-maintenance period or final inspection the work will be re-inspected and final acceptance will be in writing by the Landscape Architect, Owner's authorized representative, and governing agencies.

B. The Owner's authorized representative shall have final authority on all portions of the work.

C. After the system has been completed, the Contractor shall instruct Owner's authorized representative in the operation and maintenance of the irrigation system and shall furnish a complete set of operating and maintenance instructions.

D. Any settling of trenches which may occur during the one-year period following acceptance shall be repaired to the Owner's satisfaction by the Contractor without any additional expense to the Owner. Repairs shall include the complete restoration of all damage to planting, paving or other improvements of any kind as a result of the work.

1.11 GUARANTEE

A. The entire sprinkler system, including all work done under this contract, shall be unconditionally guaranteed against all defects and fault of material and workmanship, including settling of backfilled areas below grade, for a period of one (1) year following the filing of the Notice of Completion.

B. Should any problem with the irrigation system be discovered within the guarantee period, it shall be corrected by the Contractor at no additional expense to Owner within ten (10) calendar days of receipt of written notice from Owner. When the nature of the repairs as determined by the Owner constitute an emergency (i.e. broken pressure line) the Owner may proceed to make repairs at the Contractor's expense. Any and all damages to existing improvement resulting either from faulty materials or workmanship, or from the necessary repairs to correct same, shall be repaired to the satisfaction of the Owner by the Contractor, all at no additional cost to the Owner.

C. Guarantee shall be submitted on Contractors own letterhead as follows:

GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications, ordinary wear and tear and unusual abuse, or neglect excepted. We agree to repair or replace any defective material during the period of one year from date of filing of the Notice of Completion and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the Owner. We shall make such repairs or replacements within 10 calendar days following written notification by the Owner. In the event of our failure to make such repairs or replacements within the time specified after receipt of written notice from Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PROJECT NAME:

PROJECT LOCATION:

CONTRACTOR NAME:

ADDRESS:

TELEPHONE:

SIGNED:

DATE:

PART 2 - MATERIALS

2.1 SUMMARY

Use only new materials of the manufacturer, size and type shown on the drawings and specifications. Materials or equipment installed or furnished that do not meet Landscape Architect's, Owner's, or governing agencies standards will be rejected and shall be removed from the site at no expense to the Owner.

2.2 PIPE

A. Pressure supply lines 2 inches in diameter and up to 3 inches in diameter downstream of backflow prevention unit shall be Class 315 solvent weld PVC. Piping shall conform to ASTM D2241.

B. Non-pressure lines 3/4 inch in diameter and larger downstream of the remote control valve shall be SCH 40 solvent weld PVC conforming to ASTM D1785.

C. Recycled water PVC pipe to be color-coded purple in color marked on two sides with recycled water warning statements “Caution-Recycled Water”. Recycled water piping must be accepted by the local recycled water governing agencies.

2.3 METAL PIPE AND FITTINGS

A. Brass pipe shall be 85 percent red brass, ANSI, IPS Standard 125 pounds, Schedule 40 screwed pipe.

B. Fittings shall be medium brass, screwed 125-pound class.

C. Copper pipe and fittings shall be Type "K" sweat soldered, or brazed as indicated on the drawings.

2.4 PLASTIC PIPE AND FITTINGS

A. Pipe shall be marked continuously with manufacturer's name, nominal pipe size, schedule or class, PVC type and grade, National Sanitation Foundation approval, Commercial Standards designation, and date of extrusion.

B. All plastic pipe shall be extruded of an improved PVC virgin pipe compound in accordance with ASTM D2672, ASTM D2241 or ASTM D1785.

C. All solvent weld PVC fittings shall be standard weight Schedule 40 (and Schedule 80 where specified on the irrigation detail sheet, all mainline fittings shall be Schedule 80 PVC) and shall be injection molded of an improved virgin PVC fitting compound. Slip PVC fittings shall be the "deep socket" bracketed type. Threaded plastic fittings shall be injection molded. All tees and ells shall be side gated. All fittings shall conform to ASTM D2464 and ASTM D2466.

D. All threaded nipples shall be standard weight Schedule 80 with molded threads and shall conform to ASTM D1785.

E. All solvent cementing of plastic pipe and fittings shall be a two-step process, using primer and solvent cement applied per the manufacturer's recommendations. Cement shall be of a fluid consistency, not gel-like or ropy. Solvent cementing shall be in conformance with ASTM D2564 and ASTM D2855.

F. When connection is plastic to metal, female adapters shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be non-lead base Teflon paste, tape, or equal.

G. All pressure mainlines installed with solvent weld PVC fittings shall be installed with concrete thrust blocking at all directional changes in the mainline routing. Concrete thrust blocking shall not be required when ductile iron fittings and mechanical restraints are specified.

2.5 VALVES

A. Ball Valves:

1. Ball valves shall be of the manufacturer, size, and type indicated on the drawings.

2. All ball valves shall have a minimum working pressure of not less than 150 PSI and shall conform to AWWA standards.

B. Quick Coupler Valves:

1. Quick coupler valves shall be of the manufacturer, size, and type indicated on the drawings.
2. Quick coupler valves shall be brass with a wall thickness guaranteed to withstand normal working pressure of 150 psi without leakage. Valves shall have 1” female threads opening at base, with two-piece body. Valves to be operated only with a coupler key, designed for that purpose. Coupler key is inserted into valve and a positive, watertight connection shall be made between the coupler key and valve.

C. Automatic Control Valves:

1. Automatic control valves shall be of the manufacturer, size, and type indicated on the drawings.
2. Automatic control valves shall be electrically operated.

2.6 VALVE BOXES

A. Valve boxes shall be fabricated from a durable, weather-resistant plastic material resistant to sunlight and chemical action of soils.

B. The valve box cover shall be green in color and secured with a hidden latch mechanism or bolts.

C. The cover and box shall be capable of sustaining a load of 1,500 pounds.

D. Valve box extensions shall be by the same manufacturer as the valve box.

E. The plastic irrigation valve box cover shall be an overlapping type.

F. Automatic control valve, master valve, flow sensor, and gate valve boxes shall be 16"x11"x12" ‘nominal’ rectangular size. Valve box covers shall be marked "RCV" with the valve identification number, or “MV”, “FS”, “GV” "heat branded" onto the cover in 1-1/4 inch high letters / numbers.

G. Drip flush valve and Air relief valve boxes shall be 6" circular size. Valve box covers shall be marked with "FV" or “ARV” "heat branded" onto the cover in 1-1/4 inch high letters.

H. Quick coupler and ball valve boxes shall be 10" circular size. Valve box covers shall be marked with "QCV", “BV” "heat branded" onto the cover in 1-1/4 inch high letters.

I. Valve box cover shall be purple in color and permanently marked (attached tags are not acceptable) on valve box cover plate with the words “Warning-Recycled Water-Do Not Drink”.

2.7 AUTOMATIC CONTROLLER

A. Automatic controller shall be of the manufacturer, size, and type indicated on the drawings.

B. Controller enclosure shall be of the manufacturer, size, and type indicated on the drawings.

C. Controller shall be grounded according to local codes using equipment of the manufacturer, size, and type indicated on the drawings; or as required by local codes and ordinances.

2.8 ELECTRICAL

A. All electrical equipment shall be NEMA Type 3, waterproofed for exterior installations.

B. All electrical work shall conform to local codes and ordinances.

2.9 LOW VOLTAGE CONTROL WIRING

A. Remote control wire shall be direct-burial AWG-UF type, size as indicated on the drawings, and in no case smaller than 14 gauge.

B. Connections shall of the manufacturer, size, and type indicated on the drawings.

C. Common wires shall be white in color. Control wires shall be red (where two or more controllers are used, the control wires shall be a different color for each controller. These colors shall be noted on the "Record Drawings" plans located on controller door).

D. Ground wires shall be green in color or bare copper and in no case smaller than 6 gauge.

2.10 IRRIGATION HEADS AND DRIP EMITTERS AND INLINE DRIP TUBING

A. Irrigation heads, drip emitters and inline drip tubing shall be of the manufacturer, size, type, with radius of throw, operating pressure, and discharge rate indicated on the drawings.

B. Irrigation heads, drip emitters and inline drip tubing shall be used as indicated on the drawings.

C. Irrigation heads shall have purple reclaimed water warning cover.

2.11 DRIP IRRIGATION EQUIPMENT

Drip tubing equipment such as flush valves, air relief valves, wye strainers and pressure regulators shall be of the manufacturer, size, and type indicated on the drawings.

2.12 MISCELLANEOUS EQUIPMENT

A. Landscape Fabric:

1. Landscape fabric for valve box assemblies shall be 5.0- oz. weight woven polypropylene weed barrier. Landscape fabric shall have a burst strength of 225 PSI, a puncture strength of 60 lbs. and capable of water flow of 12 gallons per minute per square foot.

2. Type: DeWitt Pro 5 Weed Barrier or approved equal.

B. Equipment such as flow sensors, rain sensors, flush valves, air relief valves, wye strainers, and master valves shall be of the manufacturer, size and type indicated on the drawings.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

A. Inspections:

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that irrigation system may be installed in strict accordance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Landscape Architect or Owner's authorized representative.

2. Do not proceed with installation in areas of discrepancy until all discrepancies have been resolved.

C. Grades:

1. Before starting work, carefully check all grades to determine that work may safely proceed, keeping within the specified material depths with respect to finish grade.

2. Final grades shall be accepted by the Engineer before work on this section will be allowed to begin.

D. Field Measurements:

1. Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design. Contractor shall coordinate the installation of all irrigation materials with all other work.

2. All scaled dimensions are approximate. The Contractor shall check and verify all size dimensions prior to proceeding with work under this section.
3. Exercise extreme care in excavating and working near existing utilities. Contractor shall be responsible for damages to utilities, which are caused by his operations or neglect.

E. Diagrammatic Intent:

The drawings are essentially diagrammatic. The size and location of equipment and fixtures are drawn to scale where possible. Provide offsets in piping and changes in equipment locations as necessary to conform with structures and to avoid obstructions or conflicts with other work at no additional expense to Owner.

F. Layout:

1. Prior to installation, the Contractor shall stake out all pressure supply lines, routing and location of sprinkler heads, valves and automatic controller.
2. Layout irrigation system and make minor adjustments required due to differences between site and drawings. Where piping is shown on drawings under paved areas, but running parallel and adjacent to planted areas, install the piping in the planted areas.

G. Water Supply:

Connections to, or the installation of, the water supply shall be at the locations shown on the drawings. Minor changes caused by actual site conditions shall be made at no additional expense to Owner.

H. Electrical Service:

1. Connections to the electrical supply shall be at the locations shown on the drawings. Minor changes caused by actual site conditions shall be made at no additional expense to Owner.
2. Contractor shall make electrical connections to the irrigation controller. Electrical power source to controller locations shall be provided by others.

3.2 TRENCHING

A. Excavations shall be straight with vertical sides, even grade, and support pipe continuously on bottom of trench. Trenching excavation shall follow layout indicated on drawings to the depths below finished grade and as noted. Where lines occur under paved area, these dimensions shall be considered below subgrade.
B. Provide minimum cover of 18 inches on pressure supply lines 2 ½ inches and smaller.
C. Provide minimum cover of 18 inches for control wires.
D. Provide minimum cover of 36 inches on pressure supply lines under vehicular travel ways.
E. Provide minimum cover of 12 inches for non-pressure lines.
F. Pipes installed in a common trench shall have a 4-inch minimum space between pipes.

3.3 THRUST BLOCKS

A. Thrust blocks must be constructed of Class “B” concrete.
B. Thrust blocks shall be poured against undisturbed site soil.
C. PVC fitting joints shall be kept free of concrete. Do not encase fitting in concrete.
D. Thrust blocking shall be sized to provide the minimum bearing areas as shown below. Bearing areas indicated have been calculated for Class 200 PVC pipe at a test pressure of 150 PSI in soil with 2,000 PSI bearing capacity. Increase thrust block sizing as necessary for varying soil conditions.
    1. Provide a minimum thrust block bearing area of 2.0 square feet on all bends (all degrees) and tees installed on pressure supply lines 4 inches and smaller.

3.4 BACKFILLING

A. Backfill material on all lines shall be the same as adjacent soil free of debris, litter, and rocks over 1/2 inches in diameter.

B. Backfill shall be tamped in 4-inch layers under the pipe and uniformly on both sides for the full width of the trench and the full length of the pipe. Backfill materials shall be sufficiently damp to permit thorough compaction, free of voids. Backfill shall be compacted to dry density equal to adjacent undisturbed soil and shall conform to adjacent grades.

C. Flooding in lieu of tamping is not allowed.

D. Under no circumstances shall truck wheels be used to compact backfill.

E. Provide sand backfill a minimum of 4 inches over and under all piping under paved areas.

3.5 PIPING

A. Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. No hydraulic driving is permitted under asphalt pavement.

B. Cutting or breaking of existing pavement is not permitted.

C. Carefully inspect all pipe and fittings before installation, removing dirt, scale, burrs, and reaming. Install pipe with all markings up for visual inspection and verification.

D. Remove all dented and damaged pipe sections.

E. All lines shall have a minimum clearance of 4 inches from each other and 12 inches from lines of other trades.

F. Parallel lines shall not be installed directly over each other.

G. In solvent welding, use only the specified primer and solvent cement and make all joints in strict accordance with the manufacturer's recommended methods including wiping all excess solvent from each weld. Allow solvent welds at least 15 minutes setup time before moving or handling and 24 hours curing time before filling.

H. PVC pipe shall be installed in a manner, which will provide for expansion and contraction as recommended by the pipe manufacturer.

I. Center load all plastic pipe prior to pressure testing.

J. All threaded plastic-to-plastic connections shall be assembled using Teflon tape or Teflon paste.

K. For plastic-to-metal connections, work the metal connections first. Use a non-hardening pipe dope an all threaded plastic-to-metal connections, except where noted otherwise. All plastic-to-metal connections shall be made with plastic female adapters.

3.6 CONTROLLER

A. The exact location of the controller shall be approved by the Landscape Architect or Owner's authorized representative before installation. The electrical service shall be coordinated with this location.

B. The Irrigation Contractor shall be responsible for the final electrical hook up to the irrigation controller.

C. The irrigation system shall be programmed to operate during the periods of minimal use of the design area.

3.7 CONTROL WIRING

A. Low voltage control wiring shall occupy the same trench and shall be installed along the same route as the pressure supply lines whenever possible.

B. Where more than one wire is placed in a trench, the wiring shall be taped together in a bundle at intervals of 10 feet. Bundle shall be secured to the mainline with tape at intervals of 20 feet.

C. All connections shall be of an approved type and shall occur in a valve box. Provide an 18-inch service loop at each connection.

D. An expansion loop of 12 inches shall be provided at each wire connection and/or directional change, and one of 24 inches shall be provided at each remote control valve.

E. A continuous run of wire shall be used between a controller and each remote control valve. Under no circumstances shall splices be used without prior approval.

3.8 VALVES

A. Automatic control valves, quick coupler, and gate valves are to be installed in the approximate locations indicated on the drawings.

B. Valve shall be installed in shrub areas whenever possible.

C. Install all valves as indicated in the detail drawings.

D. Valves to be installed in valve boxes shall be installed one valve per box.

3.9 VALVE BOXES

A. Valve boxes shall be installed in shrub areas whenever possible.

B. Each valve box shall be installed on a foundation of 3/4 inch gravel backfill, 3 cubic feet minimum. Valve boxes shall be installed with their tops 1/2 inch above the surface of surrounding finish grade in lawn areas and 2 inches above finish grade in ground cover areas.

3.10 IRRIGATION HEADS DRIP EMITTERS AND INLINE DRIP TUBING

A. Irrigation heads, drip emitters and inline drip tubing shall be installed as indicated on the drawings.

B. Spacing of heads and inline drip tubing shall not exceed maximum indicated on the drawings.

C. Riser nipples shall be of the same size as the riser opening in the sprinkler body.

3.11 MISCELLANEOUS EQUIPMENT

A. Install all assemblies specified herein according to the respective detail drawings or specifications, using best standard practices.

B. Quick coupler valves shall be set approximately 18 inches from walks, curbs, header boards, or paved areas where applicable.

C. Install devices such as rain sensors, flush valves, and air relief valves, master valves and flow sensors as indicated on the drawings and as recommended by the manufacturer.

3.12 FLUSHING THE SYSTEM

A. Prior to installation of irrigation heads, the valves shall be opened and a full head of water used to flush out the lines and risers.

B. Irrigation heads shall be installed after flushing the system has been completed.

3.13 ADJUSTING THE SYSTEM

A. Contractor shall adjust valves, align heads, and check the coverage of each system prior to coverage test.

B. If it is determined by the Landscape Architect or Owner's authorized representative that additional adjustments or nozzle changes will be required to provide proper coverage, all necessary changes or adjustments shall be made prior to any planting.

C. The entire system shall be operating properly before any planting operations commence.

D. Automatic control valves are to be adjusted so that the irrigation heads, drip emitters and inline drip tubing operate at the pressure recommended by the manufacturer.

3.14 TESTING AND OBSERVATION

A. Do not allow or cause any of the work of this section to be covered up or enclosed until it has been observed, tested and accepted by the Landscape Architect, Owner, and governing agencies.

B. The Contractor shall be solely responsible for notifying the Landscape Architect, Owner, and governing agencies, a minimum of 48 hours in advance, where and when the work is ready for testing.

C. When the sprinkler system is completed, the Contractor shall perform a coverage test of each system in its entirety to determine if the water coverage for the planted areas is complete and adequate in the presence of the Landscape Architect.

D. The Contractor shall furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the plans, or where the system has been willfully installed as indicated on the drawings when it is obviously inadequate, without bringing this to the attention of the Landscape Architect. This test shall be accepted by the Landscape Architect and accomplished before starting any planting.

E. Areas to be maintained for the formal maintenance period shall start maintenance at the same time, as directed by the Landscape Architect, Owner, and governing agencies. Partial areas will not be released into maintenance prior to completion of items listed in the pre-maintenance review. The maintenance period may not be phased.

F. If, after the maintenance review, the irrigation systems are not accepted by the Landscape Architect, the contractor shall reimburse the Owner's Representative for additional site visits, or additional time required to review work. All additional time will be billed at the Owner's Representative's hourly rate and will be paid for by the contractor at no additional cost to the owner.

G. Final inspection will not commence without record drawings as prepared by the Irrigation Contractor.

3.15 MAINTENANCE

During the maintenance period the Contractor shall adjust and maintain the irrigation system in a fully operational condition providing complete irrigation coverage to all intended plantings.

3.16 COMPLETION CLEANING

Clean up shall be made as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be swept, and any damage sustained on the work of others shall be repaired to original conditions.

END OF SECTION 32 84 00

SECTION 32 93 00 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Plants
2. Planting soils and soil amendments
3. Landscape Mulches
4. Tree stabilization
5. Landscape edgings
6. Root barrier

B. Related Sections:

1. Division 01 Section "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. Division 12 Section "Site Furnishings" for exterior unit planters or ceramic pots.
3. Division 31 Section "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
4. Division 31 Section "Earth Moving" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
5. Division 32 Section "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.
6. Division 33 Section "Subdrainage" for below-grade drainage of landscaped areas, paved areas, and wall perimeters.

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Brown Trunk Height: (BTH) Indicating the height of palm trees. The Brown Trunk Height shall be measured from the ground line at the base of the palm to the top of the new growth above the crown shaft.

C. Clear Trunk Height (CTH): Indicating the height of palm trees. The Clear Trunk Height shall be measured from the ground line at the base of the palm to the top of the pineapple and excludes any new growth above the crown shaft.

D. Clear Wood Height (CWH): Indicating the height of palm trees. The Clear Wood Height shall be measured from the ground line at the base of the palm to the bottom of the pineapple.

E. Compost: mixture of various decaying highly organic substances such as dead leaves, but free of animal wastes, used to improve soil structure and provide nutrients.

F. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

G. Date of Acceptance: Date at the end of the warranty periods (as specified herein) when written acceptance is provided by the Owner.

H. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

I. Finish Grade: Elevation of finished surface of planting soil (not mulch) within 1/10th of an inch. Unless other wise noted soil finish shall be:

1. 2 ½" below hardscape /pavement areas
2. 4" below topcut curb or planter wall
3. 1" below hardscape/ pavement areas (at lawn assembly)

J. Manufactured or Import Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

K. Native Planting Areas: Areas to be planted with California Native Plants or covered with mulches not intended for pedestrian or vehicular circulation. Native Planting areas will require special soil preparation and planting procedures to create the ecology necessary for Native Plantings.

L. Native Soil: Existing soil found in place on the site. Soil is defined as the unconsolidated mineral or organic matter on the immediate surface of the earth which serves as a natural medium for the growth of plants.

M. Notice of Completion: The date at the close of the Maintenance Period when the work has been completed, checked, accepted and written approval of the work has been given by the Landscape Architect.

N. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

O. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

P. Planting Area: Areas to be planted or covered with mulches not intended for pedestrian or vehicular circulation.

Q. Planting Soil: Existing, in-place surface soil or imported topsoil that is modified with soil amendments and fertilizers per the specifications to produce a soil mixture best for plant growth.

R. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

S. Raised Planter: Planted areas that are bounded by any wall or curb 12" or higher than the adjacent grade or surface. To be filled with import topsoil to the full and complete depth of the planter.

T. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

U. Soil Amendment: elements added to the soil, such as compost, peat moss, or fertilizer to improve its capacity to support plant life. Such materials are usually intended to improve structure, drainage or aeration, or add nutrients to the soil.

V. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

W. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

X. To Remain: Planting areas identified in the Drawings to be protected and maintained in place.

1.4 SUBMITTALS

A. Submittals for items shall be made in one package. If submittals are judged incomplete or non-responsive to the directions of the Landscape Architect after three (3) submittals, the Contractor shall be back-charged for the Landscape Architect's costs to process additional Submittals.

B. Submittals will be rejected without the benefit of review by the Landscape Architect if they are difficult to read, incomplete or if the required information in not presented in format required.

C. Product Data:

1. For each type of product listed in Part 2 of this specification.
2. Plant Materials: Include quantities, sizes, quality, and nursery sources for plant materials.
3. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
4. Plant Photographs: For each plant specified, include photo quality color photographs at 8 ½ x11 size format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Include a minimum of three photographs of each species. Identify each photograph with the full scientific name of the plant, container size, height and spread, and name of the growing nursery. Review of plant photographs does not indicate acceptance of the plant material as delivered to the Project Site.
5. Palm Trees: Submit photos as noted above. Submit documentation from each nursery certifying that the trees have been inspected by a county or state agricultural agency within the last 3 months, the trees are disease and pest free and are available for sale.
6. Planting Schedule: Submit anticipated planting dates for each type of planting.
7. Delivery Slips for all products included in submittal, slips should indicate quantity delivered.

D. Samples for Verification: For each of the following:

1. Compost: ¼ lb bagged sample; in sealed plastic bags labeled with product name and source. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
2. Planting soils: 1 lb bagged sample for each type of soil required; in sealed plastic bags labeled with product name and source. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
3. Organic Mulch: ¼ lb bagged samples of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
4. Mineral Mulch: 1 lb bagged sample of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on the site; provide an accurate indication of name, source, size, and color range of the material.

5. Stone 1”-3” diameter: Submit nine (9) stones for each type and/or size range. Label shipping container with an accurate indication of name, source, size and color range of the material.
6. Stone 3”-8” diameter: Submit three (3) stones for each type and/or size range. Label shipping container with an accurate indication of name, source, size and color range of the material.
7. Stone over 8” diameter: Submit three (3) photo quality color images at 8 ½ x11 size format of each required stone. Label each image with an accurate indication of name, source, size and color range of the material.
8. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

E. Qualification Data: For qualified Landscape Installer and qualified Native Plantings Landscape Subcontractor (if applicable). Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners/ contact persons. Refer to the “Quality Assurance” section Part 1 of this specification for additional information.

F. Material Test Reports:

1. For Phoenix species and Washingtonia filifera Palm Trees: Submit written certification from an independent certified arborist that each palm has been visually inspected for disease. The arborist shall collect tissue samples for each of the proposed palms specimens to be tested by a qualified plant laboratory for known palm diseases including Fusarium oxysporum and Gliocladium vermoeseni. Sample results shall be listed by individual palm tree for verification by the Landscape Architect.
2. Soil Analysis Test Reports: Testing for all planting soils including import Topsoil and existing or stockpiled soil to be used during backfill operations. Refer to Soil Testing section in Part 3 testing procedures. Soil testing shall be completed after rough grading operations. See Part 1 Quality Assurance for additional requirements.
3. Percolation Test Reports: Refer to Percolation Testing section in Part 3 for testing procedures. The results of the percolation testing must be submitted to the Landscape Architect for review and approval.

G. Maintenance Instructions: Contractor shall furnish to the Owner recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

1. Instructions should include but not be limited to the following tasks: Fertilizing, irrigation schedule, dead heading, mulch or other inert groundcover replenishment, pruning of shrubs to maintain design intent and 3 year tree maintenance schedule.
2. Instructions shall be submitted to Landscape Architect for approval before submittal to the Owner and prior to the expiration of the Maintenance period.

H. Landscape Planting Plan As built Drawings Contractor mark ups.

I. Warranty: Submit written warranties on the Contractor’s or subcontractor’s letterhead, addressed to the Owner. Submit all warranties in duplicate and in the form shown in the General Conditions, or modified as approved by the Landscape Architect to suit the conditions pertaining to the warranty. Refer to Warranty and Replacement section, Part 1 for more information.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.

1. All work shall be performed by a trained crew in accordance with the standards and practices related to the trade.
2. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
3. Experience: Five years' experience in landscape installation in addition to requirements in Division 01 Section "Quality Requirements." Provide client list with contact names, phone numbers and date planting was installed.
4. License: Single entity subcontractor holding a valid C-27 California Contractor's license.
5. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
6. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
   a. Certified Landscape Technician - Exterior, with installation, maintenance and irrigation specialty area(s).
   b. Certified Ornamental Landscape Professional, designated COLP.
7. Pesticide Applicator: State licensed, commercial.

B. Native Planting Landscape Installer Qualifications: All of the work required to be provided as Native Planting as described in this Specification shall be provided by an experienced Native Plant Contractor holding a valid C-27 California contractor's license.

1. The qualified Native Plantings Landscape Installer shall exhibit work that has resulted in successful establishment of California Native Plant Landscapes.
2. Experience: Minimum 5 years experience in the installation of Native Plantings in Southern California.
3. Landscape Contractors: Subject to compliance with the requirements, provide California Native Plantings by one of the following or a comparable installer:
   a. California's Own Native Landscape Design: (760) 746-6870
   b. Coastal Sage Gardening: (619) 223-5229
   c. Landscapers Technical Services: (619) 915-6714
   d. RECON (619) 308-9333

C. Soil and Plant-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

1. Provide testing by one of the following or a comparable testing laboratory:
   a. John Deere Landscapes
   b. Waypoint Analytical
   c. Wallace Laboratories

D. Soil Analysis Testing: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio (SAR), electrical conductivity (ECe), boron content, deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Supply Testing Agency with a complete copy of this specification and a copy of the project plant list and planting plan at the time of the soil testing.
2. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
3. The soil-testing laboratory shall oversee soil sampling at the conclusion of rough grading operations; with depth, location, and number of samples to be taken per

instructions from Landscape Architect. A minimum of five representative samples (or as listed in the Drawings) shall be taken from varied locations for each soil to be used or amended for planting purposes.

4. No amendments shall be applied prior to receipt of test results.

5. Report suitability of tested soil for plant growth.

   a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) for recommended quantities of soil amendments and fertilizers listed in the specifications to produce satisfactory planting soil suitable for healthy, viable plants.

   b. Testing Agency recommendations must use the soil amendments and fertilizers listed in the specifications in their recommendations.

   c. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

   d. If corrective measures are specified, provide retesting of soils after measures are corrected to confirm soils were successfully abated. Costs for soil testing and retesting after corrective measures are completed shall be including in the base bid price.

6. The Landscape Architect shall recommend all changes to the amendments listed after review of the test results. Cost change for soil preparation shall be in accordance with the provisions in the General Conditions. Amounts of amendments listed in Part 3 shall be used for bidding purposes.

E. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

F. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip.

2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

G. Plant Material Observation: Landscape Architect may elect to observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. The landscape architect may make invasive inspection of the rootball as needed to verify that plants meet the requirements and may require random cutting into the interior of the rootball and or remove or request the removal of the sides of boxes at the nursery or on-site. Such cutting and inspection may render the container plant unsuitable for planting. Findings of the root inspections shall be considered as representative of all plants of that type from said nursery source. Remove rejected trees or shrubs immediately from Project site.

1. Notify Landscape Architect of sources of planting materials fourteen days in advance of delivery to site.

H. Preinstallation Conference: Conduct conference at Project site with the Landscape Architect, Contractor and Landscape subcontractor to review requirements.

1. Meeting minutes from the preinstallation conference shall be the responsibility of the Contractor and shall be distributed to the parties in attendance for review and subsequent approval of conference discussion items.
2. Discussion agenda items during the pre-installation shall include the Contractor's understanding and familiarity with the following:
   a. Protection of existing trees and landscape areas
   b. Contract grown plant material
   c. Site materials and finishes
   d. Required submittals, samples and mock-ups.
   e. Preparation and criteria for generation of the punch list, determination of Notice of Completion and Date of Acceptance.
   f. Soil testing and percolation testing
   g. Procedures protocol for site construction observation visits.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants or within driplines of existing trees.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Plants shall not be allowed to remain on site longer than 5 days prior to planting.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.7 PROJECT CONDITIONS

A. Field Measurements: Prior to excavation for planting or placing of plant materials, verify actual grade elevations, service and utility locations, underground and overhead lines, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work. In the vent of a conflict the Contractor shall notify the Landscape Architect and the owner.

B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions

and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Owner's written permission.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

D. Site Draining: Established site drainage shall be maintained by the Contractor during all phase of the Work. Grade areas as needed to insure proper grades and drainage as indicated on Drawings. Final finish grade shall insure positive drainage with surface drainage away from buildings, walls and toward driveways, drainlets and catch basins.

E. Errors and Omission: Refer to errors and/or discrepancies in or between plans, specifications, lists or notes to eth Landscape Architect for adjustments before proceeding with the Work. The Contractor shall assume responsibility for proceeding with the Work without referring. In the event of a conflict, the Landscape Architect shall interpret the meaning of the Contract Drawings and Contract Specifications and their decision shall be final.

F. Excavation: When conditions detrimental to plant growth are encountered such as rubble fill, adverse drainage conditions or obstructions, cease planting operations and notify the Landscape Architect for further direction.

G. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.8 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Death and unsatisfactory growth, except for defects resulting from incidents that are beyond Contractor's control.
   b. Structural failures including plantings falling or blowing over.
   c. Faulty performance of tree stabilization, edgings, tree grates, improper planting, and failure to water sufficiently.
   d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   e. Damages done to plant material during construction.
2. Warranty Periods from Date of Notice of Completion:
   a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months
   b. Ground Covers, Biennials, Perennials, and Other Plants: 6 months.
   c. Specialty Plants (succulents, tropical plants, bamboo): 24 months
   d. Palms and palm like plants: 24 months
   e. Native Plantings: 30 months
3. Include the following remedial actions as a minimum:
   a. Immediately remove dead plants within 14 days and replace unless required to plant in the succeeding planting season.
   b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

c. Replacement plants shall be of the same size, species and variety as specified in the Drawings. Replacement includes restoration of surrounding area to match the existing conditions.

d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: **180 days** from date of Notice of Completion.

B. Within one week, prior to authorization start of maintenance, submit a Maintenance Schedule to the Landscape Architect listing the days when maintenance crews will be on site. Include a contact person and emergency phone number.

C. The maintenance period shall be extended when in the opinion of the Landscape Architect, dead or dying plant materials, poor or unhealthy growing conditions or improper maintenance practices are evident within the maintenance period. The extended period shall be provided at no additional cost to the Owner and shall be extended until the work is complete and acceptable to the Landscape Architect.

1.10 REJECTION AND SUBSTITUTION

A. Products or materials, whether installed or not, not conforming to the requirements herein specified shall be considered defective, and be marked as rejected. Materials shall be removed and replaced with approved materials at no additional cost to the Owner.

B. Submit written request for each proposed substitution. Provide data substantiating the request as well as a Certificate of Suitability certifying that the proposed substitution is equal or better in all respects to that specified and that it will in all respects perform the function for which it is intended. Include with request all required samples.

1.11 SITE OBSERVATIONS

A. Schedule and coordinate site observation visits for the following construction activities. Reviews shall be performed by the Landscape Architect an notification shall be given in advance notice as noted:

B.

Item	Advance Notice
Protection of existing plant materials	48 hours
Rough grade	48 hours
Soil preparation and finish grade	48 hours
Inspection of plant material delivered on site.	48 hours
Spotting of Trees prior to excavation of planting holes	48 hours
Plant material review	48 hours
Plant layout and installation	48 hours
Substantial Completion Punch List	7 days
Punch List Completion	7 days
Maintenance Completion	7 days

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous

stock, densely foliated when in leaf and free of weeds, disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than *3/4 inch (19 mm)* in diameter; or with stem girdling or kinked roots will be rejected.
2. Plants shall have normal well-developed, vigorous and fibrous root systems which are neither root, nor container bound.
3. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.

C. Labeling: Label five plants of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

D. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

E. Provide healthy, weed and disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container or stem girdling roots above the root collar. Provide only plants that are acclimated to outdoor conditions before delivery.

F. Plants shall be grown in their container for at least six months, but not over two years.

G. A minimum of three structural roots reasonably distributed around the trunk of the plan shall be found in each plant. Plants with structural roots only on one side of the trunk (J roots) shall be rejected.

H. The root crown must be more than two inches below the soil line. The top two structural roots shall be no more than three inches below the soil line when measured four inches radial to the trunk. The top of the other structural roots shall be no greater than five inches below the soil line when measured four inches radial to the trunk. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removed all circling roots above or across the top of the structural roots.

I. The plant grower shall be responsible for certifying that the plants have been root pruned at each step in the plant production process to remove stem girdling roots and kinked roots. The plant grower shall certify in writing that all plants are reasonably free of root defects as defined in this specification and that the tree has been grown and harvested to produce a plant that meets the specifications.

J. Groundcover plants grown in flats shall be healthy vigorous rooted cuttings grown in flats for at least 3 months but not over six months. Plants that have a cracked or broken rootball shall be replaced with the same species, size and character as specified.

K. Allow for long lead time in securing all Palm Trees.

L. Succulents: Succulents shall be acquired from a licensed nursery. Succulents shall be free of insects, mottled leaves, broken or split branches or trunks, scarring or any other uncharacteristic growth patterns.

M. Plants that fail to meet any of the above requirements may be rejected by the landscape architect. Additionally, corrective measures to may be taken to fix deficiencies in the

plant material if approved by the landscape architect. Modifications may include the following:

1. Shaving all circling roots on the exterior of the root mass deep enough so that all cut roots' ends are roughly radial to the trunk.
2. Removal of all roots above the top of the main structural roots and trunk flare including any roots that are imprints from previous smaller containers.

2.2 INORGANIC SOIL AMENDMENTS

A. Sulfur: Pelletized, biodegradable, commercially processed and packaged, and containing a minimum of 90 percent sulfur capable of oxidizing over time and providing nutrient sulfur with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.

1. Acceptable Manufacturers:

a. "Tiger 90 CR", John Deere Landscapes (800) 233-6933

B. Iron Sulfate: a non-staining iron with micronutrients, pelletized, slow release, environmentally safe; 40% Iron, 1% Manganese, 1% Zinc, 1% Magnesium, 6% Sulfur; 2% Humic Acids

1. Acceptable Manufacturers:

a. "Premium Green Iron 40% Fe", Gro-Power®, Inc. (800) 473-1307

C. Ammonium Sulfate (21-0-0): a granular ammonium sulfate with 21% total nitrogen, 24% sulfur and 55% inert ingredients.

1. Acceptable Manufacturers:

a. Best "Ammonium Sulfate 21-0-0", Simplot (800) 992-6066

D. Agricultural Gypsum: Minimum 90 percent calcium sulfate (CaSo4, H2O), a commercially processed and packaged gypsum, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

E. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

2.3 COMPOST

A. Humus material shall have an acid-soluble ash content of no less than 5% and no more than 20%.

B. Organic matter shall be between 30% minimum and 60% maximum on a dry weight basis.

C. The pH of the material shall be between 6 and 8

D. Permeability Rate - Hydraulic conductivity rate shall be not less than one inches per hour nor more than three inches per hour

E. Compost shall be provided from a licensed facility and shall be "metered.

F. Compost shall undergo a pathogen reduction process, be a minimum of 15 days, and kept at a temperature between 131 degrees Fahrenheit to 150 degrees Fahrenheit.

G. The salt content shall be less than 10 millimho/cm @ 25° C. in a saturated paste extract.

H. Boron content of the saturated extract shall be less than 1.0 parts per million.

I. Silicon content (acid-insoluble ash) shall be less than 50%.

J. Calcium carbonate shall not be present if to be applied on alkaline soils.

K. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.

L. Composted wood products are conditionally acceptable, but stable humus must be present. Wood based products are not acceptable which are based on red wood or cedar.

M. Sludge-based materials are not acceptable.

N. Carbon: nitrogen ratio shall be less than 25:1.

O. The compost shall be aerobic without malodorous presence of decomposition products.

P. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending. The maximum particle size shall be 0.25 inch for hydroseeding.

Q. Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	20
copper	150
selenium	50
cadmium	15
lead	200
silver	10
chromium	300
mercury	10
vanadium	400
cobalt	50
molybdenum	20
zinc	250
nickel	100

R. Higher amounts of salinity or boron to be pre-leached to reduce the excess.

S. Acceptable Manufacturers:
1. "Humic Compost", AgriService (760) 439-9920
2. "Forest Floor Humus", Aguiñaga Fertilizer 909/424-1400
3. "Washed Steer Humus", Earthworks 951-782-0260
4. "Economix", Agromin 805/432-5265

2.4 FERTILIZERS

A. Potassium sulfate (0-0-50): a low salt fertilizer for potassium deficient soils that provides high levels of potassium for increased drought, heat, wear, and cold tolerance. Contains 18% Sulfur minimum for improved color and plant density, and 50% soluble potash derived from potassium sulfate.

Soluble Potash	50%	minimum
Sulfur	18%	minimum

1. Acceptable Manufacturers:
   a. "Sulfate of Potash 0-0-50", Best Fertilizer (800) 992-6066.

B. Triple superphosphate (0-45-0): a fertilizer for eliminating phosphorus deficiencies in soils. Contains phosphate derived from monocalcium phosphate and dicalcium phosphate, with a PH (20% solution) of 3.1; 90% water solubility; and 87% passes through a 4 mm screen with 100% retained by a 1.18 mm screen.

Available Phosphate	45%	minimum
Calcium	13.5%	minimum

1. Acceptable Manufacturers:
   a. "Triple Superphosphate 0-45-0", Best Fertilizer (800) 992-6066.
2. Palm, Tropicals and Bamboo Fertilizer (9-3-9) : Controlled release nitrogen and potash with Micronutrients.

Nitrogen (total)	9%	minimum
Water Soluble Organic Nitrogen	0.92%	
Water Insoluble Organic Nitrogen	8.08%	

Phosphoric Acid	3%	minimum
Potash (total)	9%	minimum
Soluble Potash	1.10%	
Slowly available potash	7.9%	
Calcium	3%	
Magnesium	4%	
Iron	2%	
Manganese	0.05%	
Zinc	0.05%	

3. Acceptable Manufacturers:

   a. “Gro-Power Palm Fertilizer and Tropicals (9-3-9)”,Gro-Power®, Inc. (800) 473-1307,

C. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots. Slow release fertilizer tablets, soil conditioner, 24-month formulation with trace elements, composted organic higher plant form life and mineral matter. Shall not contain any poultry, animal or human waste.

1. Nutrient Composition:

Nitrogen (total)	20%	minimum
Ammonical Nitrogen	2%	
Water Soluable Organic Nitrogen	5.3%	
Water Insoluable Organic Nitrogen	12.7%	
Phosphoric Acid	10%	minimum
Soluable Potash	5%	minimum
Calcium	3.5%	
Sulphur	2.5%	minimum
Iron (Fe)	2%	minimum
Manganese	0.05%	minimum
Zinc	0.05%	minimum
Humic Acids (derived from compost)	2.5%	minimum

2. Acceptable Manufacturers:

   a. “Gro-Power (20-10-5) Planting Tablets”, Gro-Power®, Inc. (800) 473-1307

2.5 MYCORRHIZAL SOIL CONDITIONER AND HUMIC ACIDS

A. Mycorrhizal Inoculum / Soil Conditioner: Inculum shall be both Endo and Ecto (granular), with consititing of propagules (spores, fragments of fungal mycelium, and pieces of mycorrhizal roots capable of colonizing host plant roots) of the vesicular arbuscular mycorrhizal species Glomus intraradices, Glomus aggregatum, Glomus mosseae, combined with other species and/or additional genera including, Sclerocyctis, Gigaspora, Scutellospora, Entrophospora, and Acaulospora. Ectomycorrhiza include Pisolithus and 4 species of Rhizopogon. Soil Conditioner portion shall consist of organic materials consisting of higher plant form life, composted beyond the fiberous stage, to humus. Also shall have humic acids and beneficial soil bacteria strains. It shall NOT contain poultry, animal or human waste (i.e., sewage sludge), pathogenic viruses, fly larvae, insecticides, herbicides, fungicide or poisonous chemicals that would inhibit plant growth.

1. Nutrient Composition:

Ingredients	percentage	(minimum)
Mycorrhizal Inoculum	6,500/55,00	progagules per lb.*
Humus	65%	
Humic Acids	25%	

2. Acceptable Manufacturers

a. "GroLife Granular", Gro-Power®, Inc (800) 473-1307.

B. Humic Acids (from Leonardite) 50 .00 %

1. Nutrient Composition: Per random sample of material.

Organic matter	40.00%
Carbon	40.00%
Nitrogen	0.05%
Phosphoric Acid	0.07%
Potash	0.13%
Sulfur	0.21%
Magnesium	0.18%
Calcium	0.32%
pH	4.0
Soluble Salts	1.8

2. Acceptable Manufacturers

a. "Tri-C Premium Humate" (800) 927-3311.

2.6 PLANTING SOILS

A. Import Topsoil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of [**2**] percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.

1. Import topsoil to be supplied for the full depth of raised planters indicated below and in Planting Cells of Grasscrete Porous Paving: Submit Amended Imported Topsoil to Owner's Representative for evaluation. Provide Imported Topsoil from off-site sources, obtained from naturally well-drained site; do not obtain from bogs or marshes; see Part 1 for definition of raised planters.

2. Import topsoil also to be used on-grade as required for fill operations or as specified in the drawings.

3. Permeability Rate - Hydraulic conductivity rate shall be not less than one inches per hour nor more than three inches per hour

4. Silt plus clay content of the import soil shall not exceed 20% by weight with a minimum 95% passing the 2.0 millimeter sieve. The sodium absorption rate (SAR) shall not exceed 6 and the electrical conductivity (ECe) of the saturation extract of this soil shall not exceed 3.0 millimhos per centimeter at 25 degrees centigrade. The boron content shall be no greater than 1 part per million as measured on the saturation extract.

5. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch (25 mm) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

6. General requirement for Lightweight on-structure soil mix:

a. Chemistry:

1) Reaction (pH) saturated paste	6.0-7.6
2) Salinity (ECe dS/m) saturation extract	<3.0

3) Sodium adsorption ratio (SAR) <6.0
4) Boron in saturation extract, ppm <1.0

b. Texture:

Particle Size	USDA Sieve Size	% Passing
1) Gravel	2.0	>85%
2) Coarse sands	0.5	>75%
3) Silt + clay*	0.05**	<35%

*Silt to clay ratio shall be 0.5 – 1.2
**Use Hydrometer method

7. Submit results of agricultural soils analysis testing for review and approval by the Landscape Architect.

8. Provide Amended Imported Topsoil in sufficient quantities which allow for natural settling and compaction of the topsoil mix in the Raised Planters, and flush with the top of the Grasscrete Porous Paving cells. Prioir to planting plant materials, Raised Planters and Grasscrete cells shall be compacted to 90% density to minimize settling. Set Amended Imported Topsoil and compact accordingly in 6" lift to within 4" of top of the Raised Planters.

a. Products & Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

1) A-1 San Diego Select Topsoil, Hanson Aggregates A-1 Soils.

2) Topsoil Mix #5, Agromin Horticultural Products.

3) 70/30 Topsoil, Agri-Service

2.7 MULCHES

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

1. Type: Agri Service "Forest Mulch" or "Forest Fines": organic forest products with leaf litter, light in color, free of trash and other deleterious materials and animal waste, with pathogens and weeds removed by temperature treatment.

a. Size Range:

1) 1"-5" (Forest Mulch)

2) ½" – 2" (Forest Fines)

b. Acceptable Manufacturer:

1) Agri Service Inc. (800) 262-4167

2. Type: Trade Mark "Pacific Mulch: Appearance grade, composed organic forest products, free of trash and other deleterious materials, with pathogens and weeds removed by temperature treatment

a. Size Range: 1"-3"

b. Acceptable Manufacturer:

1) John Deere Landscapes (800) 233-6933

B. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color:

1. Type: Decomposed Granite Mulch. Double washed and graded to "3/8 minus" crushed stone.

a. Size Range: 3/8" minus

b. Color: "New California Gold"

c. Acceptable Manufacturers:

1) KRC (760) 744-1035

2) Decorative Stone Solutions (800) 699-1878
3) Southwest Boulder (800) 540-1147

2. Type: Decomposed Granite Mulch. Double washed and graded to “3/4 minus” crushed stone
   a. Size Range: 3/4” minus
   b. Color: “New California Gold”
   c. Acceptable Manufacturers:
      1) KRC (760) 744-1035
      2) Decorative Stone Solutions (800) 699-1878
      3) Southwest Boulder (800) 540-1147

3. Type: Rock Cobble Mulch. Double washed stones graded to 4”-8” nominal size with 3/8” minus Decomposed Granite Mulch base layer.
   a. Size Range: 4”-8”
   b. Color: “New California Gold”
   c. Acceptable Manufacturers:
      1) KRC (760) 744-1035
      2) Decorative Stone Solutions (800) 699-1878
      3) Southwest Boulder (800) 540-1147

2.8 FILTER FABRIC

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 4.5 oz./sq. yd. minimum, with a tensile strength of 120 lbs, water flow reate of 135 g/mi/s.f. and UV Resistance of 70% composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis, and acids.
   a. Product: “Mirafi 140 N” by Tencate, or approved equal

2.9 PESTICIDES

A. Prior to using pesticides, contractor shall review procedures with the Landscape Architect and obtain written approval prior to using any pesticides.

B. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

C. Contractor shall be licensed by the County to perform pesticide applications.

D. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
   1. Acceptable Manufacturers:
      a. Treflan
      b. Surfland
      c. Eptan

E. Post-Emergent Herbicide: Round-up

2.10 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

1. Wood Stakes: Shaved, sound, new lodgepole pine, free of knots, branches, holes, cross grain, and other defects, of the length indicated on the Drawings, pointed at one end.
   a. Stakes for 24" box trees or smaller shall be no less than 10 feet in length and 2" in diameter.
   b. Stakes for 36" box trees and larger shall be no less than 12 feet in length and 3" in diameter.
   c. Acceptable Manufacturers:
      1) Villa Root Barrier, Inc. (800) 654-4067
2. Tree Ties: Flexible non-deteriorating self fastening, black vinyl ties of sizes required to adequately support trees.
   a. Acceptable Manufacturers:
      1) Gro-Straight ties
      2) Cinch-Ties
3. Guying Materials: 3/16" braided steel cable, 6" open turnbuckles, ½" pvc pipe, Duckbill Anchors or 2 x 4 x 24" redwood deadman or approved equal.
4. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.

2.11 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide "Duraedge" or comparable product by one of the following:
      a. Russell, J. D. Company (The).
   2. All steel curbing shall be **¼"** thick by **5"** deep by **16'** long with **7** stakes per section, painted **black** at the factory.
   3. Stakes: Tapered steel, a minimum of [**12 inches (300 mm)**] [**14 inches)**] {**15 inches)**] long.
   4. Accessories: Standard tapered ends, corners, and splicers.
   5. Finish: Painted Steel
      a. Paint Color: Black

2.12 AERATION TUBES

A. Tubes: 4" dia. Schedule 40 PVC perforated pipe cut to lengths as shown on the Drawings.
   1. Acceptable Manufacturer: Pacific Plastics, Inc. (714)-990-9050.

B. Grates: 4"dia.
   1. For Bark Chip Planting areas: round, black, plastic atrium drain grates;
   2. For Lawn areas: round, green, flat plastic drain grates;
   3. For Gravel and stone mulch planting areas: round, brown, flat plastic drain grates.
   4. Acceptable Manufacturer: National Diversified Sales (NDS).

C. Filter fabric "sock": Spunbond, Typar 3341, Geoscape Landscape Fabric - 2.5 oz., Commercial Grade"
   1. Acceptable Manufacturer: ADS (800) 821-6710.

2.13 ROOT BARRIER <pick one>

A. Root barrier shall be “Typar Biobarrier” root control root fabric with Treflan, 39” width unless otherwise noted in the plans.

1. Acceptable Manufacturer: Dow Elanco., John Deere Landscapes (800) 233-6933.

B.

2.14 EROSION CONTROL MATERIALS

A. Erosion Control Jute Mesh (for slopes of 3:1 or less): Jute mesh shall be new and shall be of a uniform, open, plain-weave mesh. The mesh shall be made from unbleached single jute yarn and shall be 100% biodegradable. The yarn shall be of loosely twisted construction and shall not vary in thickness by more than half its normal diameter. Jute mesh shall be furnished in rolled strips and shall conform to the following provisions.

1. Width - 1200 mm {48 inches}, with a tolerance of ± 25 mm {± one inch}
2. Thickness – 187 mils
3. Mass - 11.94 oz per square yard
4. Water Absorption rate - 42.5%
5. Light Penetration – 45%
6. Ground Cover – 55%
7. Tensile strength – 76.5 lbs/in minimum
8. Include manufacturer’s recommended steel wire staples, U- shaped, 8 gauge, 8 inches long.
9. Acceptable Manufacturer - Anti-Wash Geojute, Belton Ind. Dist. By John Deere Landscapes (800) 233-6933.

B. Erosion Coconut Matting (for slopes greater than 3:1): Erosion control matting shall be new and shall be of an evenly distributed layer of 100% coconut fiber stitched with biodegradable thread to a structure composed of Leno woven 100% biodegradable jute fiber top net and a woven 100% biodegradable jute fiber bottom net.

1. Acceptable Product and Manufacturer – “BioNet C125BN” by North American Green, Dist. By Triumph Geo-Synthetics, Inc. (800) 772-2040 or approved equal

C. Provide erosion control at slopes 3:1 or greater or as otherwise indicated in the Drawings.

2.15 MISCELLANEOUS PRODUCTS

A. Burlap: Non-synthetic, biodegradable.

B. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.

C. Tree Protection Material: Enclosure: 5’ tall chain link fence with a minimum 1½” dia. posts and 1” top and bottom rails. Caution tape, or twine and flags are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. No work under this section shall commence until all submittals have been reviewed and approved. Do not proceed with installation until all unsatisfactory conditions have been corrected.

B. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 SOILS TESTS

A. At the conclusion of rough grading, collect soil samples in the locations indicated on the plans and as described in Part 1 Quality Assurance. Each soil test location identified on the plans shall be collected using a soil probe. Each soil test location shall be comprised of 12 separate soil test probings collected from the area immediately adjacent to the soil test location identified on the plans. Under no circumstance shall the soil sample be dug by shovel and bagged from a single location. Submit the samples to an approved agricultural soils laboratory for testing.

B. Submit the test results and laboratory recommendations to the Landscape Architect for review. No amendments shall be applied prior to receipt of test results. Test recommendations shall include the amendments listed in this specification.

C. The Landscape Architect shall recommend changes to the amendments and/or procedure listed herein, after review of the test results.

D. Costs for testing and retesting the soil shall be included in the base bid.

E. Costs for soil leaching shall be included in the base bid, but only performed if specifically identified in the soil test results.

F. Soil testing is considered a long lead item, retesting may be required to confirm that recommended remediation measures were successful and soil test results are within the acceptable ranges for plant growth. The time frame for this work shall not be shortened because adequate time was not allowed for testing and retesting of the soils. The soils will need to be retested until an acceptable test result is attained.

G. Cost change for soil preparation work shall be in accordance with the provisions of the General Conditions. Refer to Part 1 Quality Assurance for additional requirements.

3.3 SOIL LEACHING

A. Soil leaching shall be included in the base bid but provided only if specifically recommended in the soil test reports. The soil leaching shall be performed as noted in the soil test report. If no recommendations are provided in the report, soils shall be leached for a minimum of one (1) week, but no longer than two (2) weeks, using the methods outlined below.

1. Add compost and any non-leachable amendments to the soil and till to a depth of 6”
2. Irrigate soil to the point of saturation when water begins to collect on the surface, but before erosion of the planting soil begins
3. Allow soil to dry for a minimum of 24 hours

4. Continue to re-irrigate the soil to the point of saturation and dry for a minimum of 24 hours for a minimum of five (5) working days.
5. Recollect soil samples for retesting using the methods mentioned above; resubmit test results to landscape architect for review.
6. If soils reports show the soil has adequately been leached, add leachable amendments and fertilizers as identified in the soils report and till to a depth of 6".
7. If soil test results show the leaching has not adequately lowered the soils to required levels, continue to leach for an additional week prior to incorporating leachable soil amendments and fertilizers as identified in the soils report and till to a depth of 6".

3.4 WEED CONTROL

A. Prior to commencement of the planting operations, remove all weeds including the roots, remove existing plant material including stumps designated not to remain, dispose of cleared and grubbed material at a legal refuse site.

B. Prior to using herbicides, review procedures with the Owner, and obtain written approval. Herbicide applications requiring government or agency approvals shall be performed by an operator licensed by the County. Protect existing plant material on site and on adjacent properties from exposure to herbicides and equipment.

3.5 PREPARATION AND LAYOUT

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

3.6 PROTECTION OF EXISTING PLANT MATERIAL

A. Erect the tree protection enclosures prior to commencing with site demolition work. Maintain fence during the entire construction period and remove when no longer needed, obtain approval from the Landscape Architect prior to removal.

B. Install the enclosure a minimum of 3' outside of the drip line of the tree or palm. Increase enclosure size for groupings of trees or in conditions where heavy equipment work may damage overhead branches. Set the posts a maximum of 10' on center, and stake to the ground. Perform work inside the enclosures by hand, where conditions permit alternative methods, obtain approvals from the Landscape Architect for such work.

C. During the entire construction phase, provide ongoing maintenance of the existing plant materials, including watering, fertilizing, pest and disease control, and adjustments to the enclosures as directed by the Landscape Architect.

D. Trees damaged by construction shall be inspected by a certified arborist. Repair damaged trees as directed by the arborist. Replace trees damaged beyond repair as determined by the arborist, with the same species and of similar size or value. Repair, replacement, and inspections by the arborist, shall be at not additional expense to the Owner.

3.7 EROSION CONTROL

A. Install jute mesh on slopes over 3:1. After any grading, clearing and grubbing that is required, fine-grade the sloped planting areas to receive jute mesh, removing all surface rocks and debris greater than 2" in diameter.

B. Jute mesh shall be installed loosely on the slopes. Longitudinal seams of the jute mesh shall be at right angles to the slope contour lines. The installed mesh shall fit the soil surface contour and shall be held in place by 230 mm {9-inch} long, 3.05 mm (11-gage) (minimum) steel wire staples driven vertically into the soil at approximately 600-mm {24-inch} spacing. Jute mesh strips shall overlap the adjacent jute mesh a minimum of 150 mm {6 inches}. Ends of strips shall be buried into the soil a minimum of 150 mm {6 inches}.

3.8 SOIL PREPARATION

A. Proceed with this part of the work only after soil test analysis recommendations have been approved by the Landscape Architect.

B. Apply 50 lbs/1,000 SF of Gypsum to subgrade prior to tilling.

C. Rip or loosen native soil or subgrade for the entire extent of all planting areas to a minimum depth of 18 inches without adding soil conditioner.

D. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter to a depth of 18” below finish grade and legally dispose of them off Owner's property.

E. Prepare areas within the driplines of existing trees by hand, do not use mechanical tillers.

F. Spread soil amendments, remaining gypsum and other amendments over all planting areas and mechanically till and blend to a depth of 6 inches.

G. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

H. Use the soil amendments listed below for bidding purposes only. Materials and application rates may be modified after receipt of soils tests noted Part 3 Soils Tests.

Amendments	Rate or Quantity / 1,000 SF of planting.	
Compost	3	cubic yards
Gypsum	50	lbs.
Ammonium sulfate	5	lbs.
Potassium sulfate	10	lbs.
Triple superphosphate	5	lbs.
Mycorrhizal Soil Conditioner	2	lbs.
Humic Acid	50	lbs.

I. Float smooth and compact all soil preparation areas to 85% relative dry density, maintain positive drainage, flow lines, and swells to area drains, fine grade to within plus or minus 0.10 foot of the grades shown on the Drawings.

J. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

K. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

L. Application of Mycorrhizal Fungi Soil Conditioner: Per the manufacturer’s recommendations, broadcast dry product uniformly over prepared soil at application rates listed in the specifications.

3.9 PRE PLANT WEED CONTROL

A. Clear and remove existing weeds at least one-inch (1”) below the soil surface.

B. Fertilize areas to receive planting with a 46-0-0 NPK commercial fertilizer at the rate of ½ lb. per 1,000 square feet.

C. After fertilization, irrigate the soil thoroughly and continuously at the equivalent of four inches (4”) of water distributed over a fourteen (14) – day period. The application of water shall be applied to the soil as needed to gradually soak through the soil profile and

not allowed to run-off the surface. Employ a specific watering duration and frequency program designed to germinate all residual weeds.

D. After sufficient weed germination is present, apply non-selective, post-emergent contact herbicide, in strict accordance to the Manufacturer's directions. Protect and buffer surrounding properties, buildings, and vegetation from overspray, as required.

E. Allow for a sufficient time period to ensure that the weeds are dead and the herbicide has dissipated, per the Manufacturer's recommendation.

F. Water planting areas thoroughly and continuously for a period of one (1) week after the application of the herbicide. Discontinue the watering process for one (1) day prior to the second application of the herbicide. Apply a second application of the herbicide. Avoid any irrigation for a minimum of four (4) days after the second application for effective weed kill.

G. After the second application and waiting period, water planting areas thoroughly and continuously for three (3) consecutive days to saturate upper layers of the soil prior to commencing planting operations.

H. Dead weeds shall be cleared and removed prior to planting.

I. Maintain a weed-free Project Site until final acceptance by the Owner, utilizing mechanical, chemical or manual treatment.

3.10 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately two times as wide as ball diameter for container-grown stock.

2. Do not excavate deeper than depth of the root ball less one inch, measured from the root flare to the bottom of the root ball.

3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.

5. Maintain supervision of excavations during working hours.

6. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

7. If subdrainage is shown on Drawings or required under planting areas, coordinate planting operations with installation of subdraiange.

B. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

C. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

D. Subsoil and topsoil removed from excavations may be amended and used as planting backfill mix.

3.11 PERCOLATION TESTING

A. Locate and prepare the percolation test pits where indicated on the Drawings, and as described herein.

B. Excavate the pits as described under the Excavation for Trees and Shrubs section, remove all loose material, and fill the pits with six inches (6") of water. After 12 hours refill with the same amount of water. Six hours after the second filling, inspect the pits with the Landscape Architect and document locations where water remains in the pit.

C. If percolation problems occur, drill two 8-inch- (150-mm-) diameter holes, into free-draining strata or to a depth of 5 feet below the bottom of rootball whichever is less, and backfill with drainage gravel and 4”diameter perforated PVC pipe open to below. Cap with appropriate grate, see AERATION TUBES Part 2.

3.12 TREE, SHRUB, GROUNDCOVER AND VINE PLANTING

A. To leach saline and sodic salts from the soil, fill all excavations with water and allow to percolate away before positioning trees and shrubs.

B. Notify the Landscape Architect of conditions where hardpan, adobe clay, or inadequate subgrade compaction are encountered. Planting operations at the locations identified shall be suspended pending corrective action.

C. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

D. Shave and/or shovel cut the outer 1/8” to 1/4” of the rootball for shrubs up to 15 gallons and 1/2” to 1” for 24” box and larger plants to ensure that all circling roots on the exterior of the root ball’s ends are roughly radial to the trunk to promote outward root growth. Remove any injured roots by cutting cleanly; do not break.

E. Use the soil amendments listed below for bidding purposes only. Materials and application rates may be modified after receipt of soils tests noted Part 3 Soils Tests.

1. Backfill mixture for all plants shall be thoroughly blended, consisting of the following:

Soil Amendment	1	part
Existing Soil	3	parts
Potassium sulfate	1	lb/cy of mix
Triple superphosphate	1	lb/cy of mix
Agricultural Gypsum	3	lb/cy of mix
Mycorrhizal Inoculum Soil Conditioner	5	lb/cy of mix
Humic Acid	5	lb/cy of mix

F. Place planting tablets in the planting pits at the following rates:

1.

Plant Size	Quantity	Tablet	Size	
liner and flat size plant	1	5	gram	
1 gallon container	1	21	gram	
5 gallon container	2	21	gram	
15 gallon container	3	21	gram	
Box specimen	2	21	gram	for each 12” of box size

G. Set container stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades or as indicated in the Drawings.

1. Use planting soil listed above for backfill.

2. Do not use planting stock if root ball is cracked or broken before or during planting operations.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts listed in the specifications. Place tablets beside the root ball

about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole and do not place plant tablets in direct contact with the rootball.

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

6. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.13 AERATION TUBES

A. Wrap tubes with the fabric and set plumb in opposite corners of the planting pit. Place gravel and backfill mix as shown on the Drawings. Tubes to remain open to below. Knot filter fabric sock to prohibit sediment from getting into tubes. Cut tubes to 2” above finish grade and cap with a drain grate.

3.14 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Do not apply pruning paint to wounds.

3.15 TREE STABILIZATION

A. Upright Staking and Guying: Per the Drawings.

1. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree. Trees with small caliper trunks may require two (2) sets of tree ties, one set 6” below lowest tree branch and at 12” above finish grade, in order to adequately support the tree.

B. Palm Bracing: Install bracing system at three or more places equally spaced around perimeter of trunk to secure each palm until established unless otherwise indicated.

1. Site-Fabricated Palm-Bracing Method:

a. Place battens over padding and secure battens in place around trunk perimeter with at least two straps, tightened to prevent displacement. Ensure that straps do not contact trunk.

b. Place diagonal braces and cut to length. Secure upper ends of diagonal braces with galvanized nails into battens or into nail-attached blocks on battens. Do not drive nails, screws, or other securing devices into palm trunk; do not penetrate palm trunk in any fashion. Secure lower ends of diagonal braces with stakes driven into ground to prevent outward slippage of braces.

2. Proprietary Palm-Bracing Device: Install palm-bracing system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.16 ROOT-BARRIER INSTALLATION

A. Install root barrier where trees are planted within 60 inches (1500 mm) of paving or other hardscape elements, such as walls, curbs, and walkways unless otherwise shown on Drawings.

B. Align root barrier vertically and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.

C. Install root barrier continuously for a distance of 60 inches (1500 mm) in each direction from the tree trunk, for a total distance of 10 feet (3 m) per tree. If trees are spaced closer, use a single continuous piece of root barrier.

1. Position top of root barrier at finished grade of soil unless otherwise directed. Adhere root barrier product in place using fabric pins or other measures. Secure

fabric every two feet for entire length of installation. Adhere to edging or hardscape.

2. Overlap root barrier a minimum of 12 inches (300 mm) at joints.
3. Do not distort or bend root barrier during construction activities.
4. Do not install root barrier surrounding the root ball of tree.

3.17 PLANTING AREA MULCHING

A. The entire limit of all planting areas shall receive landscape mulch unless otherwise specifically stated. Note that the drawings do not show mulch hatch patterns underneath plant symbols for graphic purposes only. The intention is that the entire planted area including the areas underneath the planting symbols shall receive the same landscape mulching.

B. Bark Mulch: At the completion of the planting work, rake smooth the areas indicated on the Drawings, and spread a 3” layer of mulch over the areas. Within 3’ of flatwork, headers, curb, and mow edges, taper or reduce the depth to 2”. Keep mulch 2 feet away from tree trunks and 4-6” away from shrub stems.

C. Gravel/D.G. Mulch: At the completion of the planting work, rake smooth the areas indicated on the Drawings, and spread a 3” layer of gravel/DG. over the areas.

D. Stone Mulch: At the completion of the planting work, rake smooth the areas indicated on the Drawings, and spread a layer of stone over a full depth 3” layer of Decomposed Granite mulch. Depth of rock mulch shall be as indicated on the Drawings or 1 ½ times the size of the largest stone size. Keep mulch 2 feet away from tree trunks and 4-6” away from shrub stems.

3.18 EDGING INSTALLATION

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches (760 mm) apart, driven below top elevation of edging.

3.19 LANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.20 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Written permission is required.

C. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

3.21 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Substantial Completion remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.22 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION