REQUIREMENTS and SPECIFICATIONS

TO CONSTRUCT

COMMITTAL SHELTER ROOF & CEILING REPAIRS
AND MISCELLANEOUS IMPROVEMENTS
AT THE HAWAII STATE VETERAN CEMETERY
KANEOHE, HAWAIʻI
PROJECT NO. CA-1516-C

FOR THE **DEPARTMENT OF DEFENSE**
OFFICE OF VETERANS SERVICES
STATE OF HAWAII

ARTHUR J. LOGAN
MAJOR GENERAL
ADJUTANT GENERAL STATE OF HAWAII

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Architect	Mitsunaga & Associates, Inc.
Civil Engineering	Mitsunaga & Associates, Inc.
Structural Engineering	Mitsunaga & Associates, Inc.
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DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01100 - PROJECT REQUIREMENTS

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Committal Shelter Roof & Ceiling Repairs and Miscellaneous Improvements at the Hawaii State Veteran Cemetery

1. Project Location: Hawaii State Veterans Cemetery
   45-349 Kamehameha Highway
   Kaneohe, Hawaii 96744

B. The Work includes:

1. The removal, repair and reinstallation of the existing skylight at the Central Pavilion.

2. The removal of the existing roofing system and the installation of a new, liquid applied roofing system, including all miscellaneous items necessary for a complete and watertight installation.

3. The removal and replacement of Central Pavilion's water damaged wooden roof framing members.

4. The removal of the existing water damaged hardwood ceilings and installation of new decorative metal acoustical ceiling panels.

5. The replacement of existing electrical fixtures and appurtenances, including light fixtures, electrical receptacles and cover plates.

6. Cleaning and refurbishing the existing travertine column panels, concrete columns, parapet walls, covered slabs and adjoining walkways.

7. Provide new pedestrian ramp at the driveway drop-off area.

C. Perform operations and furnish equipment, fixtures, appliances, tools, materials, related items and labor necessary to execute, complete and deliver the Work as required by the Contract Documents.

D. The Division and Sections into which these specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to work specified within each section.

E. Contractor shall not alter the Drawings and Specification. If an error or discrepancy is found, notify the Project Manager.

F. Specifying of interface and coordination in the various specification sections is provided for information and convenience only. These requirements in the various sections shall complement the requirements of this Section.

1.02 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated and include incomplete sentences. Omission of words or phrases such as “the Contractor shall”, “as shown on the drawings”, “a”, “an”, and “the” are intentional. Omitted words and phrases shall be provided by inference to form complete sentences. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred, as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the Work.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
   a. The words “shall”, “shall be”, or “shall comply with”, depending on the context, are implied where a colon (:) is used within a sentence or phrase.

3. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research’s “Encyclopedia of Associations” or in Columbia Books’ “National Trade & Professional Associations of the U.S.”.

B. Terms

1. Directed: Terms such as “directed”, “requested”, “authorized”, “selected”, “approved”, “required”, and “permitted” mean directed by Project Manager, requested by Project Manager, and similar phrases.

2. 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.

3. Furnish: The term “furnish” means to supply and deliver to project site, ready for unloading, unpacking, assembly, and similar operations.

4. Install: The term “install” describes operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

5. Provide: The terms “provide” or “provides” means to furnish and install, complete and ready for the intended use.

6. Installer: An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-Subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

7. Submit: Terms such as “submit”, “furnish”, “provide”, and “prepare” and similar phrases in the context of a submittal, means to submit to the Project Manager.

C. Industry Standards
   1. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

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

   3. Conflicting Requirements: If compliance with 2 or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Project Manager for a decision before proceeding.

1.03 CONTRACT

A. Construction Period: 180 calendar days.
B. No onsite work shall be performed on the Committal Shelter until all materials and equipment required to complete the work are in the possession of the contractor and subordinate contractors. Once on-site work has commenced, the work shall proceed without delay, to completion.
C. The contractor shall identify all long-lead items, define the duration of on-site work within the overall contract duration and ensure that all on-site work be completed within the specified period.
D. The Contractor shall provide a tent of suitable size, type and construction to serve as a temporary Committal Shelter. The tent shall be erected and available for use prior to the start of on-site construction and shall not be taken down until the on-site work has been completed and accepted by the State.

1.04 WORK SEQUENCE

A. The Work will be conducted in a single construction phase.

1.05 USE OF PREMISES AND WORK RESTRICTIONS

A. General: Contractor shall have full use of construction zone for construction operations, including use of project site, during construction period. Contractor’s use of premises is limited only by State’s right to perform work or to retain other Contractors on portions of the project site.

B. Contractor’s use of premises is restricted as follows:

1. Normal project work hours shall be between the hours of 7:00 am to 4:30 pm (Monday thru Friday). Work on Saturdays, Sundays and holidays shall not be permitted.

2. Site Access and Parking:
   a. Parking: Parking for the Contractor's employees (or Subcontractors) will be limited to the available areas within the designated Project Contract Limits or in areas designated by the Project Manager. Do not use parking stalls in regularly designated parking zones. Unauthorized vehicles parked in marked stalls and in any area outside of the designated project construction site will be subject to towing at the Contractor's expense.

3. Sanitation:
   a. Use of cemetery restroom facility will be available for use during construction. The facilities shall be kept clean and maintained in a condition acceptable with the Cemetery Manager. Abuse of this privilege will result in the revocation of the use of the facilities, and the Contractor will be required to provide temporary facilities at no additional cost to the State.

4. Noise and Dust Control:
   a. In adjacent locations surrounding the project site, noise, dust and other disrupting activities, resulting from construction operations, are to reflect Cemetery business hours. Therefore, Contractor shall monitor its construction activities. Exercise precaution when using equipment and machinery to keep the noise and dust levels to a minimum.

   b. To reduce loud disruptive noise levels, ensure mufflers and other devices are provided on equipment, internal combustion engines and compressors.

   c. Schedule construction activities that create excessive noise and dust problems, such as concrete coring, drilling, hammering, trenching, and demolition with the Project Manager.

   d. The Project Manager will require any construction activity that produces excessiveness of noise and dust to be performed during non-Cemetery business hours. The Project Manager shall make the final determination. Overtime costs for the Contractor's employees and work force are the Contractor's responsibility.

5. Other Conditions:
   a. Arrange for construction debris and trash to be removed from project site daily. Coordinate with SECTION 02070 – SELECTIVE DEMOLITION.

   b. Operate machinery and equipment with discretion and with minimum interference to driveways and walkways. Do not leave machinery and equipment unattended on roads and driveways.

   c. Store materials in the areas as designated by the Project Manager. Locate construction equipment, machinery, equipment and supplies within the Project Contract Limits.

d. Keep access roads and campus roads, to the project site free of dirt and debris. Provide, erect and maintain lights, barriers, signs, etc. when working on Cemetery roads, driveways and walkways to protect pedestrians and moped/bicycle riders. Obey Cemetery traffic and safety regulations.

e. Contractor shall temporarily suspend work during burial/memorial services and related activities, as directed by the Cemetery Manager. Burials occur on the average of three (3) per day, with each burial having an approximate duration of 20-30 minutes. The Contractor shall include the cost of such stoppages of work in the bid amount. No additional compensation will be provided for the Contractor's lack of accommodating such stoppages in his/her bid amount.

PART 2 – PRODUCTS

2.01 MATERIALS

A. All Manufacturer and model references are for standards of design and quality required and are to be assumed to be followed by "or approved equal".

PART 3 - EXECUTION

3.01 PROJECT SCHEDULE is presented for information and planning purposes. Dates and activities are subject to adjustments.

NO	EVENT OR DESCRIPTION	REFERENCE OR DATE
1	Pre-Bid Meeting and Site Visit	Notice to Bidders
2	Clarifications or Questions Due	14 days before Offers are opened
3	Bid Opening	Notice to Bidders
4	Project Start Date	Estimated 3 months after bid opening date
5	Project Completion Date	180 days after Notice to Proceed is issued

END OF SECTION

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General project coordination procedures.

   2. Project meetings.

1.02 PERFORMANCE AND COORDINATION

A. Contractor is in charge of the Work within the Project Contract Limits, and shall direct and schedule the Work. Include general supervision, management and control of the Work of this project, in addition to other areas more specifically noted throughout the Specifications. Final responsibility for performance, interface, and completion of the Work and the Project is the Contractor's.

B. The Contractor is responsible for jobsite Administration. Provide a competent superintendent on the job and provide an adequate staff to execute the Work. In addition, all workers shall dress appropriately and conduct themselves properly at all times. Loud abusive behavior, sexual harassment and misconduct will not be tolerated. Workers found in violation of the above shall be removed from the job site as directed by the Project Manager.

C. Coordination: Provide project interface and coordination to properly and accurately bring together the several parts, components, systems, and assemblies as required to complete the Work pursuant to the GENERAL CONDITIONS and SPECIAL CONDITIONS.
   1. Provide interface and coordination of all trades, crafts and subcontracts. Ensure and make correct and accurate connections of abutting, adjoining, overlapping, and related work. Provide anchors, fasteners, accessories, appurtenances, and incidental items needed to complete the Work, fully, and correctly in accordance with the Contract Documents.

   2. Provide additional structural components, bracing, blocking, miscellaneous metal, backing, anchors, fasteners, and installation accessories required to properly anchor, fasten, or attach material, equipment, hardware, systems and assemblies to the structure.

   3. Provide excavation, backfilling, trenching and drilling for trades to install their work where required.

   4. Provide concrete foundations, pads, supports, bases, and grouting for trades as needed to install their work.

   5. Provide caulking, sealing, and flashing as required to waterproof the building complete and as required to insulate the building thermally and acoustically. Include sealing, flashing, and related work as required to prevent moisture intrusion, air infiltration, and light leakage.

6. Equipment, fixtures, hardware, and systems requiring electrical services shall be provided with such electrical services, including outlets, switches, overload protection, interlocks, panelboard space, disconnects, circuit breakers, and connections.

7. Materials, equipment, component parts, accessories, incidental items, connections, and services required to complete the Work which are not provided by Subcontractors shall be provided by the Contractor.

8. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1.03 COOPERATION WITH OTHER CONTRACTORS

A. The State reserves the right at any time to contract for or otherwise perform other or additional work within the Project Contract Limits. The Contractor of this project shall to the extent ordered by the Project Manager, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by the State or other Contractors.

1.04 COORDINATION WITH OTHER PRIME CONTRACTORS

A. Multiple prime Contractors performing work under separate agreements with the State may be present near the project location, adjacent to and abutting the Project Contract Limits. This Contractor shall coordinate activities, sequence of work, protective barriers and any and all areas of work interfacing with other Prime Contractor's work. Contractor shall provide a continuity of finishes, walks, landscape, etc. at abutting Contract Limits so no additional work will be required. Any damage to other Prime Contractor's Work committed by this Contractor (or its Subcontractor) shall be repaired promptly at no additional cost to the State.

B. Coordinate Subcontractors and keep them informed of any work from the other Projects that may affect the site or the Subcontractor's work. If the Contractor has any questions regarding its coordination responsibilities or needs clarification as to the impact in scheduling of its work and the work of other projects, this Contractor shall notify the Project Manager in writing.

C. Subject to approval by the Project Manager, this Contractor shall amend and schedule its work and operations to minimize disruptions to the work and operations of other projects.
   1. Relocate or remove and replace temporary barriers, fencing supports or bracing to allow work by others to proceed unimpeded. Do not remove required barriers supporting work until specified time or as approved by the Project Manager. This does not relieve the Contractor of the responsibility of proper coordination of the work. If directed by the Project Manager, leave in place any temporary barriers.

   2. Coordinate work that abuts or overlaps work of the other projects with the Project Manager and other Prime Contractors to mutual agreement so that work is 100 percent complete with continuity of all materials, systems and finishes.

3. When directed by the Project Manager, provide access into the construction zone to allow the other project's Contractor(s) to perform their Work and work that must be interfaced.

4. Contractor shall adjust and coordinate its Work and operations as required by the other projects as part of the Work of this contract without additional cost or delay to the State.

5. When directed by the Project Manager provide a combined Contractor's construction schedule.

D. Other Contracts: If known, they are listed in SECTION 01100 - PROJECT REQUIREMENTS.

1.05 SUBMITTALS

A. Photo Documentation: Prior to the start of jobsite work, the Contractor shall photo document the existing conditions at the site and file with the Project Manager one complete set of documents.

1.06 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences as directed by the Project Manager.
   1. Attendees: Inform participants and others involved, including Construction Manager, and individuals whose presence is required, of date and time of each meeting. Notify Project Manager of scheduled meeting dates and times.

   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

   3. Minutes: Contractor record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Project Manager, within 7 days of the meeting.

B. Preconstruction Conference: Project Manager shall schedule a preconstruction conference before the start of construction, at a time convenient to the Project Manager, but no later than 7 days before the Project start date or jobsite start date whichever is later. Conference will be held at the Project site or another convenient location. The Project Manager shall conduct the meeting to review responsibilities and personnel assignments.
   1. Attendees: Project Manager, and design consultants; Facility Users; Contractor and its superintendent; major Subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Tentative construction schedule.

      b. Phasing.

c. Critical work sequencing and coordination.

d. Designation of responsible personnel.

e. Use of the premises.

f. Responsibility for temporary facilities and controls.

g. Parking availability.

h. Office, work, and storage areas.

i. Equipment deliveries and priorities.

j. First aid.

k. Security.

l. Progress cleaning.

m. Working hours.

C. Progress Meetings: Conduct progress meetings at monthly or other intervals as determined by the Project Manager. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to Project Manager, each Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

   b. Review present and future needs of each entity present, including the following:
      1) Outstanding Requests for information (clarification).

      2) Interface requirements.

      3) Sequence of operations.

      4) Status of outstanding submittals.

      5) Deliveries.

6) Off-site fabrication.

7) Access.

8) Site utilization.

9) Temporary facilities and controls.

10) Work hours.

11) Hazards and risks.

12) Progress cleaning.

13) Quality and work standards.

14) Force Account work.

15) Change Orders and Change Proposals.

16) Documentation of information for payment requests.

c. Corrective Action Plan: Contractor shall provide a plan of corrective action for any item which is delayed or expected to be delayed, then that item impacts the contractual dates.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's Construction Schedule.
   2. Submittals Schedule.
   3. Schedule of Prices.
   4. Payment Application.

B. Related Sections include the following:
   1. SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION for preparing a combined Contractor's Construction Schedule.
   2. SECTION 01330 - SUBMITTAL PROCEDURES for submitting schedules and reports.

1.02 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical activities are activities on the critical path and control the total length of the project. They must start and finish on the planned early start and finish times.
   2. Predecessor activity is an activity that must be completed before a given activity can be started.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of project.

C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.
   1. Float time is not for the exclusive use or benefit of either the Department or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

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

1.03 SUBMITTALS

A. Required Submittals: Submit 8 sets of the list of the required submittals, by Specification Section, within 15 days after award of the contract or upon earlier written instructions from the Project Manager. A general listing is provided under SECTION 01330 - SUBMITTAL PROCEDURES.
   1. The listing shall indicate and include the following:
      a. The number of copies required for submittal.
      b. Planned submittal date.
      c. Approval date required by the Contractor.
      d. A space where the "date of submittal" can be inserted.
      e. A space where the "date of approval" can be inserted.
      f. A space where an "action code" can be inserted.

B. Construction Schedule: Submit 7 sets of the Construction Schedule for review within 15 days after the award of the contract or upon earlier written instructions from the Project Manager.

C. Schedule of Prices: Submit 3 sets of the Schedule of Prices integrated with the Construction Schedule for review within 15 days after the award of the contract or upon earlier written instructions from the Project Manager.

D. Payment Application: Submit the payment application at earliest possible date and no sooner than the last day of the month after all payroll affidavits, updated submittal registers, and schedules have been submitted.

1.04 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate Contractors.

B. Construction Schedule: Coordinate Contractor's Construction Schedule with the Schedule of Prices, Submittals Schedule, loaded monthly event activity, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from parties involved.

   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

C. Schedule of Prices: Coordinate preparation of the schedule with preparation of Contractor's Construction Schedule.
   1. Correlate line items in the Schedule of Prices with other required administrative forms and schedules, including the following:
      a. The Department's Payment Application form and the Construction Progress Report continuation sheet for the event cost estimate per time period.
      b. Submittals Schedule.

PART 2 - PRODUCTS

2.01 SUBMITTALS SCHEDULE

A. Comply with the DOD GENERAL CONDITIONS "SHOP DRAWINGS AND OTHER SUBMITTALS" Article. Furnish required submittals specified in this Section and in the Technical Sections. Submittals include one or more of the following: shop drawings, descriptive sheets & other submittals, material samples & color samples.

B. Preparation: Furnish a schedule of submittals per Project Manager.
   1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Prices, and Contractor's Construction Schedule.

   2. The schedule shall accommodate a minimum of 21 calendar days for the State's review, as applicable for the Island the project is located.

   3. Prepare and submit an updated list to the Project Manager at monthly intervals or as directed by the Project Manager. The listing shall reflect all approvals received since the last update.

2.02 CONTRACTOR'S CONSTRUCTION SCHEDULE - GANTT CHART METHOD

A. The construction schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. The progress chart shall indicate the order in which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment).

B. Upon completion of the Project Manager's review, the Contractor shall amend the schedule as necessary to reflect the comments. If necessary, the Contractor shall participate in a meeting with the Project Manager to discuss the proposed schedule and changes required. Submit the revised schedule for review within 7 calendar days after receipt of the comments.

C. Use the reviewed schedule for planning, organizing and directing the work, for reporting progress, and for requesting payment for the work completed. Unless providing an update, do not make changes to the reviewed schedule without the Project Manager's approval.

D. If, in the opinion of the Project Manager, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve progress, including those that may be required by the Project Manager, without additional cost to the State. The Project Manager may require the Contractor to increase the number of shifts, overtime operations, days of work, or amount of construction plant, and to submit for approval any supplemental schedule or schedules in chart form as the Project Manager deems necessary to demonstrate how the approved rate of progress will be regained.

E. Update the construction schedule at monthly intervals or when directed by the Project Manager to revise the schedule. Reflect any changes occurring since the last update with each invoice for progress payment. Submit copies of the purchase orders and confirmation of the delivery dates as directed. The Project Manager's review of the updated schedule is to check that the updated schedule does not alter the construction performance period unless the period was revised through a change order or contract modification.

F. At Contractor's option a PERT chart may be used.

2.03 SCHEDULE OF PRICES

A. Furnish a schedule of prices per Project Manager.

B. Provide a breakdown of the Contract Sum in enough detail to facilitate developing and the continued evaluation of Payment Applications. Provide several line items for principal subcontract amounts, or for materials or equipment purchased or fabricated and stored, but not yet installed, where appropriate. Round amounts to nearest whole dollar; total shall equal the Contract Price.

C. Each item in the Schedule of Prices and Payment Application shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

2.04 PAYMENT APPLICATION

A. Use the Schedule of Prices as the Monthly Construction Progress Report. Each Payment Application shall be consistent with previous applications and payments. The Project Manager shall determine the appropriateness of each payment application item.

B. Payment Application Times: The date for each progress payment is the last day of each month. The period covered by each Payment Application starts on the first day of the month or following the end of the preceding period and ends on the last day of the month.

C. Updating: Update the schedule of prices listed in the Payment application when Change Orders or Contract Modifications result in a change in the Contract Price.

D. Provide a separate line item for each part of the Work where Payment Application may include materials or equipment purchased or fabricated and stored, but not yet installed.

E. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.

F. Provide separate line items for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

G. Payment Application Forms: Forms to be used will be identified at the Pre-Construction meeting. Submit one original and 2 copies of the payment request form.

H. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of the Contractor.
   1. Entries shall match data on the Schedule of Prices and Contractor's Construction Schedule. Use updated schedules if revisions were made. Include amounts of Change Orders and Contract Modifications issued before last day of construction period covered by application.

I. No payment will be made until the following are submitted each month:
   1. Monthly Estimate
   2. Monthly Progress Report
   3. Statement of Contract Time
   4. Updated Submittal Register
   5. Updated Progress Schedule
   6. All Daily Reports
   7. All Payroll Affidavits for work done shall be submitted weekly.

J. Retainage: The Department will withhold retainage in compliance with the DOD GENERAL CONDITIONS.

K. Transmittal: Submit the signed original and 3 copies of each Payment Application for processing.

2.05 CONTRACTOR DAILY PROGRESS REPORTS

A. The General Contractor and all Subcontractors shall keep a daily report of report events.

B. The form of the Contractor Daily Progress Report shall be as directed by the Project Manager.

C. Submit copies of the previous week's reports on Monday morning at 10:00 a.m.

D. Submit copies of the reports with the monthly payment request for the whole period since the last payment request submittal.

E. Deliver the reports in hard copy, by e-mail, or as directed by the Project Manager.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Comply with the DOD GENERAL CONDITIONS “Shop Drawings and Other Submittals” section and “Material Samples” section.

B. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

C. Related Sections include the following:
   1. SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION for submitting schedules and reports, including Contractor’s Construction Schedule and the Submittals Schedule.

   2. SECTION 01770 - CLOSEOUT PROCEDURES for submitting warranties, project record documents and operation and maintenance manuals.

1.02 SUBMITTAL PROCEDURES

A. Coordinate Work and Submittals: Contractor shall certify the submittals were reviewed and coordinated.

B. Submittal Certification: Provide in MS Word when submitting electronically. Project Manager will provide an electronic copy of the Submittal Certification. Provide a reproduction (or stamp) of the “Submittal Certification” and furnish the required information with all submittals. Include the certification on:
   1. The title sheet of each shop drawing, or on

   2. The cover sheet of submittals in 8-1/2 inch x 11-inch format, or on

   3. One face of a cardstock tag (minimum size 3-inch x 6-inch) tied to each sample. On the sample tag, identify the sample to ensure sample can be matched to the tag if accidentally separated. The opposite face of the tag will be used by the Project Manager to receive, review, log stamp and include comments.

C. Variances: The Contractor shall request approval for a variance. Clearly note any proposed deviations or variances from the Specifications, Drawings, and other Contract Documents on the submittal and also in a separately written letter accompanying the submittal.

D. Submittal Certification Form (stamp or digital)

CONTRACTOR'S NAME: _____

PROJECT: _____

DAGS JOB NO: _____

As the General Contractor, we checked this submittal and we certify it is correct, complete, and in compliance with Contract Drawings and Specifications. All affected Contractors and suppliers are aware of, and will integrate this submittal into their own work.

SUBMITTAL NUMBER _____ DATE RECEIVED _____

REVISION NUMBER _____ DATE RECEIVED _____

SPECIFICATION SECTION NUMBER /PARAGRAPH NUMBER _____

DRAWING NUMBER _____

SUBCONTRACTOR'S NAME _____

SUPPLIER'S NAME _____

MANUFACTURER'S NAME _____

NOTE: DEVIATIONS FROM THE CONTRACT DOCUMENTS ARE PROPOSED AS FOLLOWS (Indicate "NONE" if there are no deviations)

CERTIFIED BY	

Note: Form can be combined with Design Consultant's Review stamp. This is available from the Project Manager.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 SUBMITTAL REGISTER AND TRANSMITTAL FORM

A. Contractor shall use submittal register and transmittal forms as directed by the Project Manager.

B. The listing of required submittals within this Section is provided for the Contractor's convenience. Review the specification technical sections and prepare a comprehensive listing of required submittals. Furnish submittals to the Project Manager for review.

C. Contractor shall separate each submittal item by listing all submittals in the following groups with the items in each group sequentially listed by the specification section they come from:
   1. Administrative
   2. Data
   3. Tests
   4. Closing

D. Contractor shall separate all different types of data as separate line items all with the column requirements.

E. Contractor shall send monthly updates and reconciled copies electronically to the Project Manager and the Design Consultant in MS Word or MS Excel or other format as accepted by the Project Manager.

Section No. – Title	Shop Drawings & Diagrams	Samples	Certificates (Material, Treatment, Applicator, etc.)	Product Data, Manufacturer's Technical Literature and Brochures	MSDS Sheets	Calculations	Reports (Testing, Maintenance, Inspection, etc.)	Test Plan	O & M Manual	Equipment or Fixture Listing	Schedules (Project Installation)	Maintenance Service Contract	Field Posted As-Built Drawings	Others	Guaranty or Warranty	Manufacturer's Guaranty or Warranty (Greater than one year)
01310 – Project Management & Coordination											■			■		
01320 – Construction Progress Documentation											■			■		
01330 – Submittal Procedures			■											■		
01400 – Quality Requirements			■				■	■						■		
01500 – Temporary Facilities and Controls														■		
01700 – Execution Requirements														■		
01770 – Closeout Procedures	■								■				■	■	■	
02050 – Demolition														■		
02070 – Selective Demolition											■					
02223 – Aggregate Base Course			■													
02282 – Soil Treatment for Vegetation Control				■	■											

Section No. – Title	Shop Drawings & Diagrams	Samples	Certificates (Material, Treatment, Applicator, etc.)	Product Data, Manufacturer's Technical Literature and Brochures	MSDS Sheets	Calculations	Reports (Testing, Maintenance, Inspection, etc.)	Test Plan	O & M Manual	Equipment or Fixture Listing	Schedules (Project Installation)	Maintenance Service Contract	Field Posted As-Built Drawings	Others	Guaranty or Warranty	Manufacturer's Guaranty or Warranty (Greater than one year)
03732 – Concrete Sealer				■												**2**
04450 – Exterior Stone Cladding	■	■	■	■			■							■		
05120 – Structural Steel	■		■	■			■							■		
05500 – Metal Fabrications	■		■	■		■								■		
06070 – Wood Treatment			■	■												**2**
06100 – Rough Carpentry			■													
07560 – Fluid Applied Roofing	■		■	■												**10**
07620 – Flashing and Trim	■			■												**2**
07920 – Sealants		■		■	■											
09500 – Metal Acoustical Ceiling Panels	■	■		■											**1**	
09901 – Painting		■	■	■	■						■			■	**2**	
09970 – Special Coatings		■		■												
16011 – Electrical Work	■		■	■										■		
16400 – General Electrical Lighting	■			■											**1**	

END OF SECTION

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and for Contractor's Quality Control responsibilities and duties.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

   2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.

   3. Requirements of this section or by the Department or authorities having jurisdiction, do not limit the Contractor's responsibility to provide quality-control services.

C. Contractor's Quality Control Program, consisting of a Quality Control Plan and related documents are required to be in place prior to the start of onsite construction.

1.02 DEFINITIONS

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

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Project Manager.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.03 SUBMITTALS

A. Qualification Data: For QC Manager (alternate QC Manager), inspection and testing agencies, furnish evidence to demonstrate their capabilities and experience. Include proof of qualifications in the form of education, certifications, and license. For the testing agencies, include a recent report on the inspection of the testing agency by a recognized authority.
   1. The Project Manager may disapprove any QC Manager (alternate QC Manager), inspection or testing agency or individual employed by the agency when the Project Manager determines it is in the best interest of the State. The Contractor is not entitled to any claim or cost increase or time extension due to the Project Manager's disapproval of an agency or individual.

B. Reports: Prepare and submit certified written reports that include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Ambient conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and reinspecting.

C. Permits, Licenses, and Certificates: Submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

D. Quality Control (QC) Plan: Submit a QC Plan within 30 calendar days after receipt of Notice of Award.
   1. The QC Plan shall include a preliminary submittal of the list of definable features of work and the Quality Control Checklist that covers the first 90 days of construction.
   2. Submit the completed list of definable features of work and the Quality Control Checklist in conjunction with the completed Construction Schedule or CPM schedule.

E. Any approval by the Department of the QC Plan is considered an “approved as noted, resubmittal required” and will be in effect only until the completed list of definable work features are received and approved. If the completed list of definable work features and completed Construction Schedule are not received within the time indicated, the QC Plan will be disapproved and all work will stop, except for work authorized in article 1.09 in the paragraph entitled “Preliminary Work Authorized Prior to Approval.”

1.04 SCHEDULE FOR SUBMITTING INFORMATION AND REPORTS

A. Deliver the original and two copies each of the following to the Department:

1. Combined Contractor Production and Contractor Quality Control Report, (one sheet): By 10:00 AM the next working day after each day that work is performed.

2. Field Test Reports: Within two working days after the test is performed, attached to the Contractor Quality Control Report;

3. Monthly Summary Report of Tests: 2 copies attached to the Contractor Quality Control Report;

4. Testing Plan and Log: 2 copies, at the end of each month;

5. Rework Items List: 2 copies, by the last working day of the month;

6. Quality Control meeting minutes: 2 copies, within 2 working days after the meeting and;

7. Quality Control Certifications: As required by the paragraph titled “Quality Control Certifications.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Professional Architect or Project Manager Qualifications: A professional architect or Project Manager who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing architect or Project Managering services of the kind indicated. Project Managering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

D. Inspection and Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E-548, and that specializes in types of tests and inspections to be performed.

1.06 QUALITY CONTROL MANAGER

A. Duties: Provide a Quality Control Manager at the work site to implement and manage the QC Program. In addition to implementing and managing the QC Program, the QC Manager may perform the duties of the Project Superintendent. The QC Manager is required to; attend the Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform submittal review, ensure testing is performed and provide QC certifications and documentation

required in this Contact. The QC Manager is responsible for managing and coordinating the Testing Laboratory personnel and any other inspection and testing personnel required by this Contract.

B. Qualifications: An individual with a minimum of 10 years experience as a superintendent, inspector, QC Manager, project manager, or construction manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must have experience in the areas of hazard identification and safety compliance. It is desirable that the QC Manager completed the course "Construction Quality Management for Contractors" offered by the Navy or the Army Corps of Project Managers or other similar course.

C. Approval: QC Manager shall be subject to the approval of the Project Manager. Unless the Contractor has a QC Manager on staff, the Contractor shall provide the names of at least three individuals, and shall rank the individuals based on the Contractor's preference to work with or hire. The Project Manager may approve all or any one of the individuals. If any individual is presently working for the Contractor as a QC Manager, the Contractor may choose to submit only one individual, and that individual is subject to approval.
   1. Furnish evidence showing the individual(s) meets the qualifications, experience, training and other criteria required by this section.

1.07 QUALITY CONTROL PROGRAM REQUIREMENTS

A. Establish and maintain a Quality Control (QC) Program consisting of:
   1. Quality Control organization,
   2. QC Plan, and QC Plan meeting
   3. Testing,
   4. Completion inspections,
   5. Quality Control meetings, and Coordination and mutual understanding meeting
   6. Submittal review and approval, and
   7. Quality Control certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations, which comply with the requirements of this Contract.

B. The QC Program shall cover on-site and off-site work and shall be keyed to the work sequence.

C. No work or testing may be performed unless the Quality Control Manager is on the work site.

D. Unless the QC Manager and Project Superintendent are the same individual, the QC Manager shall report to the Project Superintendent as the Project Superintendent will be held responsible for the quality of work on the job and with quality requirements specified in the contract. Besides the requirements of the General Conditions, the Project Superintendent is charged with the responsibility for the overall management of the project including quality and production.

E. Preliminary Work Authorized Prior to Approval: The only work that is authorized to proceed prior to the approval of the QC Plan is mobilization of storage and office trailers, temporary utilities and surveying, unless otherwise directed by the Project Manager.

F. Notification of Changes: Notify the Project Manager of any proposed QC Plan change, including changes in the Quality Control organization personnel. Send written notification a minimum of seven days prior to a proposed change. Proposed changes are subject to acceptance by the Project Manager.

1.08 QUALITY CONTROL ORGANIZATION

A. Quality Control Manager: Meet the qualifications and duties required by this section. 01400.

B. Alternate QC Manager Duties and Qualification: Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. Limit the time the QC Manager is absent to a period not exceed a single duration of two consecutive weeks, and in aggregate not more than 45 days during a calendar year. The qualification requirements for the Alternate QC Manager shall be the same as for the QC Manager.

1.09 QUALITY CONTROL (QC) PLAN

A. Requirements: Provide a QC Plan covering both on-site and off-site work. Bind the Plan in a 3-ring binder with pages numbered sequentially, and provide an electronic version of the plan in MS Word (or PDF) format.

B. Table of Contents (TOC): List and identify the major sections identified with tabs. Format the TOC in the order of the following paragraphs.

C. QC Organization: A chart showing the Quality Control organizational structure.

D. Names and Qualifications: In resume format, for each person in the Quality Control organization.

E. Duties, Responsibility and Authority of QC Personnel: List duties, responsibilities and authorities of each person in the quality control organization.

F. Outside Organizations: List outside organizations such as, architectural and consulting Project Managering firms that will be employed by the Contractor and a description of the services these firms will provide.

G. Appointment Letters: Signed by an officer of the firm appointing the Quality Control Manager and Alternate Quality Control Manager and stating that they are responsible for implementing and managing the QC Program. Include in this letter the responsibility of the Quality Control Manager and Alternate Quality Control Manager and authority to stop work which is not in compliance with the contract. Also, provide letters from the Quality Control Manager to all other Quality Control specialists outlining their duties, authorities, and responsibilities.

H. Submittal Procedures and Initial Submittal Register: Detail the procedures for reviewing, approving and managing submittals. Provide the name(s) of the person(s) in the Quality Control organization authorized to review and certify submittals prior to approval. Provide the initial submittal of the Submittal Register.

I. Testing Laboratory Information: Include applicable testing laboratory information required by this Section.

J. Testing Plan and Log: Include the tests required, referenced by the specification section and paragraph number requiring the test, the frequency, and the person responsible for each test.

K. Procedures to Complete Rework Items: Detail the procedures to identify, record, track and complete rework items.

L. Documentation Procedures: Establish documentation procedures, including proposed report formats.

M. Definable Features of Work: List the definable features of work as a checklist. A definable feature of work (DFOW) is a task, which is separate and distinct from other tasks and requires separate quality control requirements. DFOW could be identified by different trades or disciplines or by an item or activity on the construction schedule. Although each specification section could be considered a DFOW there frequently are more than one DFOW under a particular section. Cross-reference the list to the Construction Schedule and the specification sections.

1.10 QUALITY CONTROL (QC) PLAN MEETING

A. Prior to submission of the QC Plan, meet with the Department's representatives to discuss the QC Plan requirements of the Contract. The purpose of this meeting is to develop mutual understanding of the QC Plan requirements prior to plan development and submission.

1.11 COORDINATION AND MUTUAL UNDERSTANDING MEETING

A. After submission of the QC Plan, and prior to the start of construction, meet with the Department's Representatives to present the QC Program. The purpose of this meeting is to develop a mutual understanding of the quality control details, including documentation, administration for on-site and off-site work, and coordination of the Contractor's management, production and quality control personnel. At the meeting, the Contractor will be required to explain in detail the quality control for each definable feature of work. As a minimum, the Contractor's personnel required to attend shall include an officer of the firm, the project manager, project superintendent, Quality Control Manager, Alternate

Quality Control Manager, and subcontractor representatives. Each subcontractor who will be assigned quality control responsibilities shall have a principal of the firm at the meeting. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor, and the Department's Representative. The Contractor shall provide a copy of the signed minutes to all attendees. Repeat the coordination and mutual understanding meeting if a new QC Manager is appointed.

1.12 QUALITY CONTROL MEETINGS

A. QC Manager shall conduct Quality Control (QC) Meetings at least once every two weeks at the work site with the Project Superintendent. Notify the Department's Representative at least 48 hours in advance of each meeting to allow their attendance at these meetings. As a minimum, accomplish the following at each meeting:

1. Review the minutes of the previous meeting.

2. Review the schedule and the status of work since the last meeting, including; work or testing accomplished, rework items identified and rework items completed.

3. Review the status of submittals. Address reviewed and approved submittals and submittals required in the near future

4. Review the work to be accomplished in the next three weeks and the documentation required including the status of off-site work or testing. Establish completion dates for rework items.

5. Update the schedule showing planned and actual dates of the preparatory, initial and follow-up phases, including testing and any other inspection required by this contract.

6. Discuss construction methods and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each definable feature of work.

7. Resolve quality control and production problems, including assisting in resolving Request for Information (RFI) issues.

8. Address items that may require revising the QC Plan such as changes in quality control organization personnel or changes in procedures.

9. Review health and safety plan. Discuss upcoming activities that create or disturb hazardous materials.

1.13 PHASES OF CONTROL

A. Three Phases are used to ensure quality control measures are provided for each definable feature of work, which includes both on-site and off-site work. Notify the Project Manager at least 4 days prior to each phase.

B. Preparatory Phase – Includes a meeting conducted by the QC Manager and attended by the superintendent, and the foreman responsible for the definable feature. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Quality Control Checklist. Perform the following prior to beginning work on each definable feature of work:
   1. Review the contract drawing and each paragraph of the applicable specification sections.

   2. Verify that shop drawings and submittals for materials and equipment are submitted and approved. Verify receipt of approved factory test results, when required.

   3. Review the testing plan. Ensure that the required quality control testing provisions are made.

   4. Examine the work area. Ensure that the required preliminary work is completed.

   5. Examine and ensure the required materials, equipment, and sample work conforms to the approved shop drawings and submitted data. Ensure that the materials and equipment are available at the jobsite.

   6. Discuss construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction. Plan ahead and identify potential problems for each definable feature of work.

   7. Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.

C. Initial Phase – The initial phase starts when construction crews are ready to start work on a definable feature of work. Meet with the superintendent, and the foreman responsible for that definable feature of work. Observe the initial segment of the definable feature of work to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily Contractor Quality control Report and in the Quality Control Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each definable feature of work:
   1. Establish the quality of workmanship required.

   2. Resolve conflicts.

   3. Ensure that testing is performed by the approved laboratory.

   4. Check work procedures for compliance with the Safety Plan and the appropriate activity hazard analysis to ensure that applicable safety requirements are met.

D. Follow-Up Phase – For on-going work, perform the following activities daily, or more frequently if necessary, until the completion of each definable feature of work. Document the work in the daily Contractor Quality Control Report and in the Quality Control Checklist:
   1. Ensure that the work is in compliance with Contract requirements.

   2. Maintain the quality of workmanship required.

   3. Ensure that testing is performed by the approved laboratory.

   4. Ensure that rework items are being corrected.

   5. Perform safety inspections.

E. Conduct additional Preparatory and Initial Phases on the same definable features of work if the quality of on-going work is unacceptable, or if there are changes in the applicable quality control organization, or if work on a definable feature is resumed after substantial period of inactivity, or if other problems develop.

F. For Off-Site Work – Notify the Project Manager at least two weeks prior to the start of the preparatory and initial phases.

1.14 TESTING

A. Perform sampling and testing required in this section and as otherwise required by these specification.

B. Testing Laboratory Requirements:
   1. Inspection of Testing Laboratories: Prior to approving a non-accredited laboratory, the Department may conduct an inspection of the proposed testing laboratory records and facilities. Records subject to inspection include; equipment inventory, equipment calibration dates and procedures, library of test procedures, audit and inspection reports by agencies conducting laboratory evaluations and certifications, testing and management personnel qualifications, test report forms, and the internal quality control procedures.

   2. Capability Check: The Department may check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this contract.

   3. Test Results:
      a. Cite applicable contract requirements, tests or analytical procedures used.
      b. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the Project Manager immediately.
      c. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specifications and contract requirements. Indicate the applicable specification section.
      d. The authorized testing laboratory representative shall sign and certified the test results and reports.

e. Furnish the signed reports, certifications, and other documentation to the Project Manager via the QC Manager.

4. Test Reports and Monthly Summary Report of Tests - The QC Manager shall furnish the signed reports, certifications and a monthly summary report of field tests. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month.

1.15 COMPLETION INSPECTIONS

A. Pre-Final Inspection: Near completion of the Work or any increment Work, the QC Manager shall conduct an inspection to identify items, which do not conform to the contract requirements. Include any remaining items on the "Rework Items List" which were not corrected. The QC Manager shall make follow-on inspections to ascertain that all deficiencies have been corrected.

B. Final Inspection: Comply with the General Conditions section titled "SUBSTANTIAL COMPLETION AND FINAL INSPECTION." Verify that the facility is substantially complete and ready for final inspection. The QC Manager, the superintendent or other primary contractor management personnel shall ensure that all deficient items are corrected prior to notifying the Department for a final inspection.

1.16 DOCUMENTATION

A. Maintain current and complete records of on-site and off-site activities.

B. A Contractor Production Report is required for each day that work is performed and shall be attached to the Contractor Quality Control Report prepared for the same day. Account for each calendar day throughout the life of the Contract. Use terminology consistent with the construction schedule to report the work. The Contractor Production Report is to be prepared, signed and dated by the project superintendent and shall contain the following information:
   1. Report date, report number, contractor's name, project title, DAGS job number, project location and superintendent present.

   2. Weather conditions in the morning and in the afternoon including; maximum and minimum temperatures, durations and estimated rainfall, and prevailing wind directions and speed.

   3. Identify work performed by corresponding schedule activity number, post contract number, change order number, and other items.

   4. A list of Contractor and subcontractor personnel on the work site. Include their trades, work location, description of work performed, hours worked by trade, daily total work hours on work site, and total work hours from start of construction.

   5. A list of job safety actions taken and safety inspections conducted. Indicate that safety requirements have been met including the results, and address the following:
      a. Was a job safety meeting held? If yes, attach a copy of the meeting minutes.

b. Were there any lost time accidents? If yes, attach a copy of the completed OSHA report and the Department's "Contractor Significant Incident Report".
c. Was any crane, trenching, scaffold, high voltage electrical, or high work done? If yes, attach a statement or checklist showing inspection(s) performed.
d. Were there hazardous material(s) or waste released into the environment? If yes, attach descriptions, accident reports, notifications required and made.
e. List safety actions taken today and safety inspections conducted.

6. A list of equipment or material received each day that is incorporated into the job.

7. A list of equipment and plant equipment on the work site including the number of hours used, idle and down for repair.

8. Include a "remarks" section in this report. Address pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered an a record of visitors to the work site.

C. A Contractor Quality Control Report is required for each day that work is performed and for every seven consecutive calendar days of no-work period and on the last day of a no-work period. Account for each calendar day throughout the life of the Contract. Use terminology consistent with the construction schedule to report the work. The Contractor Quality Control Report is prepared, signed and dated by the QC Manager and shall contain the following information:
1. Identify the control phase and the definable feature of work.

2. Results of the Preparatory Phase meetings held including the location of the definable feature of work and a list of personnel present at the meeting. Indicate in the report that for this definable feature of work, the drawings and specifications have been reviewed, submittals approved, materials comply with approved submittals, materials are stored properly, preliminary work is done correctly, the testing plan was reviewed, work methods and schedule were discussed, and that safety and hazard analysis were addressed.

3. Results of the Initial Phase meetings held including the location of the definable feature of work and a list of personnel present at the meeting. Indicate in the report that for this definable feature of work the preliminary work was done correctly, samples were prepared and approved, the workmanship is satisfactory, test results are acceptable, work is in compliance with the Contract, work complies with safety requirements, and the required testing was performed including a list of who performed the tests.

4. Results of the Follow-Up Phase inspections held including the location of the definable feature of work. Indicate in the report for this definable feature of work that the work complies with the Contract as approved in the Initial Phase, work complies with safety requirements, and that required testing was performed including a list of who performed the tests.

5. Results of the Phases of Control for off-site work, if applicable, including action taken.

6. List the rework items identified, but not corrected by close of the day's work.

7. List the rework items corrected from the rework items list along with the corrective action taken.

8. Include a "remarks" section in this report. Address pertinent information including directions received, quality control problem areas, deviations from the QC plan, construction deficiencies encountered, QC meetings held, acknowledgment that as-built drawings have been updated, corrective direction given by the QC organization and corrective action taken by the Contractor.

9. Provide Contractor Quality Control Report certification.

D. Quality Control Checklist: Maintain a Quality Control Checklist for each definable feature of work. Each control check should indicate whether or not the work performed complies with contract requirements. Work performed that does not comply with contract requirements shall be noted in the Rework Items List.

E. Testing Plan and Log: As tests are performed, the QC Manager shall record on the "Testing Plan and Log" the date the test was conducted, the date the test results were forwarded to the Department remarks and acknowledgment that an accredited or approved testing laboratory was used. Attach a copy of the updated "Testing Plan and Log" to the last daily Contractor Quality Control Report of each month.

F. Rework Items List: The QC Manager shall maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected. There is no requirement to report rework item that is corrected the same day it is discovered. Attach a copy of the "Rework Items List" to the last daily Contractor Quality Control Report of each month. The Contractor shall be responsible for including on this list items needing rework including those identified by DAGS.

G. Report Forms: Furnish the proposed forms to be used to the Project Manager for review and approval.
   1. Contractor Production Report and Contractor Quality Control Report, with separate continuation sheet. These forms may be combined.

   2. Testing Plan and Log.

   3. Rework Items List.

1.17 RECORD (As-Builts) DRAWINGS

A. The QC Manager is required to ensure the record drawings and jobsite record sets are kept current on a daily basis in accordance with Section 01770 – Closeout Procedures.

1.18 NOTIFICATION OF NON-COMPLIANCE

A. Contractor will be notified of any detected non-compliance items. Take immediate corrective action after receipt of such notice.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

A. General: On completion testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.02 DEPARTMENT'S AUTHORITY

A. Review and removal of Quality Control Personnel:
   1. All Quality Control organization personnel are subject to review by Project Manager; and the Project Manager may interview any member of the Quality Control organization at any time in order to verify the submitted qualifications.

   2. The Project Manager has the authority to have the QC Manager replaced at any time for cause. Justifications may include, but are not limited to: not being on site when QC Manager's duties are required, or wrongfully approving substandard and noncompliant work.

   3. The Contractor is not entitled to any claim or cost increase or time extension due to the Project Manager's disapproval of an agency or individual.

END QUALITY REQUIREMENTS SECTION

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

B. Temporary utilities include but are not limited to, the following:
   1. Electric power service.

   2. Cemetery water is available for use. The cemetery also has non-potable water system in the water. Water connections should be coordinated with the Project Manager.

C. Support facilities include, but are not limited to, the following:
   1. Warning signs.

   2. Trash, refuse disposal.

   3. Construction aids and miscellaneous services and facilities.

   4. Lifts and hoists.

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

   2. Barricades, warning signs, and lights.

   3. Temporary security measures.

E. Related Sections: Refer to Divisions 2 through 16 for other temporary requirements including ventilation, humidity requirements and products in those Sections.

1.02 USE CHARGES

A. General: Cost or use charges for temporary facilities are not chargeable to the State and shall be included in the Contract Price. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
   1. Other Contractors with agreements with the State working within the contract limits.

   2. Occupants of Project.

   3. Testing agencies.

   4. Project Manager and personnel of authorities having jurisdiction.

1.03 QUALITY ASSURANCE

A. Standards: Comply with UBC Chapter 33, “Site Work, Demolition and Construction”, ANSI A10.6, NECA’s “Temporary Electrical Facilities”, and NFPA 241, "Construction, Alteration, and Demolition Operations".

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.

2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70, “National Electrical Code”.

1.04 PREPARATION AND PROTECTION

A. Protection of Property: Continually maintain adequate protection of the Work from damage and protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. Repair, replace or pay the expense to repair damages resulting from Contractor’s fault or negligence.

B. Before starting work to be applied to previously erected constructions, make a thorough and complete investigation of the recipient surfaces and determine their suitability to receive required additional construction and finishes. Make any repair that is required to properly prepare surfaces, and coordinate the Work to provide a suitable surface to receive following Work.

C. Commencing work by any trade implies acceptance of existing conditions and surfaces as satisfactory for the application of subsequent work, and full responsibility for finished results and assumption of warranty obligations under the Contract.

D. Protect existing (including interiors) work to prevent damage by vandals or the elements. Provide temporary protection. Use curtains, barricades, or other appropriate methods. Take positive measures to prevent breakage of glass and damage to plastic, aluminum and other finishes.

E. Repairs and Replacements: Promptly replace and repair damages to the approval of the Project Manager. Additional time required to secure replacements and to make repairs does not justify a time extension.

1.05 BARRICADES AND ENCLOSURES

A. Barricades: Before construction operations begin, erect temporary construction barricade(s) to prevent unauthorized persons from entering the construction and/or scaffold area necessary to complete the work.

1. Provide barricade plan to the Project Manager for approval.

2. Maintain the temporary barricade(s) throughout the duration of the Work. During the course of the work, the Project Manager may require additional barricades for the safety of the public and staff. Contractor shall erect these barricade(s) at his own expense.

3. See other related sections for environmental controls during the course of the work.

PART 2 - PRODUCTS

2.01 MATERIAL

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

B. Barricade Tape: Non-adhesive, 4-mil, 3" barricade tape by Harris or approved equal.

2.02 EQUIPMENT

A. Electrical Outlets: Properly configured, NEMA polarized outlets to prevent insertion of 110 to 120 V plugs into higher voltage outlets; equipped with ground fault circuit interrupters, reset button, and pilot light.

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

PART 3 - EXECUTION

3.01 TEMPORARY UTILITY INSTALLATION

A. General: Connect to existing service where directed by the Project Manager.

B. Sanitary Facilities: Use of user's existing toilet facilities will be permitted where and when directed by the Project Manager, as long as facilities are cleaned and maintained in a condition acceptable to user. At Substantial Completion, restore these facilities to condition existing before initial use. Provide separate facilities for male and female personnel.

C. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment. Protect wiring, in conduits or other, measures when exposed to possible damage or traffic areas.

D. Telephone Service: Provide a portable wireless telephone with voice-mail or messaging service for superintendent's use in making and receiving telephone calls when at the construction site.

3.02 SUPPORT FACILITIES INSTALLATION

A. Temporary Sign(s):

1. Provide and install signs as listed. Sign designs are attached to Part 3 of this Section:
   a. Warning Sign

2. Install signs where directed by the Project Manager or where indicated to inform public and persons seeking entrance to the Project. Do not permit installation of unauthorized signs.

3. Provide temporary signs to provide directional information to constructional personnel and visitors.

4. Construct signs with durable materials, properly supported or mounted, and visible.

B. Trash, Refuse Disposal:
   1. Department of Health – Illegal Dumping Notice. See attachment to Part 3 of this section.
      a. This Notice to be printed out on 8.5x11" paper.

      b. This Notice to be posted at the job site field office and/or in locations visible to all contractors, subcontractors, suppliers, vendors, etc. throughout the duration of the project.

   2. Illegal Dumping of solid waste could subject the Contractor to fines and could lead to felony prosecution in accordance with Chapter 342H, HRS. For more information, see the following web site: http://www.hawaii.gov/health/environmental/waste/sw/pdf/Illdump.pdf

   3. Provide waste collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste.

   4. Do not burn debris or waste materials on the project site.

   5. Haul unusable debris and waste material to an appropriate off site dump area.
      a. Water down debris and waste materials during loading operations or provide other measures to prevent dust or other airborne contaminants.

      b. Vacuum, wet mop, or damp sweep when cleaning rubbish and fines which can become airborne from floors or other paved areas. Do not dry sweep.

   6. Clean up shall include the collection of all waste paper and wrapping materials, cans, bottles, construction waste materials and other objectionable materials, and removal as required. Frequency of clean up shall coincide with rubbish producing events.

3.03 ENVIRONMENTAL CONTROLS

A. General: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Dust Control:
   1. Prevent dust from becoming airborne at all times including non working hours, weekends and holidays in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 60.1 Air Pollution Control.

2. Contractor is responsible for and shall determine the method of dust control. Subject to the Contractor's choice, the use of water or environmentally friendly chemicals may be used over surfaces that create airborne dust.

3. Contractor is responsible for all damage claims due to their negligence to control dust.

C. Noise Control

1. Keep noise within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 46 Community Noise Control. Obtain and pay for the Community Noise Permit when construction equipment or other devices emit noise at levels exceeding the allowable limits.

2. Ensure mufflers and other devises are provided on equipment, internal combustion engines and compressors to reduce loud disruptive noise levels and maintain equipment to reduce noise to acceptable levels.

3. Unless specified elsewhere, do not start construction equipment that meet allowable noise limits prior to 6:45 A.M. or equipment exceeding allowable noise levels prior to 7:00 A.M.

3.04 BARRICADES

A. Barricades: Erect temporary construction barricade(s) to prevent unauthorized persons from entering the project area and to the extent required by the Project Manager.

1. Maintain temporary construction barricade(s) throughout the duration of the Work. During the course of the project, the Project Manager may require additional barricades be provided for the safety of the public. Contractor shall erect the additional barricade(s) at its own expense.

2. Construction: Plastic tape.

B. Security Enclosure and Lockup:

1. Install substantial temporary enclosure around partially completed areas of construction.

2. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

3.05 OPERATION, TERMINATION, AND REMOVAL

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

B. Termination and Removal: Remove each temporary facility when need for its service has ended, or when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

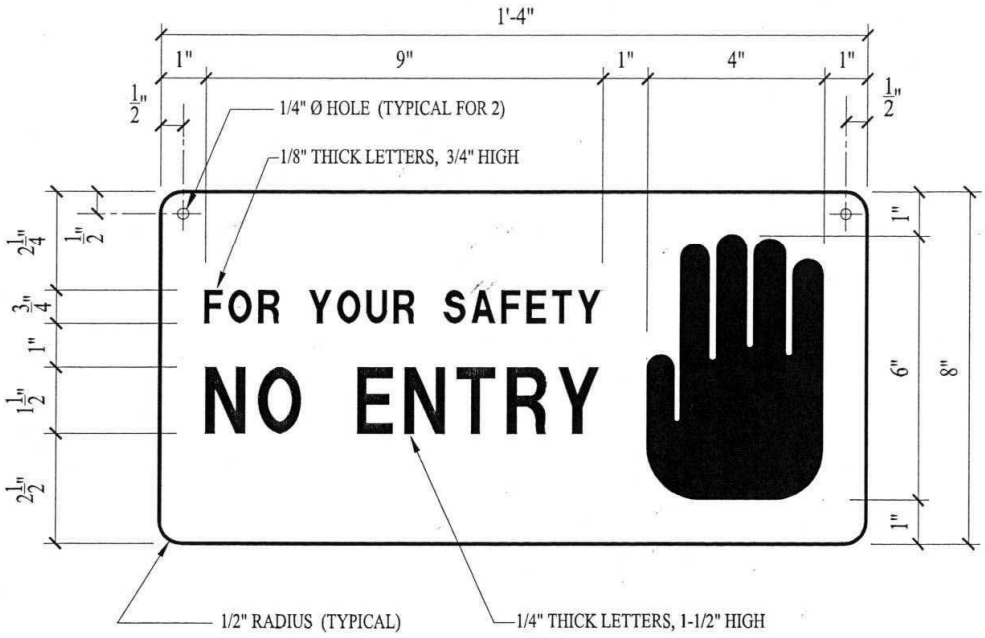
3.06 ATTACHMENTS

A. Warning Sign: Requirements for Warning Sign.

B. Department of Health – Illegal Dumping Notice

END OF SECTION

REQUIREMENTS FOR WARNING SIGN



1. General Requirements: Furnish all labor, materials and equipments necessary to construct and install warning signs as specified hereinafter.
2. Materials
   a. Backing: Backing shall be 6061-T6 aluminum 0.032-inch minimum thickness.
   b. Paint: Paint shall be satin finish, exterior grade or factory baked enamel or a combination thereof.
3. Colors: Signs shall have white background. Remaining items shall be similar to Rust-Oleum Federal Safety Red.
4. Requirements for Warning Sign: Message configuration and dimensions shall be in accordance with the attached illustration.
5. Installation
   a. Signs shall be located at 50-foot intervals around roped off work area or at all entrances in the case of interior work.
   b. Signs shall be attached to the rope barrier, rope barrier supports, individual sign supports or buildings. Do not use nails to attach signs to building(s).
6. Clean-up: Remove all signs upon completion of project. Repair any damages caused by sign mounting and removal.

DEPARTMENT OF HEALTH
ILLEGAL DUMPING NOTICE

The law requires you to dispose solid waste only at recycling or disposal facilities permitted by the Department of Health.

"Solid waste" includes municipal refuse, construction and demolition waste, household waste, tires, car batteries, derelict vehicles, green wastes, furniture, and appliances.

Illegal dumping of solid waste or allowing illegal disposal of solid waste on your property even if contractual or other arrangements are made could subject you to fines from $10,000 to $25,000 per occurrence and could lead to felony prosecution in accordance with Chapter 342H, HRS.

Contact the Department of Health, Solid Waste Section at 586-4226 to report illegal dumping activities or if you have further questions.

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including the following:
   1. Construction layout. Field engineering and surveying.
   2. General installation of products.
   3. Coordination of State-installed products.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.
   7. Correction of the Work.

B. Related Sections
   1. SECTION 01770 - CLOSEOUT PROCEDURES.

1.02 SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.03 NOTIFICATION

A. Contact the Project Manager and the Project Contact Person at least 3 working days prior to starting any onsite work.

1.04 PROJECT AND SITE CONDITIONS

A. Project Contract Limits (Contract Zone Limits) indicate only in general the limits of the work involved. Perform necessary and incidental work, which may fall outside of these demarcation lines. Confine construction activities within the Project Contract Limits and do not spread equipment and materials indiscriminately about the area.

B. Disruption of Utility Services: Prearrange work related to the temporary disconnection of electrical and other utility systems with the Project Manager. Unless a longer notification period is required elsewhere in the Contract Documents, notify the Project Manager at least 15 days in advance of any interruption of existing utility service. Time and duration of interruptions are subject to the Project Manager's approval. Keep the utility interruptions and duration to a minimum so as not to cause inconvenience or hardship to the facility. If temporary electrical or other utility systems hook-up is required, provide the necessary services. Pay for temporary services as part of the contract, unless specifically noted otherwise.

C. Contractor's Operations - Provide means and methods to execute the Work and minimize interruption or interference to the facility's operations. Rearrange the construction schedule when construction activities result in interruptions that hamper the operations of the facilities.

D. Maintain safe passageway to and from the facility's occupied buildings, rooms and other occupied spaces for the using agency personnel and the public at all times.

E. Contractor, Subcontractor(s) and their employees will not be allowed to park in zones assigned to Users or facility personnel. Subject to availability, the Project Manager may designate areas outside of the Contract Zone Limits to be used by the Contractor. Restore any lawn area damaged by construction activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINING THE SITE

A. Contractor and Subcontractors are expected to visit the site and make due allowances for difficulties and contingencies to be encountered. Compare contract documents with work in place. Become familiar, with existing conditions, the conditions to be encountered in performing the Work, and the requirements of the drawings and specifications.

B. Verify construction lines, grades, dimensions and elevations indicated on the drawings before any clearing, excavation or construction begins. Bring any discrepancy to the attention of the Project Manager, and make any change in accordance with the Project Manager instruction.

C. Obtain all field measurements required for the accurate fabrication and installation of the Work included in this Contract. Verify governing dimensions and examine adjoining work on which the Contractor or Subcontractor's work is in any way dependent. Submit differences discovered during the verification work to the Project Manager for interpretations before proceeding with the associated work. Exact measurements are the Contractor's responsibility.

D. Furnish or obtain templates, patterns, and setting instructions as required for the installation of all Work. Verify dimensions in the field.

E. Contractor shall accept the site and the existing building(s) in the condition that exists at the time access is granted to begin the Work. Verify existing conditions and dimensions shown and other dimensions not indicated but necessary to accomplish the Work.

F. Locate all general reference points and take action to prevent their destruction. Lay out work and be responsible for lines, elevations and measurements and the work executed. Exercise precautions to verify figures and conditions shown on drawings before layout of work.

3.02 SITE UTILITIES

A. Cooperate, coordinate and schedule work to maintain construction progress, and accommodate the operations and work of the owners of underground or overhead utility lines or other property in removing or altering the lines or providing new services.

B. Contact all the various utility companies before the start of the work to ascertain any existing utilities and to develop a full understanding of the utility requirements with respect to this Project. Furnish the Project Manager with evidence that the utility companies were contacted.

C. Should the Contractor discover the existence and location of utilities in the contract drawings are not correct, do not disturb the utilities and immediately notify the Project Manager.

D. Do not disturb or modify any utilities encountered, whether shown or not on the Contract Drawings, unless otherwise instructed in the drawings and specifications or as directed by the Project Manager. Repair and restore to pre-damaged condition any utilities or any other property damaged by construction activities.

E. Transfer to “Field Posted As-Built” drawings the location(s) and depth(s) of new and existing utilities that differ from the Contract Drawings. Locate by azimuth and distance and depth(s) from fixed referenced points.

F. After ascertaining the exact location and depth of utilities within the project area, mark and protect the locations.
   1. Acquaint personnel working near utilities with the type, size, location, depth of the utilities, and the consequences that might result from disturbances.

   2. Do not start trenching or start similar operations until reasonable and appropriate precautions to protect the utilities are taken.

G. For newly identified utility lines, if directed by the Project Manager, manually excavate within 2-feet of the utility line to avoid damage. Under this directive, manual excavation is considered additional work.

H. Existing Irrigation Systems: Where work is located in areas with existing irrigation systems, Contractor shall test the existing systems and document all deficiencies prior to any work that may damage the existing systems.

3.03 FIELD MEASUREMENTS

A. Take field measurements to fit and install the Work properly. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Submit a Request For Information (RFI) immediately upon discovery of the need for clarification of the Contract Documents. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.04 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to existing conditions. If discrepancies are discovered, notify the Project Manager promptly.

3.05 INSTALLATION

A. Install materials, items, fixtures required by the various Divisions and Sections of the Specifications in accordance with Contract Documents, by workers specially trained and skilled in performance of the particular type of work, to meet guarantee and regulatory agency requirements. Should the drawings or specifications be void of installation requirements, install the materials, items, and fixtures in accordance with the manufacturer's current specifications, recommendations, instructions and directions.

3.06 CUTTING AND PATCHING

A. Oversee cutting and patching of concrete, masonry, structural members and other materials where indicated on drawings and as required by job conditions. Unless noted elsewhere in the contract documents, do not cut or patch existing or new structural members without previously notifying the Project Manager.

B. Provide patch materials and workmanship of equal quality to that indicated on the drawings or specified for new work.

3.07 CLEANING

A. General: Clean the Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully. Contractor shall remove and dispose of all debris, rubbish and other wastes generated from the construction operations. Use of the cemetery waste receptacles is not permitted.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

   2. Do not hold waste more than 7 days unless approved otherwise by the Project Manager.

   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations. Storage of hazardous material not allowed.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use only cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.08 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions to provide proper temperature and relative humidity conditions.

3.09 CORRECTION OF THE WORK

A. Repair or replace defective construction. Restore damaged substrates and finishes. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair defective components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01715 – EXISTING CONDITIONS – ASBESTOS / LEAD / HAZARDOUS MATERIAL SURVEY

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the results of the State's survey for Asbestos, Lead and / or other Hazardous materials and is provided for the Contractor's information.

B. Related Sections include the following:
   1. SECTION 13284 – REMOVAL AND DISPOSAL OF MERCURY-CONTAINING LAMPS; for requirements of all work which includes mercury spill cleanup.

1.02 ASBESTOS

A. The structure or structures to be renovated or modified under this contract have been surveyed for the presence of asbestos containing materials (ACM), using AHERA requirements. A copy of the initial survey report, as well as any subsequent supplemental survey report(s) if performed, is included in this Section.
   1. The report(s) are included, even when no ACM was found, for the Contractor's information. Review the attached report(s) for the basis on which the negative ACM finding was made. Contractor may perform further surveys at its own expense if ACM not shown in the report(s) is suspected in the areas of the building(s) in which work will be performed. If ACM is found, notify the Contracting Officer immediately.

   2. If there is ACM outside of the areas in which work will be performed, this ACM shall not be disturbed in any way.

B. If applicable, notify employees, Subcontractors and all other persons engaged on the project of the presence of asbestos in the existing buildings in accordance with the requirements of Chapter 110, Article 12-110-2 (f) (1) (B) of the Occupational Safety and Health Standards, State of Hawaii.

C. In the event that work is required in any building or buildings on the site other than the one(s) designated within this project scope, request copies of the asbestos survey report(s) for such building(s) from the Contracting Officer. Based on the information contained in the additional survey(s), notify affected personnel per paragraph 1.02 B.

1.03 LEAD CONTAINING PAINT

A. Review the attached lead testing data for the basis on which the non-LCP was made. Lead testing was for design purposes only and the results do not satisfy any of the requirements of Chapter 12-148.

1.04 POLYCHLORINATED BIPHENYLS (PCB's)

A. Inform employees, Subcontractors and all other persons engaged in the project that PCB's are not present in the existing building(s).

1.05 MERCURY-CONTAINING LAMPS

A. Inform employees, Subcontractors and all other persons engaged in the project that mercury-containing lamps are present in the existing building(s) and at the job site.

B. Handle mercury containing lamps as universal waste in accordance with the universal waste rule 40 CFR 273 and the State of Hawaii Department of Health fluorescent lamp policy.
   1. Label universal waste lamp packaging or containers with a standard "Universal Waste" label. Indicate the waste accumulation start date.

   2. Universal waste lamps shall be recycled within 10 days of removal.

C. In the event of a spill, the Contractor shall refer to SECTION 13284 – REMOVAL AND DISPOSAL OF MERCURY-CONTAINING LAMPS for requirements of all work which includes mercury spill cleanup.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.01 SURVEY

A. Attached, *Limited Hazardous Materials Survey Report, Hawaii State Veterans Cemetery Committal Shelter, Honolulu, Oahu, Hawaii,* 19 pages, dated September 28, 2015, prepared by EnviroServices & Training Center, LLC.

END OF SECTION

LIMITED HAZARDOUS MATERIALS SURVEY REPORT

HAWAII STATE VETERANS CEMETERY COMMITTAL SHELTER
HONOLULU, OAHU, HAWAII

Prepared for:
MITSUNAGA & ASSOCIATES, INC.
747 Amana Street, Suite 216
Honolulu, HI 96814

Prepared by:
ENVIROSERVICES & TRAINING CENTER, LLC
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Honolulu, Hawaii 96814
tel: (808) 839-7222

ETC Project No. 15-4046

September 28, 2015

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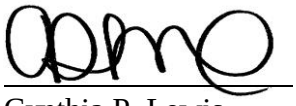
APPENDICES

1.0 CERTIFICATIONS AND LIMITATIONS

EnviroServices & Training Center, LLC (ETC) has completed this Limited Hazardous Materials Survey for the Hawaii State Veterans Cemetery Committal Shelter located in Honolulu, Oahu, Hawaii (Subject Site). ETC's findings and recommendations contained herein are based on research, site observations, government regulations and laboratory data, which were gathered at the time and location of the study. Opinions stated in this report do not apply to changes that may have occurred after the services were performed.

ETC has performed specified services for this project with the degree of care, skill and diligence ordinarily exercised by professional consultants performing the same or similar services. No other warranty, guarantee, or representation, expressed or implied, is included or intended; unless otherwise specifically agreed to in writing by both ETC and ETC's Client.

This report is intended for the sole use of Mitsunaga & Associates, Inc. exclusively for the Subject Site. Mitsunaga & Associates, Inc. may use and release this report, including making and retaining copies, provided such use is limited to the particular site and project for which this report is provided. However, the services performed may not be appropriate for satisfying the needs of other users. Release of this report to third-parties will be at the sole risk of ETC's Client and/or said user, and ETC shall not be liable for any claims or damages resulting from or connected with such release or any third party's use or reuse of this report.

Prepared By: 

Cynthia P. Lewis
State of Hawaii Asbestos Inspector Certification # HIASB-3939

Date: September 28, 2015

2.0 EXECUTIVE SUMMARY

EnviroServices & Training Center, LLC (ETC) has completed this Limited Hazardous Materials Survey Report for Hawaii State Veterans Cemetery Committal Shelter located in Honolulu, Oahu, Hawaii (Subject Site). The following summarizes the hazardous materials identified during ETC's investigation:

Summary of Asbestos Containing Materials Survey

None of the suspected ACM sampled contained levels of asbestos equal to or above the regulatory limit of 1%.

Summary of Lead Paint Survey

No paint surfaces were observed.

Summary of Arsenic Survey

No suspected arsenic treated materials were observed.

Summary of Polychlorinated Biphenyl (PCB) Ballast and Mercury-Containing Lamps

The one (1) interior fluorescent light ballast inspected was not PCB-containing. The two (2) fluorescent lamps inspected are classified as mercury-containing.

3.0 INTRODUCTION/PURPOSE

The purpose of this survey was to investigate Hawaii State Veterans Cemetery Committal Shelter located in Honolulu, Hawaii (Subject Site) for the presence of hazardous materials that may be affected by the renovation project. Specifically, ETC completed the following tasks:

- Mobilized a State of Hawaii Department of Health (DOH)/Environmental Protection Agency (EPA) certified asbestos building inspector to the Subject Site;
- Performed site reconnaissance at the Subject Site;
- Collected eighteen (18) samples of suspected Asbestos Containing Material (ACM) from various locations throughout the Subject Site;
- Submitted the eighteen (18) samples of suspected ACM to EMC Labs, Inc. (EMC) located in Phoenix, Arizona for asbestos analysis via Polarized Light Microscopy (PLM) in accordance with the Asbestos Hazard Emergency Response Act (AHERA) protocol and the National Institute for Occupational Safety and Health (NIOSH) Method 600/R-93/116;
- Visually inspected the one (1) interior fluorescent light fixture for required documentation indicating the presence or lack of PCB-containing ballasts oil and mercury-containing lamps;
- Prepared this report documenting the field activities and the results of the investigation including analytical results, conclusions, and recommendations.

4.0 METHODOLOGY

4.1 Asbestos

ETC personnel collected a total of eighteen (18) samples of suspected ACM for asbestos analysis. All of the suspected ACM samples were collected from various areas of the Subject Site in accordance with EPA guidelines and recommendations.

The suspected ACM were wetted with amended water before sample collection. A small piece was then carefully cut out and placed into a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. The approximate quantity of each suspected ACM was noted. Sample locations were randomly selected in accordance with EPA protocols and recommendations.

All of the asbestos samples were properly logged and recorded following strict chain of custody procedure and submitted to EMC for analysis by polarized light microscopy in accordance with EPA Method 600/R-93/116. EMC Labs, Inc. is accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP).

4.2 Lead Paint

No painted surfaces were observed.

4.3 Arsenic

No suspected arsenic treated materials were observed.

4.4 PCB Ballast and Mercury-Containing Lamps

ETC inspected the one (1) interior fluorescent light fixture for required documentation indicating the presence or lack of PCB-containing ballasts oil and mercury-containing lamps. The fluorescent light ballast was inspected for the presence of labeling stating "No PCB". If labeling was not observed on the light ballast and/or if the ballast was not accessible, the ballast was assumed to be PCB-containing.

Fluorescent lamps were inspected for the presence of green end caps or labeling indicating low-mercury levels, or silver end caps, indicating high levels of mercury. Silver end capped lamps were considered to be hazardous/universal waste.

5.0 RESULTS

5.1 Asbestos Inspection

None of the suspected ACM sampled contained levels of asbestos equal to or greater than the regulatory limit of 1%. The results of this analysis are contained below in Table 1.

Table 1

Sample ID	*Homogeneous Area*	*Material*	*Condition*	*Category*	*Friability*	*Analysis Layer*	*Asbestos Content*
4046-AB-01	Committal Shelter Roof	Roof Material	Good	Not Applicable	Not Applicable	All	None Detected
4046-AB-02							None Detected
4046-AB-03							None Detected
4046-AB-04	Committal Shelter Roof Side Walls	Yellow Adhesive on Roof Material	Good	Not Applicable	Not Applicable	All	None Detected
4046-AB-05							None Detected
4046-AB-06							None Detected
4046-AB-07	Committal Shelter Roof	Flashing Gray/Tan Caulking	Good	Not Applicable	Not Applicable	All	None Detected
4046-AB-08							None Detected
4046-AB-09							None Detected
4046-AB-10	Committal Shelter Roof	Flashing Black Sealant	Good	Not Applicable	Not Applicable	All	None Detected
4046-AB-11							None Detected
4046-AB-12							None Detected
4046-AB-13	Committal Shelter Roof Skylight	Black Caulking	Good	Not Applicable	Not Applicable	All	None Detected
4046-AB-14							None Detected
4046-AB-15							None Detected
4046-AB-16	Committal Shelter Ceiling	Mastic on Light Fixture	Good	Not Applicable	Not Applicable	All	None Detected
4046-AB-17							None Detected
4046-AB-18							None Detected

5.2 Lead Paint Inspection

No paint surfaces were observed.

5.3 Arsenic

No suspected arsenic treated materials were observed.

5.4 PCB Ballast and Mercury-Containing Lamps

The one (1) interior fluorescent light fixture ballast inspected was not PCB-containing. The two (2) fluorescent lamps inspected are classified as mercury-containing. The results of this survey are contained below in Table 2.

Table 2

Total No. of Fixtures	***No. of Ballasts Inspected***	***Ballasts***		***Fixtures Not Inspected***	***Total No. of Lamps***	***No. of Lamps Inspected***	***Lamps***		***Lamps Not Inspected***
		PCB Containing	***Non-PCB Containing***				***Mercury Containing Universal Waste***	***Low Mercury Containing***	
1	1	0	1	0	2	2	2	0	0

6.0 DISCUSSION

ETC personnel's scope of work included a small non-working drinking fountain. However, the drinking fountain had been removed prior to ETC's investigation.

7.0 RECOMMENDATION

In summary, mercury-containing fluorescent lamps were observed. Based on ETC's visual inspection of the facility, ETC recommends the following:

- Manage and/or remove and dispose of hazardous and regulated materials in accordance with applicable local, state, and federal regulations, prior to renovation and/or demolition activities that may disturb these materials.

Appendix **I**

LABORATORY ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0160762

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	15-4046
Address:	505 WARD AVE, STE 202	Date Received:	09/18/2015
	HONOLULU HI 96814	Date Analyzed:	09/23/2015
Collected:	09/17/2015	Date Reported:	09/23/2015
Project Name:	HAWAII STATE VETERANS CEMETERY	EPA Method:	EPA 600/R-93/116
Address:	COMMITTAL SHELTER	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0160762-001 4046-AB-01	COMMITAL SHELTER ROOF	LAYER 1 Roofing, Black/ White	No	None Detected			
						Carbonates Quartz Binder/Filler	100%
		LAYER 2 Roofing, Black	No	None Detected		Synthetic Fiber	8%
						Quartz Carbonates Binder/Filler	92%
0160762-002 4046-AB-02	COMMITAL SHELTER ROOF	LAYER 1 Roofing, Black/ White	No	None Detected			
						Carbonates Quartz Binder/Filler	100%
		LAYER 2 Roofing, Black	No	None Detected		Synthetic Fiber	8%
						Quartz Carbonates Binder/Filler	92%
0160762-003 4046-AB-03	COMMITAL SHELTER ROOF	LAYER 1 Roofing, Black/ White	No	None Detected			
						Carbonates Quartz Binder/Filler	100%
		LAYER 2 Roofing, Black	No	None Detected		Synthetic Fiber	8%
						Quartz Carbonates Binder/Filler	92%
0160762-004 4046-AB-04	COMMITAL SHELTER ROOF SIDE WALLS	Adhesive, Yellow	No	None Detected			
						Carbonates Quartz Binder/Filler	100%

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Project Name:	HAWAII STATE VETERANS CEMETERY	EPA Method:	EPA 600/R-93/116
Address:	COMMITTAL SHELTER	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0160762-005 4046-AB-05	COMMITAL SHELTER ROOF SIDE WALLS	Adhesive, Yellow	No	None Detected	Carbonates Quartz Binder/Filler	 100%
0160762-006 4046-AB-06	COMMITAL SHELTER ROOF SIDE WALLS	Adhesive, Yellow	No	None Detected	Carbonates Quartz Binder/Filler	 100%
0160762-007 4046-AB-07	COMMITAL SHELTER ROOF	Flashing Caulking, Gray/ Tan	No	None Detected	Quartz Carbonates Binder/Filler	 100%
0160762-008 4046-AB-08	COMMITAL SHELTER ROOF	Flashing Caulking, Gray/ Tan	No	None Detected	Quartz Carbonates Binder/Filler	 100%
0160762-009 4046-AB-09	COMMITAL SHELTER ROOF	Flashing Caulking, Gray/ Tan	No	None Detected	Quartz Carbonates Binder/Filler	 100%
0160762-010 4046-AB-10	COMMITAL SHELTER ROOF	Flashing Sealant, Black	No	None Detected	Organic Material Carbonates Binder/Filler	1% 99%
0160762-011 4046-AB-11	COMMITAL SHELTER ROOF	Flashing Sealant, Black	No	None Detected	Carbonates Binder/Filler	 100%

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Laboratory Report
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Project Name:	HAWAII STATE VETERANS CEMETERY	EPA Method:	EPA 600/R-93/116
Address:	COMMITTAL SHELTER	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0160762-012 4046-AB-12	COMMITAL SHELTER ROOF	Flashing Sealant, Black	No	None Detected	Carbonates Binder/Filler	100%
0160762-013 4046-AB-13	COMMITAL SHELTER ROOF SKYLIGHT	Caulking, Black	No	None Detected	Quartz Carbonates Binder/Filler	100%
0160762-014 4046-AB-14	COMMITAL SHELTER ROOF SKYLIGHT	Caulking, Black	No	None Detected	Cellulose Fiber Carbonates Quartz Binder/Filler	<1% 99%
0160762-015 4046-AB-15	COMMITAL SHELTER ROOF SKYLIGHT	Caulking, Black	No	None Detected	Cellulose Fiber Carbonates Quartz Binder/Filler	<1% 99%
0160762-016 4046-AB-16	COMMITAL SHELTER CEILING	Mastic, Yellow	No	None Detected	Carbonates Binder/Filler	100%
0160762-017 4046-AB-17	COMMITAL SHELTER CEILING	Mastic, Yellow	No	None Detected	Carbonates Binder/Filler	100%
0160762-018 4046-AB-18	COMMITAL SHELTER CEILING	Mastic, Yellow	No	None Detected	Carbonates Binder/Filler	100%

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		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents

Analyst - Kenneth Scheske

Signatory - Lab Director - Kurt Kettler

CHAIN OF CUSTODY

EMC Labs, Inc.
9830 S. 51st St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 160762
TAT: 3day
Rec'd: SEP 18 P.M.

COMPANY NAME:	ENVIROSERVICES & TRAINING CENTER, LLC	BILL TO: (If Different Location)	
	505 Ward Ave. Suite #202	Trina Oshiro	
	Honolulu, HI 96814		
CONTACT:	Cynthia Lewis		
Phone/Fax:	(808) 839-7222 Ext. 238		
Email:	clewis@gotoetc.com		

Now Accepting: VISA – MASTERCARD **Price Quoted: $_____ / Sample $_____ / Layers**

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. TURNAROUND TIME: [Same Day RUSH] [1-Day] [2-Day] [3-4-5 Day] [6-10 Day]

****Prior confirmation of turnaround time is required**
****Additional charges for rush analysis (please call marketing department for pricing details)**
****Laboratory analysis may be subject to delay if credit terms are not met**

2. TYPE OF ANALYSIS: [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]

3. DISPOSAL INSTRUCTIONS: [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. Project Name: HAWAII STATE VETERANS CEMETERY COMMITTAL SHELTER

P.O. Number: _____ **Project Number:** 15-4046

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
1	PLEASE SEE ATTACHED	09/17/15		Yes			
18				6			

SPECIAL INSTRUCTIONS: PLEASE STOP AT FIRST POSITIVE

Sample Collector: (Print) Cynthia Lewis (Signature) _____

Relinquished by: CL Date/Time: 09/17/15 Received by: Diana Feiriso Date/Time: 9/18/15

Relinquished by: Diana Feiriso Date/Time: 9/18/15 Received by: _____ Date/Time: 9/18/15

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

Rev. 09/27/08

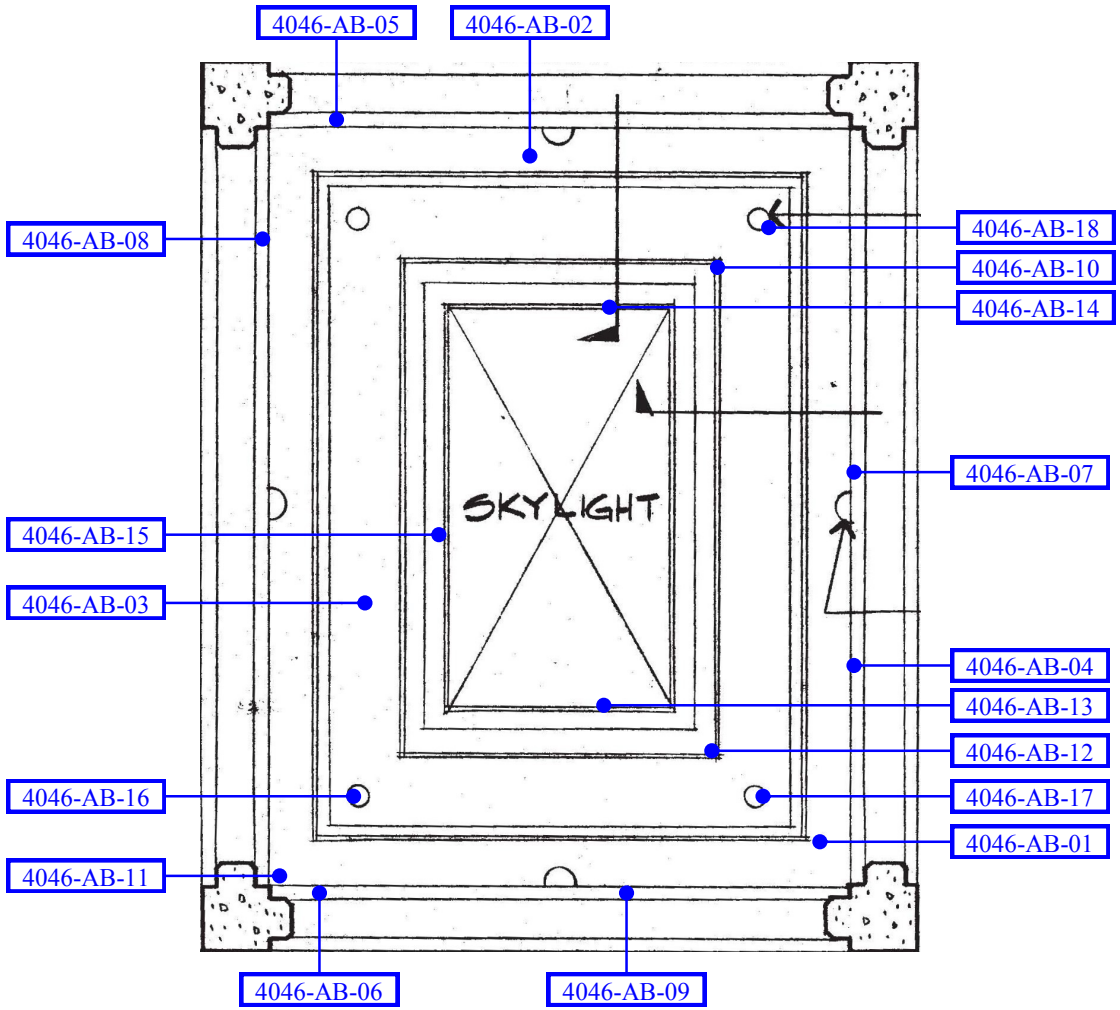
160762

Chain of Custody
Hawaii State Veterans Cemetery Committal Shelter

Sample ID	*Date Sampled*	*Homogeneous Area*	*Material*
4046-AB-01	09/17/15	Committal Shelter Roof	Roof Material
4046-AB-02			
4046-AB-03			
4046-AB-04	09/17/15	Committal Shelter Roof Side Walls	Yellow Adhesive on Roof Material
4046-AB-05			
4046-AB-06			
4046-AB-07	09/17/15	Committal Shelter Roof	Flashing Gray/Tan Caulking
4046-AB-08			
4046-AB-09			
4046-AB-10	09/17/15	Committal Shelter Roof	Flashing Black Sealant
4046-AB-11			
4046-AB-12			
4046-AB-13	09/17/15	Committal Shelter Roof Skylight	Black Caulking
4046-AB-14			
4046-AB-15			
4046-AB-16	09/17/15	Committal Shelter Ceiling	Mastic on Light Fixture
4046-AB-17			
4046-AB-18			

Appendix **II**

SAMPLE LOCATION MAP



LIMITED HAZARDOUS MATERIALS SURVEY
ASBESTOS SAMPLE LOCATIONS

Legend

4046-AB-XX	Positive (Asbestos Containing Material)
4046-AB-XX	Negative (None Detected)
4046-AB-XX	Not Analyzed
←	Wall Sample
●—	Non-Wall Sample

Hawaii State Veterans Cemetery Committal Shelter
Honolulu, Oahu, Hawaii

Figure 1 of 1
Not to Scale

ETC Project No. 15-4046

September 2015

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including the following:
   1. Project Record Documents.
   2. Warranties.

B. Related documents include the following:
   1. SECTION 01700 - EXECUTION REQUIREMENTS.

1.02 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting a Final Inspection to determine Substantial Completion, ensure that the requirements of Article 7 of the DOD GENERAL CONDITIONS has been met.

1.03 FINAL COMPLETION

A. Preliminary Procedures: Within 10 days from the Project Acceptance Date, ensure that the requirements in the DOD GENERAL CONDITIONS Article 7 PROSECUTION AND PROGRESS has been met.

1.04 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit 2 copies of any updated and action taken list. In addition to requirements of DOD GENERAL CONDITIONS Article 7 PROSECUTION AND PROGRESS, include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
   2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
   3. Include the following information at the top of each page:
      a. Project Name and Title.
      b. DOD Job Number.
      c. Date and page number.
      d. Name of Contractor.

1.05 PROJECT RECORD DOCUMENTS AND REQUIREMENTS

A. General:
   1. Do not use Project Record Documents for daily construction purposes. Protect Project Record Documents from deterioration and loss. Maintain these documents as specified in paragraph entitled “Record Drawings” hereinafter.

2. The Designer, under contract with the State, will update the drawings to show all addendum, PCD, and sketch changes. The Project Manager will transmit these drawings (mylar or vellum) to the Contractor who will make all "red-line" corrections to these drawings to record the changes depicted on the Contractor's Field Posted Record ("As-Builts") by accepted drafting practices as approved by the Project Manager.

3. Where the recorded changes depicted on the Contractor's Field Posted Record ("As-Builts") are in the form of shop drawings, the Contractor shall provide those shop drawings electronically on the same sheet size as the drawings transmitted to the Contractor. The new drawing sheets shall be titled and numbered to conform to the construction drawings and clearly indicate what information they supercede in the actual construction drawings. For example a new drawing that replaces drawing M-3, could be numbered M3a.

4. The Contractor shall bring to the attention of the Project Manager any discrepancy between the changes made by the Designer and those depicted on addendum, PCD, and sketch changes. The Project Manager will resolve any conflicts.

5. Submit final Record Documents (Field Posted Record Drawings) before the Final Inspection Date and no later than the Contract Completion Date, unless the DOD GENERAL CONDITIONS require otherwise.

6. The Contractor shall guarantee the accuracy of its final Record Documents. The State will hold the Contractor liable for costs the State incurs as a result of inaccuracies in the Contractor's Record Documents.

7. Prepare and submit [construction photographs and electronic files], damage or settlement surveys, property surveys, and similar final record information as required by the Project Manager.

8. Deliver tools, spare parts, extra materials, and similar items to a location designated by the Project Manager. Label with manufacturer's name and model number where applicable.

9. Submit pest-control final inspection report and warranty.

B. Record Drawings:
   1. Maintain a duplicate full-size set as the Field Posted Record ("As-Builts") Drawings at the job site. Clearly and accurately record all deviations from alignments, elevations and dimensions, which are stipulated on the drawings and for changes directed by the Project Manager that deviate from the drawings.

   2. Record changes immediately after they are constructed in place and where applicable, refer to the authorizing document (Field Order, Change Order, or Contract Modification). Use red pencil to record changes. Make Field Posted Record Drawings available to the Project Manager at any time so that its clarity and accuracy can be monitored and can be countersigned for validity.

a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
d. Mark the contract drawings or the shop drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on contract drawings.
e. Mark important additional information that was either shown schematically or omitted from original Drawings.
f. Locate concealed building utilities by dimension from bench marks or permanent structures. Locate site utilities by dimensions, azimuth and lengths from bench marks or permanent structures.
g. Note field order numbers, Change Order numbers, Contract Modification numbers, Alternate numbers, post-construction drawing numbers (PCD) and similar identification (RFI numbers) where applicable.
h. The Contractor shall initial each deviation and each revision marking.

3. Use the final updated Contract Drawing set (including all addenda, PCD, and sketches) plus applicable shop drawings for making the final Field Posted Record Drawings submittal.

4. Certify drawing accuracy and completeness. Label and sign the record drawings or use digital electronic signature as approved by the Project Manager.

5. Label the title sheet and on all sheets in the margin space to the right of the sheet number, written from the bottom upward, with the title "FIELD POSTED RECORD DRAWINGS" and certification information as shown below. Provide a signature line and company name line for each subcontractor that will also certify the respective drawing. Adjust size to fit margin space.

   FIELD POSTED RECORD DRAWINGS Certified By: _____ Date: _____
   [Contractor's Company Name]

6. Revise the Drawing Index and label the set "FIELD POSTED RECORD DRAWINGS". Include the label "A COMPLETE SET CONTAINS [_____] SHEETS" in the margin at the bottom right corner of each sheet. Quantify the total number of sheets comprising the set.

7. If the Project Manager determines a drawing does not accurately record a deviation or omits relevant information, the State will correct any FIELD POSTED RECORD DRAWINGS sheet. Contractor will be charged for the State's cost to correct the error or omission.

8. Use the final Field Posted Record Drawings sheets and create one electronic version of the set. The set shall be recorded in Adobe Acrobat PDF (Portable Document Format). Create a single indexed, bookmarked PDF file of the entire set of drawings.

1.06 WARRANTIES

A. Submittal Time: Submit written manufacturer's warranties at request of the Project Manager for designated portions of the Work where commencement of warranties other than Project Acceptance date is indicated.

B. Partial Occupancy: Submit properly executed manufacturer's warranties within 45 days of completion of designated portions of the Work that are completed and occupied or used by the State during construction period by separate agreement with Contractor.

C. Organize manufacturer's warranty documents into an orderly sequence based on the table of contents of the Specifications.
   1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 inch x 11-inch paper.

   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer and prime contractor.

   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES", Project Name and Title, DOD Job Number and name of Contractor.

   4. Use the final submittal of the warranties to create an electronic Adobe Acrobat PDF (Portable Document Format) version of the bound warranty documents files. Each sheet shall be separately scanned, at 600 DPI or better into a PDF file, indexed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.01 FINAL CLEANING

A. General: Provide final cleaning as required by Article 7 of the DOD GENERAL CONDITIONS.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturers written instructions unless noted otherwise. Complete the following cleaning operations before requesting final inspection for entire Project or for a portion of Project:

1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits resulting from construction activities.

3. Remove tools, construction equipment, machinery, and surplus material from Project site.

4. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

5. Remove debris and surface dust from limited access spaces, including: roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

6. Sweep concrete floors broom clean in unoccupied spaces.

7. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass surfaces, taking care not to scratch surfaces.

8. Remove labels that are not permanent.

9. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
   a. Do not paint over “UL” and similar labels, including mechanical and electrical nameplates.

10. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

11. Replace parts subject to unusual operating conditions.

12. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

13. Replace disposable air filters and clean permanent air filters. Clean the exposed surfaces of diffusers, registers, and grills.

14. Clean ducts, blowers, and coils if units were operated without filters during construction.

15. 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 and mercury vapor fixtures to comply with requirements for new fixtures.

16. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the State's property. Do not discharge volatile, harmful, or dangerous materials into drainage and sewer systems or onto State property. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

DIVISION 2 – SITE CONSTRUCTION

SECTION 02050 - DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. The work includes demolition and removal as indicated on the drawings or as specified. Contractor shall pay for all necessary permits and certificates.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Submit proposed demolition and removal procedures.

1.03 DUST CONTROL

A. Take appropriate action to check the spread of dust and avoid nuisance in the surrounding area.

1.04 PROTECTION

A. Existing Improvements: Protect existing improvements that are to remain, to be reused, or remain the property of the Project Manager.

B. Trees: Protect trees within the project site.

C. Public Safety: Conduct operations with minimum interference to streets, driveways, sidewalks, and passageways.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXISTING FACILITIES

A. Demolish and remove portions of existing structures as indicated on the drawings.

B. Plot existing active utilities lines transversing the construction area. Other utilities than those indicated is not definitely known.

3.02 SAFETY

A. Work shall follow the Manual of Accident Prevention in Construction, published by the General Contractors Association of America.

3.03 DISPOSITION OF MATERIALS

A. Title to Materials: Title to all materials and equipment to be removed is vested in the Contractor.

B. Materials removed from the property, shall be trucked and loaded to conform with Federal and State conveyance requirements.

3.04 CLEANUP

A. Remove and transport debris and rubbish to prevent spillage into drainage systems, streams, roadways, and/or adjacent areas.

END OF SECTION

SECTION 02070 – SELECTIVE DEMOLITION

PART 1 – GENERAL

1.01 SUMMARY

A. Extent of selective demolition work is indicated on drawings. Selective demolition work includes but is not limited to removal and subsequent disposal of all materials indicated or required to be removed.

B. It shall be the responsibility of the Contractor to examine the project site and determine the existing conditions.

C. Execute all work in an orderly and careful manner with due consideration for all items of work to remain.

D. Obvious conditions which exist at the site shall be accepted as part of the work, even though they may not be clearly indicated on the Drawings and/or described herein, or may vary therefrom.

E. All debris of any kind accumulated from the work of this Section shall be disposed off the site daily.

F. Burning of any debris on-site will not be permitted.

G. Permits, Notices, Etc.:
   1. The Contractor shall serve proper notice and consult with the Project Manager regarding any temporary barricades and disconnections of electrical or other utility lines in the area which may interfere with the removal work, and all such lines where necessary shall be properly disconnected or relocated before commencing with the work.

   2. Contractor shall procure and pay for all necessary permits.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Schedule: Submit two copies of schedule indicating proposed methods and sequence of operations for selective demolition work to the Project Manager for review prior to commencement of work. Include coordination for temporary shut-off and continuation of utility services as required, together with details for dust and noise control protection.

1.03 JOB CONDITIONS

A. Condition of Structure: The State assumes no responsibility for actual condition of items or portions of structure to be demolished.

B. Conditions existing at time of commencement of contract will be maintained by the State insofar as practicable.

C. Do not interfere with use of adjacent occupied spaces. Maintain free and safe passage to and from occupied spaces.

D. Protections: Provide temporary barricades and other forms of protection as required to protect the general public and staff from injury due to selective demolition work.
   1. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

   2. Life safety procedures and provisions shall be in conformance with all applicable Federal, State, and County regulations, including HIOSH.

   3. Provide accessibility around temporary structures conforming to ADAAG Section 4.1.1(4).

   4. Remove protections, obstructions, and barricades at completion of work.

   5. Where barriers are erected or placed to facilitate the work, barriers shall not affect or impact the facility's fire exiting route or alarm systems.

E. Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to the State.

F. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from the Project Manager. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations, as directed by the Project Manager.

G. Dust Control:
   1. Keep dust within acceptable levels at all times, including non-working hours, weekends and holidays, as specified in SECTION 01500 – TEMPORARY FACILITIES AND CONTROLS.

   2. Mechanical dry sweeping not permitted. Vacuuming, wet mopping, approved limited dry hand, wet or damp sweeping is acceptable.

   3. During loading operations, water down debris and waste materials to allay dust.

   4. The method of dust control and all costs incurred thereof shall be the responsibility of the Contractor.

H. Noise Control: As specified in SECTION 01500 – TEMPORARY FACILITIES AND CONTROLS.

I. Fire Safety: Fire safety during demolition shall comply with Article 87 of the 1997 Uniform Fire Code, as amended.

J. Demolition Work: Conform to State of Hawaii, Occupational Safety and Health Standards; Subtitle 8, Division of Occupational Safety and Health; Part 3, Construction Standards; Chapter 131.1, Demolition.

K. Other Controls:
   1. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, the Contractor shall prevent any material from being spilled onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutter and catch basins unless treated to comply with Department of Health pollution regulations.

   2. Trucks hauling materials shall be covered as required by PUC regulation. Trucks hauling fine material shall be covered.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 INSPECTION
A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Inventory existing conditions of structure surfaces, equipment or surrounding properties which could be misconstrued as damage resulting from selective demolition work; photograph, video or otherwise document and file with the Project Manager prior to starting work.

3.02 BARRICADES AND ENCLOSURES
A. As specified in SECTION 01500 – TEMPORARY FACILITIES AND CONTROLS.

3.03 SELECTIVE DEMOLITION
A. Perform selective demolition work, including all exterior improvements indicated on the drawings, in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with demolition schedule and governing regulations.
   1. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction. All dust shall be suppressed by a fog spray or other approved method.

   2. Extent of demolition and removal as shown are minimum requirements. Contractor shall be responsible for the extent of work required to properly accommodate the methods of construction required for the new work. Additional work required to accommodate construction shall be considered incidental to the new work and shall be done at no additional cost to the State.

B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to the Project Manager in written, accurate detail. Pending receipt of directive from the Project Manager rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubbish, and other materials resulting from demolition operations from building site daily. Transport and legally dispose of materials off site.

1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

2. Burning of removed materials is not permitted on project site.

3.05 CLEAN UP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave areas broom clean.

B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition and patching work.

C. All existing grass areas disturbed or damaged due to construction or ingress or egress to the site shall be repaired to original conditions. Grass areas shall be recultivated, topsoiled, and then grassed with the same kind and type of material as existing, in a manner approved by and to the satisfaction of the Project Manager.

END OF SECTION

SECTION 02223 - AGGREGATE BASE COURSE

PART 1 - GENERAL

1.01 SUMMARY

A. This work shall consist of furnishing, spreading and compacting untreated aggregate base course on the prepared subgrade or on existing improved surfaces in accordance with the requirements of these specifications.

1.02 STANDARD CODES AND SPECIFICATIONS

A. The "Standard Details for Public Works Construction" September 1984 and the "Standard Specifications for Public Works Construction," September 1986, of the Department of Public Works, County of Honolulu, except as amended in the drawings and specifications herewith, shall govern work covered under this section.

1.03 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Before installation, submit to the Project Manager, affidavits from the manufacturers or suppliers of the aggregate base course proposed to be furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of these specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The aggregate base course shall consist of crushed basalt aggregates. Base course consisting of crushed coral aggregates will not be accepted.

B. Materials shall be in accordance with Section 31.2 of the referenced Standard Specifications, except as amended in the drawings and specifications herewith.

PART 3 - EXECUTION

3.01 PLACING AND COMPACTING

A. Spreading: The base material shall be delivered to the site and spread on the prepared foundation acceptable to Project Manager by means of vehicles equipped with spreading devices. The material when spread shall be uniform in gradation and free from large pockets of segregated particles. Segregated material shall be remixed until uniform.

B. Material shall not be stockpiled nor dumped in piles but shall be spread longitudinally and only in such quantity to obtain the required thickness. After watering and compacting, the completed base shall conform to the required grade and cross-section within the tolerances specified herein below.

C. Lift Thickness: When the specified thickness of the base is 6 inches, the base shall be constructed in one lift. When the specified thickness is greater than 6 inches, the base shall be constructed in two or more equal lifts. The maximum thickness of each lift shall not exceed 6 inches.

D. Compacting: The base course shall be compacted until it does not creep or weave in front of the roller or compacting vehicle. When tested, the base course shall have a minimum density of 95% of its maximum dry density.

E. Filler Material: Wherever necessary, filler material shall be added to the surface. It shall be spread in one or more uniform thin layers. Each layer shall be rolled dry until additional filler cannot be forced into the voids. The surface shall then be sprinkled with water and again thoroughly rolled. All excess filler shall be removed. The sprinkling and rolling shall be continued to secure a thoroughly bonded surface.

F. Multiple Lifts: Where the aggregate base course is constructed in more than one layer, each layer shall be constructed as specified above except that sprinkling will be required only in the top layer. Each layer shall be compacted to a minimum of 95% of its maximum dry density.

3.02 TOLERANCES

A. The finished surface shall be checked for accuracy with a 10-foot straightedge. If the surface at any point varies more than 1/4 inch from the lower edge of the straight-edge laid in any direction, it shall again be shaped and re-rolled. This process shall be repeated until the surface meets the required tolerance.

B. The finished subgrade upon which the final wearing surface is placed shall not vary more than 0.05 foot above or below the theoretical grade.

END OF SECTION

SECTION 02282 - SOIL TREATMENT FOR VEGETATION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. This work shall consist of spraying weed killer on the prepared roadway sidewalk subgrade prior to the installation of the base course and where called for on plans and on existing growth prior to application of asphalt in the case of resurfacing jobs.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Prior to the start of work, the contractor shall submit to the Project Manager the material product data and Material Safety Data Sheets for the material proposed for use.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Weed Killer shall be "Casoron 4G", "Norosac 4G", or a pre-approved equal for under asphalt application on new or rebuilt pavement, and shall be "Hyvar X", "Roundup" or pre-approved equal for application to existing weeds for resurfacing jobs.

PART 3 - EXECUTION

3.01 APPLICATION

A. The under asphalt weed killer shall be mixed and uniformly spread using calibrated application equipment at the maximum rates permitted for “under asphalt” use and in strict accordance with the manufacturer’s label. Base course material shall be installed as soon as possible after applying the weed killer to preclude loss of germination inhibiting action.

B. In treatment of existing growth on resurfacing jobs, the weed killer shall be mixed and uniformly sprayed in strict accordance with the manufacturer’s label.

C. Nut grass shall be retreated two (2) days after initial application and again if growth still exists.

D. The Contractor shall notify the Project Manager 24 hours before application of weed killer.

END OF SECTION

SECTION 02515 - CONCRETE CURBS AND WALKWAYS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section includes concrete curbs and walkways.

1.02 STORAGE OF MATERIALS

A. Cement and aggregates shall be stored in such a manner as to prevent their deterioration of the intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete and shall be promptly removed from the site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials shall be in accordance to the Department of Public Works, City and County of Honolulu "STANDARD SPECIFICATIONS FOR PUBLIC WORKS" dated September 1986 and "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION", dated September 1984 as revised, except as amended in the plans and/or specifications herein (paragraphs of Measurements and Payments in the Sections are not applicable to this project).

1. Concrete Curb and Gutter ..... Section 41

2. Concrete Sidewalk ..... Section 42

PART 3 - EXECUTION

3.01 INSTALLATION

A. All work shall be as indicated and as detailed in the "STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION", dated September 1984, as revised or the construction drawings.

B. All work shall conform to the Department of Public Works, City and County of Honolulu "STANDARD SPECIFICATIONS FOR PUBLIC WORKS" dated September 1986.

END OF SECTION

DIVISION 3 – CONCRETE

SECTION 03732 – CONCRETE SEALER

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all concrete sealer on concrete surfaces as indicated on the drawings and specified herein.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Product Data: Submit manufacturer's product literature, including mixing procedures and application instructions for approval.

1.03 DELIVERY AND HANDLING

A. Delivery of Materials: Deliver all materials in sealed containers, clearly labeled and containing manufacturer's name, product identification, manufacturer's instructions for mixing, and warning for handling and toxicity.

B. Handling: Handle all materials in a safe manner and in a way to avoid breaking container seals.

C. Environmental Requirements: Contractor shall comply with manufacturer's recommendations as to environmental conditions under which the sealant may be applied.

1.04 WARRANTY

A. Contractor shall provide a written installer's guarantee covering work of this section for a guarantee period of two (2) years after date of Final Project Acceptance. The guarantee shall provide for the repair and replacement of sealer in damaged or worn areas at no cost to the State.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Product of the following manufacturers or pre-approved equal are acceptable provided they meet the materials and standards of quality specified.

1. Glaze 'N Seal
2. Sherwin-Williams
3. Seal Green
4. or pre-approved equal manufacturers.

2.02 MATERIALS

A. Concrete Sealant: Product is based on Glaze 'N Seal to establish the standard.

B. Product Description:
   1. Water based "natural look", clear, penetrating sealer. Contains no solvents.

   2. Oil and water repellent. Resists moisture, stains, and mildew.

PART 3 – EXECUTION

3.01 PREPARATION OF CONCRETE SURFACES

A. All surface preparation per recommended manufacturer specifications and shall include data on proper curing methods, number of coats to be applied.

B. Provide proper scaling and maintenance procedures to protect sealer from excessive wear.

3.02 APPLICATION

A. Apply materials according to manufacturer's instructions.

3.03 CURING

A. Provide barricades as required to prevent damage to newly completed sealant work until system has cured at least 24 hours and as recommended by the manufacturer.

3.04 CLEAN UP

A. Protect concrete surfaces until sealant is cured. Perform clean up with materials as recommended by the manufacturer.

END OF SECTION

DIVISION 4 – MASONRY

SECTION 04450 – EXTERIOR STONE CLADDING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Stone panels set with individual anchors.

B. Related Sections:
   1. SECTION 07920 – JOINT SEALANTS: For sealing joints in stone cladding system with elastomeric sealants.

1.02 DEFINITIONS

A. Definitions contained in ASTM C 119 apply to this Section.

B. IBC: International Building Code

C. Stone Cladding Assembly: An exterior wall covering system consisting of stone panels together with anchors, mortar, fasteners, and sealants used to secure the stone to the building structure.

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.04 ACTION SUBMITTALS

A. Product Data: For each variety of stone, stone accessory, and manufactured product.

B. Shop Drawings: Show fabrication and installation details for stone cladding assembly, including dimensions and profiles of stone units.
   1. Show locations and details of joints both within stone cladding assembly and between stone cladding assembly and other construction.
   2. Include details of mortar and sealant joints.
   3. Show locations and details of anchors.
   4. Show direction of veining, grain, or other directional pattern.

C. Samples for Initial Selection: For joint materials involving color selection.

D. Stone Samples for Verification: Sets for each variety, color, and finish of stone required; not less than 12 inches square.
   1. Sets shall consist of at least three Samples, exhibiting extremes of the full range of color and other visual characteristics expected and will establish the standard by which stone will be judged.

E. Sealant Samples for Verification: For each type and color of joint sealant required.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator and testing agency.

B. Welding certificates.

C. Material Test Reports:
   1. Stone Test Reports: For stone variety proposed for use on Project, by a qualified testing agency, indicating compliance with required physical properties, other than abrasion resistance, according to referenced ASTM standards. Base reports on testing done within previous five years.

   2. For metal components, by a qualified testing agency, indicating chemical and physical properties of metal.

   3. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer complying with requirements in Section 07920 – JOINT SEALANTS and indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

D. Source quality-control reports.

1.06 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Stone Units: Furnish five finished stone panels, with dimensions to match largest tile size, for each finish and variety of stone specified.

1.07 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate stone cladding assemblies similar to that required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: A firm or individual experienced in installing stone cladding assemblies similar in material, design, and extent to that indicated for this Project, whose work has a record of successful in-service performance.

C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.6/D1.6M, “Structural Welding Code – Stainless Steel.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature change, contaminants, corrosion, breaking, chipping, and other causes.
   1. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.

2. Store stone on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to stone. Ventilate under covers to prevent condensation.

B. Mark stone units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual stone units. Orient markings on vertical panels so that they are right side up when units are installed.

C. Deliver sealants to Project site in original unopened containers labeled with manufacturer's name, product name and designation, color, expiration period, pot life, curing time, and mixing instructions for multicomponent materials.

D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

E. Store aggregates in locations where grading and other required characteristics can be maintained and where contamination can be avoided.

1.09 FIELD CONDITIONS

A. Protect stone cladding during erection by doing the following:

1. Cover tops of stone cladding installation with nonstaining, waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold securely in place.

2. Prevent staining of stone from mortar, grout, sealants, and other sources. Immediately remove such materials without damaging stone.

3. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.

4. Protect sills, ledges, and projections from mortar and sealant droppings.

B. Hot-Weather Requirements: Comply with hot-weather construction and protection requirements for masonry contained in TMS 602/ACI 530.1/ASCE 6.

C. Environmental Limitations for Sealants: Do not install sealants when ambient and substrate temperatures are outside limits permitted by sealant manufacturer or below 40 deg F (5 deg C) or when joint substrates are wet.

1.10 COORDINATION

A. Coordinate installation of inserts that are to be embedded in concrete or masonry, flashing, reglets, and similar items to be used by stone cladding Installer for anchoring, supporting, and flashing of stone cladding assembly. Furnish setting drawings, templates, and directions for installing such items and deliver to Project site in time for installation.

B. Time delivery and installation of stone cladding to avoid extended on-site storage and to coordinate with work adjacent to stone cladding.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations for Stone: Obtain stone from single quarry with resources to provide materials of consistent quality in appearance and physical properties.
   1. For stone types that include same list of varieties and sources, provide same variety from same source for each.

   2. Make quarried blocks available for examination by Design Consultant.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from single manufacturer and each aggregate from single source or producer.

C. Source Limitations for Other Materials: Obtain each type of stone accessory, sealant, and other material from single manufacturer for each product.

D. Stone Fabricators: Subject to compliance with requirements, available fabricators by whose products may be incorporated into the Work include, but are not limited to the following:
   1. Bella Pietra Design
   2. Marmol Hawaii
   3. Tile Warehouse Hawaii

2.02 PERFORMANCE REQUIREMENTS

A. General: Design stone anchors and anchoring systems according to ASTM C 1242.
   1. Stone anchors shall withstand not less than two times the weight of the stone cladding in both compression and tension.

B. Structural Performance: Stone cladding assembly shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Wind Loads: As indicated.

   2. Equipment Loads: Allow for loads due to maintenance equipment.

C. Seismic Performance: Stone cladding assembly shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. Component Importance Factor: 1.0.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Shrinkage and Creep: Allow for progressive vertical shortening of building frame equal to 1/8 inch in 10 feet.

F. Safety Factors for Stone: Design stone cladding assembly to withstand loads indicated without exceeding stone's allowable working stress determined by dividing stone's average ultimate strength, as established by testing, by the following safety factors:
   1. Safety Factor for Slate: 5.

   2. Safety Factor for Concentrated Stresses: 10.

G. Design stone anchors to withstand loads indicated without exceeding allowable working stresses established by the following:
   1. For Cold-Formed Stainless Steel: ASCE/SEI 8, "Specification for the Design of Cold-Formed Stainless Steel Structural Members."

H. Limit deflection in each prefabricated assembly caused by indicated loads and thermal movements, acting singly or in combination with one another, to not more than 1/720 of assembly's clear span or the following, whichever is smaller:
   1. 1/16 inch, measured in plane of wall.

   2. 1/4 inch, measured perpendicular to wall.

I. Provisions for Fabrication and Erection Tolerances: Allow for fabrication and erection tolerances of building's structural system.

J. Provision for Deflection of Building Structure:
   1. Deflection Due to Weight of Stone Cladding Assembly: Allow for 1/4-inch vertical deflection in 20-foot span of structural members supporting stone cladding assembly.

   2. Live Load Deflection: Allow for 1/4-inch vertical deflection, in 20-foot span of structural members supporting stone cladding assembly, due to live loads imposed on building's structural frame after stone installation.

K. Corrosion and Staining Control: Prevent galvanic and other forms of corrosion as well as staining by isolating metals and other materials from direct contact with incompatible materials. Materials shall not stain exposed surfaces of stone and joint materials.

2.03 SLATE

A. Material Standard: Comply with ASTM C 629/C 629M, Classification I Exterior.

B. Description: Gray-green slate with a fine, even grain and unfading color, from clear, sound stock.

C. Finish: Natural cleft.

D. Match Design Consultant's samples for color, finish, and other stone characteristics relating to aesthetic effects.

E. Thickness: Not less than 1-1/4 inches unless otherwise indicated.

2.04 ANCHORS AND FASTENERS

A. Fabricate anchors, including shelf anchors, from stainless steel, ASTM A240/A 240M or ASTM A 666, Type 304; temper as required to support loads imposed without exceeding allowance design stresses. Fabricate dowels and pins for anchors from stainless steel, ASTM A 276, Type 304.

B. Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers.
   1. For stainless steel, use annealed stainless-steel bolts, nuts, and washers; for bolts, ASTM F 593; and for nuts, ASTM F 594, Alloy Group 1.

C. Weld Plates for Installation in Concrete: Comply with SECTION 05500 – METAL FABRICATIONS.

2.05 MORTAR MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction, natural color or white as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207.

C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Pigments shall have a record of satisfactory performance in mortar.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime.

E. Aggregate: ASTM C 144; except for joints narrower than 1/4 inch and pointing mortar, 100 percent shall pass No. 16 sieve.
   1. White Aggregates: Natural white sand or ground white stone.

   2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other durable stone; of color necessary to produce required mortar color.

F. Water: Potable.

2.06 STONE ACCESSORIES

A. Setting Shims: Strips of resilient plastic or vulcanized neoprene, Type A Shore durometer hardness of 50 to 70, nonstaining to stone, of thickness needed to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.

B. Setting Buttons: Resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials.

C. Sealants for Joints in Stone Cladding: Manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated below that comply with applicable requirements in SECTION 07920 – JOINT SEALANTS and do not stain stone:

1. Joint Sealant: Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

2. Joint Sealant Colors: Match color of stone.

D. Sealant for Filling Kerfs: Same sealant used for joints in stone cladding.

2.07 STONE FABRICATION

A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated.

B. Control depth of stone and back check to maintain minimum clearance of 1.25 inch (Seating Stuctures) and 1.75 inches (center pavilion) between backs of stone units and surfaces or projections of structural members, fireproofing (if any), backup walls, and other work behind stone.

C. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated. Shape beds to fit supports.

D. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone securely in place.

E. Finish exposed faces and edges of stone, except sawed reveals, to comply with requirements indicated for finish and to match approved samples.

F. Quirk-miter corners unless otherwise indicated; provide for cramp anchorage in top and bottom bed joints of corner pieces.

G. Cut stone to produce uniform joints 3/8 inch wide and in locations indicated.

H. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.

I. Fabricate molded work, including washes and drips, to produce stone shapes with a uniform profile throughout entire unit length, with precisely formed arris slightly eased to prevent snipping, and with matching profile at joints between units.
   1. Produce moldings and molded edges with machines that use abrasive shaping wheels made to reverse contour of molding shape.

J. Clean backs of stone to remove rust stains, iron particles, and stone dust.

K. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
   1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved samples and mockups.

2.08 MORTAR MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortar of uniform quality and with optimum performance characteristics.
   1. Do not use admixtures, including pigments, air-entrained agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated. Do not use calcium chloride.

   2. Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer unless otherwise indicated. Discard mortar when it has reached initial set.

B. Portland Cement-Lime Setting Mortar: Comply with ASTM C 270, Proportion Specification, Type S.

C. Pointing Mortar: Comply with ASTM C 270, Proportion Specification, Type N.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive stone cladding and conditions under which stone cladding will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone cladding.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of stone cladding.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 SETTING STONE CLADDING, GENERAL

A. Before setting stone, clean surfaces that are dirty or stained by removing soil, stains, and foreign materials. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

B. Execute stone cladding installation by skilled mechanics and employ skilled stone fitters at Project site to do necessary field cutting as stone is set.
   1. Use power saws with diamond blades to cut stone. Produce lines cut straight and true, with edges eased slightly to prevent snipping.

C. Contiguous Work: Provide reveals, reglets, and openings as required to accommodate contiguous work.

D. Set stone to comply with requirements indicated. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure stone cladding in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated, with uniform joints of widths indicated,

and with edges and faces aligned according to established relationships and indicated tolerances.

E. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
   1. Sealing expansion and other joints is specified in SECTION 07920 – JOINT SEALANTS.

   2. Keep expansion joints free of mortar and other rigid materials.

F. Install concealed flashing at continuous shelf angles, lintels, ledges, and similar obstructions to downward flow of water, to divert water to building exterior. Extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.

G. Keep cavities open where unfilled space is indicated between back of stone units and backup wall; do not fill cavities with mortar or grout.
   1. Place weep holes in joints where moisture may accumulate, including at base of cavity walls and above shelf angles and flashing. Locate weep holes at intervals not exceeding 24 inches.

   2. Place vents in cavity walls at tops of cavities, below shelf angles and flashing, and at intervals not exceeding 20 feet vertically. Locate vents in joints at intervals not exceeding 60 inches horizontally.

3.03 SETTING MECHANICALLY ANCHORED STONE CLADDING

A. Set stone cladding with mechanical anchors without mortar unless otherwise indicated.

B. Attach anchors securely to stone and to backup surfaces. Comply with recommendations in ASTM C 1242.

C. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with sealant indicated for filling kerfs.

D. Set stone supported on clips or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths and to prevent point loading of stone on anchors. Hold shims back from face of stone a distance at least equal to width of joint.

3.04 JOINT-SEALANT INSTALLATION

A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in SECTION 07920 – JOINT SEALANTS.

3.05 INSTALLATION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of walls, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, corners and jambs within 20 feet of an entrance, expansion joints, and other conspicuous lines, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch in 40 feet or more.

B. Variation from Level: For lintels, sills, water tables, parapets, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch maximum.

C. Variation of Linear Building Line: For positions shown in plan and related portions of walls and partitions, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.

D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus 1/4 inch.

E. Variation in Joint Width: Do not vary from average joint width more than plus or minus 1/8 inch or a quarter of nominal joint width, whichever is less. For joints within 60 inches of each other, do not vary more than 1/8 inch or a quarter of nominal joint width, whichever is less from one to the other.

F. Variation in Plane between Adjacent Stone Units (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units.

3.06 ADJUSTING AND CLEANING

A. Remove and replace broken, chipped, stained, or otherwise damaged stone, defective joints, and stone cladding that does not match approved samples. Damaged stone may be repaired if Design Consultant approves methods and results.

B. Replace damaged or defective work in a manner that results in stone cladding's matching approved samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone cladding as work progresses. Remove excess sealant and smears as sealant is installed.

D. Final Cleaning: Clean stone cladding no fewer than six days after completion of pointing and sealing, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage stone.

END OF SECTION

DIVISION 5 – METALS

SECTION 05120 – STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. This Section covers structural steel and structural steel erection.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Related Sections: The following sections contain requirements that relate to this section.

1. SECTION 05500 – METAL FABRICATIONS
2. SECTION 07560 – FLUID APPLIED ROOFING
3. SECTION 09901 – PAINTING

1.03 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Product Data for each type of product specified.

C. Shop Drawings shall detail the fabrication of the structural steel all connections, including anchor bolts, embedded plates, welded anchors; locate all holes in structural steel for bolted connections and for the passage of other work.

D. Qualification data for firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Mill test reports signed by manufacturers certifying that their products, comply with all applicable requirements.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed structural steel work similar in material, design, and extent to that shown and with a record of successful in-service performance. The Erector shall have not less than 5 years continuous experience in the erection of structural steel.

B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that shown and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work.

C. Welding Standards: Comply with applicable provisions of AWS D1.1 “Structural Welding Code-Steel.”

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.

B. Protect steel members and packaged materials from erosion and deterioration. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed by the Project Manager.

1.06 SEQUENCING

A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Structural Steel Shapes, Plates, and Bars: Carbon Steel: ASTM A 36, typical; ASTM A 992 for W-shapes.

B. Cold-Formed Structural Steel Tubing, Hollow Structural Sections (HSS): ASTM A 500, Grade B.

C. Steel Pipe: ASTM A 53, Type E or S, Grade B, hot dipped, galvanized after fabrication.

D. Anchor Rods, Bolts, Nuts, and Washers: ASTM F 1554, ASTM A 36, or ASTM A 307, hot galvanized, after fabrication.

E. Nonhigh-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A; hot-dip zinc-coating per ASTM A 153, Class C.

F. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1; hot-dip zinc-coating per ASTM A 153, Class C.

G. Welding Electrodes: E70 Electrodes. Comply with AWS requirements.

H. Other Materials: All other materials not specifically listed herein, but required for the successful installation and completion of the work are included, and are subject to approval.

2.02 PRIMER

A. Primer: Rust inhibitive primer per Specification SECTION 09901 – PAINTING.

B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds and repair painting galvanized steel, with dry film containing not less than 93 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20, GRC.

2.03 FABRICATION

A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications.

B. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.04 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

Surfaces embedded in concrete or mortar (extend priming of partially embedded members to a depth of 4 inches), surfaces to be field welded, galvanized surfaces, and surfaces to receive sprayed-on fireproofing.

B. Surface Preparation: Clean surfaces to be painted. Remove oil, loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC specifications as follows: SSPC-SP 3 “Power Tool Cleaning.”

C. Priming: Immediately after surface preparation, apply primer according to manufacturer’s instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

D. Shop primer and field painting is specified under SECTION 09901 – PAINTING, Part 2.03 Exterior Paint Schedule.

2.05 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel indicated for galvanizing according to ASTM A 123. Galvanize units after assembly.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Before erection proceeds, and with the steel erector present, verify elements of concrete and masonry bearing surfaces and locations of anchorages for compliance with requirements.

B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads.

Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.

3.04 CLEANING

A. Immediately after erection, clean field welds, bolted connections, and abraded shop-primed areas. Apply primer to exposed areas using same material as used for shop priming. Coat portion of base plate and column below top of slab on grade with an additional 1.5 mil DFT primer.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint according to ASTM A 780.

3.05 CLEAN UP: Remove all shipping dunnage, shipping cushions, protective materials, wrappers, cuttings, shavings, dust debris and all other debris generated by the work daily. Do not stockpile, accumulate debris generated by the work in rooms, in buildings, on buildings, on site over night, remove debris daily.

END OF SECTION

SECTION 05500 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all metal fabrications as indicated on the drawings and as specified herein, including but not limited to the following:
   1. Miscellaneous steel attachments, anchors, plates, angles, etc. set in concrete.

   2. Anchors, angles, bolts for items, and other accessories shown in details and/or required for the complete installation of work in all sections.

B. Related Work Specified Elsewhere:
   1. SECTION 05120 – STRUCTURAL STEEL.

   2. SECTION 09901 – PAINTING: Metal painting.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Product Data: Submit manufacturer's data.

C. Shop Drawings: Submit shop drawings.

D. Certificate of Qualification: Required.

E. Conformance: Where materials are to comply select requirements such as design loading and system performance, include structural computations, material properties, and other information needed to confirm conformance.

F. Certifications: Submit certificates of asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free, and mercury free materials.

1.03 QUALITY ASSURANCE

A. Shop Assembly: Preassemble items in shop to greatest extent possible.

B. Fabricator Qualifications: Firm shall be experienced in producing metal fabrications.

1.04 PRODUCT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.05 COORDINATION

A. Coordinate installation of anchorage for metal fabrications.

PART 2 – PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Metal Surfaces, General: Provide materials selected for their surface flatness, for metal fabrications exposed to view in the completed Work.

B. Steel Plates, Shapes and Bars: ASTM A 36, hot-dip galvanized, ASTM A 123, G90.

C. Steel Pipe: ASTM A 53, Grade B, minimum yield stress of 35,000 psi, hot-dip galvanized, G90, standard weight (Schedule 40) ASTM A 123, G90.

D. Steel Tube: ASTM A 500, Grade B, or ASTM A 501, hot-dip galvanized ASTM A 123, G90.

E. Brackets, Flanges, and Anchors: Cast or formed metal of the same type material and finish as item to be fastened, ASTM A 123, G90.

F. Cast-in-Place Anchors in Concrete: Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27 cast steel. Bolts, washers, and shims, hot-dip galvanized, ASTM A 153, G90.

G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

H. Stainless Steel Plate: ASTM A 666, Type 316.

I. Stainless Steel Bars and Shapes: ASTM A 276, Type 316.

2.02 FASTENERS

A. General: Provide hot-dipped galvanized fasteners complying with ASTM A 153, G90, for exterior use or where built into exterior walls. Provide stainless steel fasteners where dissimilar metals are joined or where indicated. Select fasteners for the type, grade, and class required or as indicated.

B. Steel Bolts: Regular hexagon-head type, ASTM A 307, hot-dip galvanized, ASTM A 153, G90.

C. Stainless Steel Bolts and Screws: ASTM F 593, Type 314.

D. Lag Bolts and Screws: ANSI B18.2.1, hot-dip galvanized, ASTM A 153, G90.

E. Washers and Nuts: Same material and finish as bolts.

F. Expansion Anchors:
   1. Anchor Bolt and Sleeve: Anchor bolt and sleeve assembly of carbon steel components zinc-plated to comply with ASTM A 153, hot-dipped galvanized, G90 with capability to sustain without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488.

2. Metal Anchor Bolts, Straps, Hangers, Brackets and Other Inserts: Furnish to other trades the anchor bolts, straps, hangers, brackets and other inserts for the final installation of work under this and other trades.

G. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required, hot-dipped galvanized, ASTM A 153, G90.

H. Wood Screws: Flat head, carbon steel, ASME B18.6.1, ASTM A 153, G90.

I. Machine Screws: ASME B18.6.3, Type 316, stainless steel.

2.03 PAINT

A. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC – Paint 20, zinc rich coating (ZRC) or approved equal.

2.04 FABRICATION, GENERAL

A. Workmanship: Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in the finished product.

B. Form exposed work true to line and level, with accurate angles and surfaces and with straight sharp edges.

C. Weld corners and seams continuously, complying with AWS recommendations.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible.

E. Provide for anchorage of the type shown, coordinate with supporting structure.

F. Cut, reinforce, drill, and tap miscellaneous metal work to receive finish hardware and similar items.

G. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes to draw water where water may accumulate.

H. Galvanizing: Provide all metal fabrications with hot-dip galvanized coating, unless otherwise indicated, as follows:
1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 123 for galvanizing rolled, pressed, and forged steel shapes, plates, bars, and strip 1/8-inch thick and heavier, and assembled steel products.

2.05 ROUGH HARDWARE

A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting work, and for anchoring or securing work to concrete or other structures.

B. Fabricate items of sizes, shapes and dimensions required. Furnish galvanized steel washers.

2.06 MISCELLANEOUS

A. Provide miscellaneous steel framing and supports, to complete work.

B. Fabricate miscellaneous units to size, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing.

C. Hot-dip galvanize all miscellaneous units and supports unless otherwise specified.

D. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Hot-dip galvanize all miscellaneous frames and supports.

PART 3 – EXECUTION

3.01 PREPARATION

A. Prior to all work of this Section, verify that all work by other trades is complete to the point where fabrication and installation of the work of this Section may start.

B. Contractors shall make all measurements in the field to ensure proper and adequate fit of all metal fabrication items.

C. Installer shall examine areas and conditions under which metal fabrication items are to be installed. Notify Contractor, in writing, of conditions detrimental to the completion of the Work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other fasteners as required.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting for installation of miscellaneous metal fabrications. Set work accurately. Provide temporary bracing or anchors.

C. Connections: Fit exposed connections accurately.

D. Field Welding: Comply with AWS Code.

E. Grouting: Mix grout with potable water in the consistency recommended by the manufacturer.

3.03 CLEAN UP

A. After installation, clean all surfaces to receive final treatment.

B. Remove all rubbish, debris, fines, etc., accumulated from the work of this Section from project site and leave area neat and clean.

END OF SECTION

DIVISION 6 – WOOD AND PLASTICS

SECTION 06070 – WOOD TREATMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Plant preservative and insecticide treatment of lumber and other wood products specified in other Sections of this Specification by pressure and dip methods.

B. Field treatment of field cut or drilled lumber.

1.02 RELATED SECTIONS

A. SECTION 06100 – ROUGH CARPENTRY: Lumber products and fire retardant treatment of lumber products.

1.03 REFERENCES

A. American Wood-Preservers' Association
   1. AWPA C2-00: Lumber, Timber, Bridge Ties and Mine Ties-Preservative Treatment by Pressure Processes.

   2. AWPA C9-00: Plywood-Preservative Treatment by Pressure Processes.

   3. AWPA C31-00: Lumber Used out of Contact with the Ground and Continuously Protected from Liquid Water-Treatment by Pressure Processes.

   4. AWPA M4-01: Care of Preservative-Treated Wood Products.

   5. AWPA C20-99: Structural Lumber- Fire Retardant Treatment by Pressure Process.

   6. AWPA N1-01: All millwork, Preservative Treatment by Non-Pressure Process.

   7. AWPA N2-00: Composite Wood Products, Preservative Treatment by Non-Pressure Process.

1.04 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Product Data: Provide data on all treatment products, including field application instructions if applicable.
   1. Provide manufacturer’s Material Safety Data Sheets on all products, and hazardous materials.

C. Preserver Certifications:
   1. Provide a Certificate of Treatment showing compliance with these specifications for the following:
      a. Kiln drying

      b. Method of treatment performed, including dip treatment.

D. Contractor's Certification: Provide a certification letter stating that all wood used on this job including cuts and penetration were treated and coated with preservatives in compliance with requirements of this contract.

E. Guarantee: Guarantee form for written guarantee.

1.05 REGULATORY REQUIREMENTS

A. Comply with State OSHL (Occupancy Safety and Health Law) and pollution controls regulations of the State Department of Health and EPA.

1.06 QUALITY ASSURANCE

A. Source Limitations for Treated Wood: Obtain each type of fire-retardant-treated wood product through one source from a single producer.

B. Comply with the American Wood-Preservers' Association standards as described in the applicable building or residential code. Preservatives shall be EPA registered.

C. Do not use preservatives containing arsenic or other EPA banned chemicals.

D. Do not use Perma-Clear 65 or other zinc napthanate and permethrin products.

1.07 DELIVERY STORAGE AND HANDLING

A. Protect AWPA C31 inorganic boron treated wood from contact with the ground, rain or other sources of liquid water until permanent installation of covering construction.

1.08 GUARANTEE

A. Provide a two year guarantee to replace all treated wood which is attacked by subterranean termites.

B. Provide a five year guarantee to replace all treated wood which is attacked by dry wood termites or deteriorates due to dry rot. This guarantee period supersedes the guarantee provisions of the Interim General Conditions (IGC). The Surety shall not be held liable beyond two years of the project acceptance date.

C. Guarantee periods shall commence on Project Acceptance date.

PART 2 - PRODUCTS

2.01 GENERAL

A. Mill lumber to finish size and shape prior to treating, and treat before assembly. Plywood may be treated in regular panel sizes.

B. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
   1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece, or omit marking and provide certificates of treatment compliance issued by inspection agency.

2.02 PRESSURE TREATMENT WITH WATER-BORNE PRESERVATIVES

A. Treating solutions:
   1. Copper azole, Type A (CBA-A).

   2. Inorganic boron (SBX).

B. Treatment Methods:
   1. General:
      a. All water-borne treatment methods require incising of lumber of nominal 2 inch thickness (1-1/2 inches actual dimension).

      b. Choice of treatment method and conditions of use of each treating solution shall conform to the treatment schedule contained in Part 3.

   2. CBA-A: Treatment methods, depth of penetration and treating solution retention shall conform to AWPA C2 for lumber and C9 for plywood.

   3. SBX: Treatment method shall conform to AWPA C31. Treating solution retention shall be a minimum of 0.28 pounds per cubic foot (equivalent to 0.42 DOT).

C. Drying:
   1. Before Treatment:
      a. CBA-A Treatment: Wood shall be air dried or kiln-dried before treatment to an average moisture content of 28 percent or less per AWPA standards.

      b. SBX Treatment: Wood having a moisture content higher than 28% is acceptable when treating with SBX.

   2. After Treatment:
      a. All 1 inch and 2 inch lumber and all plywood shall be dried to a moisture content of 19 percent or less after treatment.

2.03 PRESSURE TREATMENT WITH OIL-BORNE PRESERVATIVES

A. Treating Solution:
   1. 0.50 percent by weight chlorpyrifos, 0.75 percent by weight 3-iodo-2-propynyl butyl carbamate (IPBC). The solvent used in formulating the preservative solution shall meet the requirements of AWPA hydrocarbon solvent Type C, Standard P9, Paragraph 3.1.

   2. For interior application use low odor mineral spirits as solvent.

B. Treatment Methods:
   1. Treated wood shall attain the following net retention requirements: 0.0175 pounds of Chlorpyrifos per cubic foot of wood, 0.035 pound of 3-Iodo-2 propynyl butyl carbamate per cubic foot of wood.

C. Drying:
   1. Before Treatment: All wood treated with oil-borne preservatives shall be kiln-dried to an average moisture content of 12% to 15% per AWPA standards.

   2. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

2.04 PRESERVATION BY DIP TREATMENT

A. Treating Solution:
   1. Any of the Oil-Borne Preservatives listed above.

   2. A solution of 1 quart chlopyrifos in 55 gallons of a 0.50 percent IPBC solution.

B. Treatment Methods:
   1. Immersion treat for a minimum period of 15 minutes.

   2. Do not incise lumber scheduled to be left unpainted or receive a clear finish.

C. Drying:
   1. After Treatment: Wood shall be thoroughly dried and virtually odor-free prior to installation.

2.05 FIELD TREATMENT

A. Treatment Method:
   1. Treat in accordance with AWPA Standard M4-98 using two heavy brush coats of a treating solution.

PART 3 - EXECUTION

3.01 SCHEDULE OF TREATMENTS

A. Species:
   1. Treat all wood species except all-heart redwood.

   2. All water-borne and oil-borne treatment solutions are applicable to douglas-fir and hem-fir species except for CBA-A treatment which is acceptable for hem-fir species only.

B. Application:
   1. Pressure Treatment:
      a. General: Unless otherwise stipulated, all lumber and plywood shall be pressure treated.

      b. Hardwood flooring and exposed lumber 1-1/2" (net thickness) and over that will be unpainted or receive a clear finish shall be and pressure treated with oil-borne preservative. Do not incise lumber.

      c. SBX treated wood shall not be used in areas exposed to direct precipitation (e.g. exposed decking, trellises, fencing, etc.) unless painted or covered with a finish material.

2. Dip Treatment: All finish lumber under 1-1/2 inch net thickness (except hardwood flooring); finish plywood; and mill work items, such as for cabinet work, shelving and similar wood work that will be exposed to view in the finished work.

3. Field Cuts: Treat end cuts, notches and penetrations into treated lumber or plywood. Exception: Cuts and penetrations made in SBX treated wood 2 inches or less in nominal thickness need not be field treated.

END OF SECTION

SECTION 06100 – ROUGH CARPENTRY

PART 1 – GENERAL

1.01 SUMMARY

A. Provide all rough carpentry, complete, including stud walls, eave framing, roof rafters, rough bucks, blocking, furring strips, and rough hardware, and other rough carpentry.

1.02 QUALITY ASSURANCE

A. Grading Marks: Factory mark each piece of lumber with type, grade, mill, and grading agency identification.

B. Wood Preservative Treatment: See SECTION 06070 – WOOD TREATMENT.

1.03 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Certificates: Submit certificate of treatment.

1.04 PRODUCT HANDLING

A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack and sticker lumber to provide air circulation within stacks.

1.05 JOB CONDITIONS

A. Coordination: Fit carpentry work to other work; scribe and cope to provide accurate fit. Coordinate location of furring, rough bucks, blocking, and similar supports to allow proper attachment of other work.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Lumber, General: Factory-mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with clear stain, transparent finish or without finish.

Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.

2. Provide seasoned lumber with 15% maximum moisture content at time of dressing.

B. Framing Lumber:

1. Light Framing Lumber: 2-inches through 4-inches thick, less than 6-inches wide, such as studs, plates, blocking, rough bucks, furring, etc., provide Construction grade, Douglas Fir/Larch.

2. Structural framing: 2-inches through 4-inches thick, 6-inches and wider, No. 2 grade, Douglas Fir, (WCLB or WWPA).

C. Plywood Sheathing: Comply with American Plywood Association (APA) PS 1 for softwood plywood and PS 51 for hardwood plywood.

D. Miscellaneous Materials:
   1. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended.
      a. Provide metal hangers and framing anchors.

      b. Provide ALL fasteners and anchorages with a hot-dip zinc coating (ASTM A 153, G90).

   2. Moisture Barrier: ASTM D 226, Type II (No. 30) asbestos-free, asphalt saturated roofing felt.

2.02 WOOD TREATMENT

A. Treat all rough lumber in accordance with SECTION 06070 – WOOD TREATMENT.

2.03 OTHER MATERIALS: All other materials not specifically listed herein or shown on the drawings, but required for the successful installation and completion of the work are included and are subject to approval of the Project Manager.

PART 3 – EXECUTION

3.01 INSTALLATION

A. General: Discard units of material with defects which might impair quality of work, and units which are too small (4'-0" and less) to use in fabricating work with minimum joints or optimum joint arrangement.
   1. Set carpentry work accurately to lines and levels, with members plumb and true, accurately cut and fitted.

   2. Securely attach carpentry work to substrate by anchoring and fastening as shown or as required.

   3. Use common wire nails, except as otherwise indicated.

   4. Electro-galvanized fasteners and pneumatically machine driven nails are prohibited on this project.

B. Wood Framing, General:
   1. Provide framing members of sizes and on spacings shown, and frame openings as shown, or if not shown, comply with recommendations of "Manual for Housing Framing" of National Forest Products Association. Do not splice structural members between supports.

   2. Anchor and nail as shown, and to comply with the current ICBO Uniform Building Code.

   3. Provide moisture barrier below all wood plates resting on concrete.

C. Wood Blocking, Rough Bucks, and Furring Strips: Provide wherever shown and where required for attachment of other work.
   1. Form to shapes as shown and cuts as required for true line and level of work to be attached.

   2. Coordinate location with other work involved.

   3. Attach to substrates to support applied loading.

   4. Countersink bolts and nuts flush with surfaces, unless otherwise shown.

   5. Provide moisture barrier between wood and concrete or masonry surfaces.

D. Retreat cut and penetrated lumber in accordance with SECTION 06070 – WOOD TREATMENT.

3.02 CLEAN-UP: Remove all cut-offs, discards, sawdust, chips, shavings and debris caused by the work or used to ship the work to the job site, daily. Do not stock-pile or accumulate debris. Do not store debris over-night, remove daily.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07560 – FLUID APPLIED ROOFING

PART 1 - GENERAL

1.01 SUMMARY
A. Application of two component cold fluid applied waterproofing membrane, consisting of polymethyl-methacrylate resin, catalyst, and polyester reinforcing fleece.

1.02 RELATED WORK
A. SECTION 07620 – SHEET METAL FLASHING AND TRIM

1.03 REFERENCES
A. American Society for Testing and Materials (ASTM) C 836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane.

B. Factory Mutual Research Corporation (FMRC) 4450/4470 – Roof Assembly Classification and Loss Prevention Data Sheets 1-28, 1-29, 1-49 & 1-54 (current edition).

C. Underwriters' Laboratories, Inc. (UL) 790 – Standard Test for Fire Resistance of Roof Covering Materials.

D. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual.

E. American Society of Civil Project Managers ASCE 7 most current adopted version.

1.04 SUBMITTALS
A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Shop Drawings: Submit a scaled drawing showing the layout of joint reinforcing and all flashing details.

C. Product Data: Provide manufacturer's technical literature on the roofing system. This includes coatings, reinforcing fabrics, flashing materials, fasteners, etc.

D. Manufacturer's Installation Instructions: Submit all data sheets available from the manufacturer on the installation of the roofing system applicable to this work.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.05 QUALIFICATIONS
A. Applicator Qualifications: Applicator of roofing material shall be a manufacturer approved applicator. Proof of qualifications shall be in writing from the manufacturer.

1.06 QUALITY CONTROL

A. Membrane Manufacturer: Company specializing in manufacturing the products specified in this section with ten (10) years documented experience.

B. Applicator: Contractor specializing in performing the work of this section with three (3) years documented experience and approved by system manufacturer for warranted membrane installation.

C. Manufacturer's Technical Representative: A representative of the roofing material manufacturer shall be on the roof during job start. Provide a written inspection report of each site visit and submit the reports to the Roofing Contractor. The manufacturer's representative shall approve the application process at specific stages of completion. After approved by the manufacturer's representative submit according to SECTION 01330 – SUBMITTAL PROCEDURES.

D. Final Inspection: Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer's unopened and undamaged containers.

B. Store and protect materials from damage and weather.

C. Store materials under cover at temperatures between 55 and 90 degrees F.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit.

1.09 WARRANTY

A. Waterproofing Warranty: Provide roofing manufacturers NDL warranty, where the manufacturer agrees to conduct repairs to the roofing system when leaks occur due to failure in materials or workmanship for a period of 20-years from the date of project acceptance.

B. Installers Warranty: Submit roofing Installer's 2 year warranty signed by Installer, covering the Work of this Section, 2 years from roofing system installation completion date.

C. Roof system shall not be installed over an existing roof system, all existing roof system materials shall be removed to the deck and deck shall be free of defects affecting membrane installation.

D. If there are defects in the existing roof deck, make corrections to make the roof deck acceptable to the roofing materials manufacturer.

E. The surety will not be held liable beyond two years from the date of project acceptance.

1.10 REGULATORY REQUIREMENTS

A. Provide a roofing system achieving an Underwriters Laboratories (UL) Class A fire classification.

B. Install all roofing products in accordance with all federal, state and local building codes; IBC 2006 edition as locally amended.

C. Windstorm Classification: Provide a roofing system which will achieve the required uplift resistance as calculated in accordance with ASCE 7-05 and IBC 2006 as locally amended. Corners and perimeter areas shall be calculated in accordance with ASCE 7-05 and IBC 2006 as locally amended.
   1. Wind Speed: 130 mph
   2. Exposure: B
   3. Importance Factor: 1.0

D. All work shall be performed in a manner consistent with current OSHA guidelines.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design:
   1. Roofing/Waterproofing Membrane: EZ Seal Non-Fibered PMMA Resin Membrane Roofing Waterproofing System manufactured by Malarkey Roofing Products or approved equal.

   2. Flashing Membrane: EZ Seal Non-Fibered PMMA Resin Membrane Roofing Waterproofing System manufactured by Malarkey Roofing Products or approved equal.

   3. Accessory Products: Provide resin primers, additives, substrate repair paste/mortar, reinforcing fleece, adhesives, sealants and accessory products as recommended by the roofing membrane manufacturer.

   4. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289-06, Type II, Class 1, Grade 2, fiber reinforced facers both sides.
      a. Compressive Strength: 20 psi
      b. Board Size: 48” x 48”
      c. R-value: R-19
      d. Board Edges: Square
      e. Manufacturers: Hunter, RMax or approved equal.

   5. Recover Board: Fiber reinforced gypsum panel with integral water-resisting core, 5/8” thick Densdeck Prime, or approved equal.

   6. Insulation Adhesive: Single component, moisture-cured insulation adhesive, polyurethane roofing adhesive dispensed from a portable, pre-pressurized container requiring no external power source. Insulation adhesive is used to attach compatible recover boards to insulation boards and insulation boards to properly prepared roof decks and substrates. The insulation adhesive shall meet or exceed requirements of the specified wind

up-lift resistance rating and must also be approved by the roofing system manufacturer.

B. The declaration of a basis of design is not meant to limit competition but to establish a standard of quality. Other manufacturers of like products shall submit product data for pre-qualification approval.
   1. Proprietary Names: Use of manufacturer's proprietary product names is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certifications of performance for proposed products to be used to show equivalencies.

   2. Equivalency: Equivalent products to the specified products.

   3. Substitution: Requests for substitution of a product will be evaluated for equivalency based on product data submitted.

C. Requests for substitutions will be considered in accordance with provisions of SECTION 01330.

D. PMMA Membrane Physical Properties:

PROPERTY	TEST	TEST METHOD
Color	Gray	-
Physical state	Solid	-
Minimum thickness	≥80 mils	ASTM D751/D5147
Tensile strength @ break	≥60 lbs/in	ASTM D5147
Elongation @ peak load (avg)	≥50%	ASTM D5147
Tear Strength	≥60 lbf	ASTM D5147
Surface hardness (avg)	≥70	ASTM D2240
Water absorption (168h@158F)	≤3%	ASTM D570
Moisture vapor permeance (US Perms)	≤0.3	ASTM E96
Hydrostatic resistance (psi)	≥150	ASTM D751
Low Temperature Crack Bridging	-15F	ASTM C957/ ASTM C1305
Crack spanning	2mm/0.8 inch	-
Resistance to temperatures (short term)	250C/482F	-
Usage time*	15 minutes	-
Rainproof after*	45 minutes	-
Solid to walk on after*	1-hour	-
Completely hardened after*	3-hours	-
VOC content	≤100 g/l	-

*all times are approximate and depend upon wind, humidity and temperature.

2.02 OTHER MATERIALS

A. All other materials not specifically listed herein or shown on the drawings, but required for the successful installation and completion of the work included and are subject to approval of the Project Manager.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work including penetration openings, curbs, cant strips, and nailers are solidly set in place, and substrate is prepared and secure.

3.02 EXISTING ROOF REMOVAL

A. The existing roof shall be completely removed down to the structural deck and discarded. Strip and remove all associated flashing and accessory items.

3.03 SUBSTRATE PREPARATION

A. General:

1. All substrates must be free from gross irregularities, loose, unsound or foreign material such as dirt, ice, snow, water, grease, oil, release agents, lacquers, or any other condition that would be detrimental to adhesion of the primer and/or resin to the substrate. All surfaces will require scarifying, sandblasting or grinding to achieve a suitable substrate as acceptable to the Membrane Manufacturer.

2. Inspect all substrates, and correct defects before application of new waterproofing. Fill all surface voids greater than 1/16 inch (1.5 mm) wide and/or deep with fill material acceptable to the Membrane Manufacturer.

3. Substrate shall have a maximum moisture content of six (6) percent or 75% relative humidity, and be prepared as required to provide adhesion of the membrane to substrate with a minimum bond strength of 116 psi (0.8 N/mm^2) for roofing applications.

4. Determinations of surface preparation indicated by bond strength and moisture content testing shall be periodically performed and recorded by the Contractor throughout the course of work. Test results shall be submitted in writing to the Owner or his designated Representative and Membrane Manufacturer for acceptance.

5. The final substrate shall be clean, dry, and free of contaminants.

B. Insulation / Recover Board:

1. Following application and curing of PMMA Primer, joints in top-layer (insulation or cover board) shall be covered with 4 inch (10 cm) wide strips of cold fluid-applied reinforced PMMA membrane. All voids or gaps between board joints shall be filled with PMMA Paste as recommended or required by Membrane Manufacturer prior to application of the membrane cover strip.

C. Concrete:

1. Existing concrete shall be free of sharps, projections, spalls, oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and previous waterproofing materials.

2. All concrete and concrete repair materials must be cured a minimum of 28 days in accordance with ACI-308, or as recommended by the concrete/mortar manufacturer, in order to achieve a minimum hardness of 3,500 psi (25 N/mm^2) with a maximum moisture content of six (6) percent or 75% relative humidity.

3. Concrete shall be abrasively cleaned in accordance with ASTM D4259 to provide a sound substrate free from laitance with an open abraded surface. When using mechanical methods to remove existing waterproofing products or surface deterioration, the surface profile is not to exceed 1/8 inch (3 mm) peak to valley.

4. Areas of spalls, voids, bug holes and other deterioration on vertical or horizontal surfaces shall be repaired in accordance with the requirements of the Membrane Manufacturer.

3.04 INSULATION / RECOVER BOARD INSTALLATION

A. Insulation and cover board shall be installed in accordance with the manufacturer's current published specifications and recommendations for use with adhered roofing.

B. Install only as much insulation and/or cover board as can be covered with roofing membrane and completed before the end of the day's work or before the onset of inclement weather.

C. Neatly fit insulation and cover board to all penetrations, projections, and nailers. Insulation shall be loosely butted without gaps. All gaps in insulation shall be filled with acceptable insulation or filler. Under no circumstances shall the membrane be left unsupported over a space greater than 1/16-inch.

D. When installing multiple layers of insulation and/or cover board, all joints between succeeding layers shall be staggered a minimum of 6" in each direction.

E. Insulation shall be feathered or tapered to provide a minimum of ¼" per foot slope to existing drain or overflow scupper.

3.05 INSULATION / RECOVER BOARD ATTACHMENT - ADHESIVE

A. Insulation Adhesive Attachment:

1. Application Rate: Dispense a ¼" to 3/4" wide beads of roofing adhesive at a rate of 12" o.c. or one lineal foot per square foot of insulation board to be attached, or as recommended by adhesive manufacturer.
   a. Note: An increased amount of roofing adhesive may be required at the perimeter band of the roof, depending upon parapet and building height. Refer to the Roof Adhesive Manufacturers Application Rate Chart for recommended application rates.

2. Application: Use roof edge as a guide when dispensing the first bead of roofing adhesive. Under normal application rate, dispense the first bead 3" inside the outside edges of the insulation board to be attached, with sequential beads equidistant. As adhesive is applied, place the insulation boards onto the roofing adhesive beads and ensure embedment into the adhesive by evenly ballasting the newly laid insulation within 3 minutes to

spread the roofing adhesive for maximum contact. Keep ballast on the insulation until the insulation is firmly attached.

3.06 PMMA PRIMER APPLICATION

A. Apply appropriate fast-curing primer on all substrates as required or recommended by the cold fluid-applied Membrane Manufacturer.

3.07 PMMA FLASHING MEMBRANE APPLICATION

A. General:

1. Install all flashings in accordance with details or as recommended by Membrane Manufacturer.

2. Provide minimum vertical height of 8 inches (20 cm) for all flashing terminations wherever possible. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope.

3. Do not flash over existing through-wall flashings, weep holes and overflow scuppers.

4. All flashing shall be terminated as required by the Membrane Manufacturer. Cap flashings or counter flashings may be constructed of metal, stone, tile or other materials properly installed in accordance with industry-accepted practice.

3.08 PMMA ROOF MEMBRANE APPLICATION

A. Mix and apply cold fluid-applied reinforced PMMA roofing membrane in strict accordance with written instructions of Membrane Manufacturer.

1. Using a lambswool roller, apply an even layer of cold fluid-applied PMMA resin at the minimum consumption of 0.21 kg/ft^2 (2.3 kg/m^2) or as recommended by the Membrane Manufacturer and allow to cure for 45 minutes minimum.

2. Work Membrane Manufacturer's fleece reinforcement into the wet resin, removing trapped air, using the lambswool roller. Maintain a minimum 2-inch (5 cm) overlap at all side and butt laps of adjacent reinforcement rows. Maintain a minimum 4-inch (10 cm) overlap at all flashings and penetrations.

3. Apply an even topcoat of cold fluid-applied PMMA resin at the minimum consumption of 0.09 kg/ft^2 (1.0 kg/m^2) or as recommended by the Membrane Manufacturer.

4. Allow completed membrane to cure as recommended by the Membrane Manufacturer prior to continuing application or applying loads. Fluid-applied membrane will be rainproof after approximately 45-minutes, and capable of carrying all load, i.e., be walked-on, in approximately 1-hour.

3.09 PROTECTION OF FINISHED WORK

Monitor finished system for 7 days, sweeping off birdbaths to allow for full cure.

3.10 CLEAN-UP

Remove all wrappers, boxes, spent material cans and buckets, cut-offs, fouled roller covers and frames, and any other debris generated by the work on a daily basis, do not accumulate debris, on site, over night.

END OF SECTION

SECTION 07620 – SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.01 SUMMARY

A. Provide all sheet metal flashing and other related work as indicated on the drawings and as specified herein.
   1. Sheet metal pans.
   2. Flashings.
   3. Scuppers.
   4. Miscellaneous accessories.

B. Related Work Specified Elsewhere:
   1. SECTION 07560 – FLUID APPLIED ROOFING: Coordinate installation.
   2. SECTION 07920 – SEALANTS: Sealant applications.
   3. SECTION 09901 – PAINTING: Sheet metal painting.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Product Data: Submit manufacturer's product data of all manufactured items.

C. Shop Drawings: Submit shop drawings of all required flashing details for approval. No fabrication will be permitted before approval is secured.

D. Guaranty: Submit guaranty as noted under paragraph entitled "GUARANTY" hereinbelow.

1.03 GUARANTY

A. The warranty provisions and number of years for the warrantee by this article shall take precedence over the standard provisions in the GENERAL CONDITIONS.

B. The Contractor shall furnish a written guaranty on the sheet metal for a two (2) year period after the project acceptance date. The guaranty shall provide for the repair of all leaks as well as repair and replacement of sheet metal and damage to the building and/or its finishes at no cost to the State.

1.04 PRE-INSTALLATION MEETING

A. The General Contractor, the Sheet Metal Contractor and Roofing Installer shall attend a pre-installation meeting. Include other related trades as applicable. Confirm the required participants with the Project Manager. Notify participants at least five days prior to meeting. Intent of the meeting is to review the preparation and installation requirements for the roofing system and to coordinate and schedule the required work.

1.05 QUALITY ASSURANCE

A. All sheet metal fabrications shall conform to State and local codes, SMACNA (latest edition) and industry standards.

B. Coordinate work with SECTION 07550 – MODIFIED BITUMINOUS MEMBRANE ROOFING to provide required supports and fasteners to comply with roofing performance requirements.

1.06 PERFORMANCE REQUIREMENTS

A. Install flashing and sheet metal work to withstand wind loads, structural movements, thermally induced movement, and exposure to weather without falling, rattling, leaking, and fastener disengagement.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.08 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and non-corrosive installation.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Gutter Pan: ASTM B370, minimum 20 ounce rolled copper.

B. Downspouts: Extruded, seamless polyvinyl chloride, Schedule 40 plumbing pipe conforming to ASTM D3034 with matching unions, bends, half bends, quarter bends to arrange downspout from bottom of leader head box to transition onto splash block tray. Downspout shall convert unimpeded, water gathered at roof top to grade. Provide painted finish.

C. Scuppers: ASTM B370 minimum 20 ounce rolled copper.

D. Flashing: ASTM B370 minimum 20 ounce rolled copper.

E. Fasteners: Fasteners shall be manufacturer's standard or custom fabricated stainless steel or copper types at copper materials and stainless steel types at other metal materials. Exposed fasteners where occurs or where required shall be of head to match flashing finish with composite metal and neoprene washer.

F. Moisture Barrier: ASTM D 226, Type II, No. 30, asbestos free, asphalt saturated roofing felt.

G. Cleating: Cleats for sheet metal work shall be provided where required.

H. Adhesive: Type recommended by flashing sheet metal manufacturer for waterproofing and weather resistant seaming and adhesive application of flashing sheet metal.

2.02 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Fabricating: Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Forming: Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.

E. Expansion Provisions: Space movement joints at maximum of 10-feet with no joints allowed within 24-inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separation: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Fasteners: Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view unless indicated or approved.

I. Attachments: Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer. Size shall be as recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured. Cleats shall be continuous for full length of roof edge.

PART 3 – EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. General: Surface to which sheet metal is to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect the application. Installer shall report any unsatisfactory surfaces to the Contractor. All such areas and/or conditions shall be corrected by the Contractor. Proceed with installation only after unsatisfactory conditions have been corrected. In the absence of such a report, the Contractor shall be held responsible for the finished product.

B. Accessories: All accessories or other items essential for the completeness of the sheet metal installation, though not specifically indicated on the drawings or specified, shall be provided. All such items unless otherwise indicated on the drawings or specified, shall be of the same kind of materials as the item to be applied, unless otherwise indicated or specified herein. Nails, screws and bolts shall be of the type best suited for the purpose intended and shall be of stainless steel or of a composition that is compatible with metal to which it will contact.

C. Workmanship: Except as otherwise indicated on the drawings or specified, the workmanship of sheet metal work, method of forming joints, anchoring, cleating, provisions for expansion, etc., shall conform to the standards details and recommendations of the Sheet Metal and Air Conditioning Contractors National Association's "Architectural Sheet Metal Manual", and shall be subject to the approval of the Project Manager.

D. Downspouts: ASTM B370, minimum 20 ounce rolled copper, of proper size and shape to allow proper fit to existing copper lead boxes. Secure PVC downspouts with robust stainless steel straps and fasteners to withstand repeated blows from an aluminum or solid wood baseball bat.

E. Weather Resistance: All sheet metal work shall be fabricated to watertight and wind-tight in compliance with the purpose intended.

F. Protection from Contact of Dissimilar Materials: Surfaces in contact with dissimilar metal shall be painted with heavy-bodied bituminous paint, or shall be separated by means of moistureproof building felts.

3.02 PROTECTION

A. Protect all sheet metal work until final acceptance of the building.

3.03 CLEAN-UP

A. Remove all adhesive, sealants, grease, dirt, etc., from flashing and sheet metal and clean surfaces as recommended by the manufacturer and maintain in a clean condition during construction.

B. At completion of the work, clean up and remove all rubbish and debris from the premises which resulted from this work.

END OF SECTION

SECTION 07920 – SEALANTS

PART 1 – GENERAL

1.01 SUMMARY

A. Completely close with sealant all joints indicated or specified to be sealed to a watertight condition.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Manufacturer's Data: Submit copies of manufacturer's product data and specifications for type of sealant required, to the Project Manager for approval.

C. Material Safety Data Sheets (MSDS): Submit MSDS for each sealant product.

D. Color Samples: Submit sets of color finish samples of sealants.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of sealant through one source from a single manufacturer.

1.04 PRODUCT HANDLING

A. Delivery: Deliver sealants to the jobsite in sealed containers labeled to show the designated name, formula, or specification number, lot number, color, date of manufacture, shelf life, curing time, manufacturer's directions, and name of manufacturer.

B. Storage: Carefully handle and store all materials to prevent inclusion of foreign materials. Remove from project site all damaged and deteriorated materials and materials exceeding shelf life.

C. All sealant materials shall be handled in accordance with the manufacturer's specifications and installed prior to expiration of shelf life.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General: Provide sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Sealants:
   1. At Exterior and Interior Vertical and Overhead Moving Joints: One-part polyurethane-based sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25, Use NT. Provide one of the following, or approved equal:
      a. Dymonic; Tremco, Inc.

      b. Sikaflex 1a; Sika Corp.

      c. Dynatrol I; Pecora Corp.

      d. NP-1; Sonneborn.

   2. For Sealing Glass In Channel Glazing Panels and Metal Frames: One-part butyl rubber based sealant, conforming to ASTM C 1311. Provide one of the following, or approved equal:
      a. Tremco Butyl Sealant; Tremco, Inc.

      b. BC-158; Pecora Corp.

      c. B-100; ADCO.

C. Primer for Sealants: Non-staining, as recommended by the sealant manufacturer.

D. Sealant Backer Rod: Compressible rod stock of polyethylene foam, polyethylene-jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, nonabsorptive material as recommended for compatibility with sealant by the sealant manufacturer to control the joint depth for sealant placement, to break bond of sealant at bottom of joint, to form optimum shape of sealant bead on back side, and to provide a highly compressible backer which will minimize the possibility of sealant extrusion when joint is compressed. Do not use oakum or other types of absorptive materials as backstops.

E. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer.

F. Masking Tape: Non-staining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

2.02 OTHER MATERIALS: All other materials not specifically listed herein or shown on the drawings, but required for the successful installation and completion of the work are included and are subject to approval of the Project Manager.

PART 3 – EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

3.02 EXAMINATION

A. Examine joints widths, surfaces, and backing, and their anchorage to the structure, and conditions under which joint sealer work is to be performed, and notify Contractor in writing of conditions detrimental to proper completion of the work and performance of sealers. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.03 JOINT PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; oil; grease; waterproofing; water; repellants; water; and surface dirt.

2. Clean concrete, masonry, stone tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

4. Steel Surfaces in Contact with Sealant: Scrape and wirebrush to remove loose mill scale. Remove dirt, oil, or grease by solvent cleaning, and wipe surfaces with clean cloths.

5. Clean metal, glass, and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

6. Do not permit solvents to air dry. Wipe surfaces free of solvent using clean, dry white cloth or white lintless paper.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

D. Examine joint size and correct to achieve depth ratio of 1/2 of joint width with a minimum width and depth of 1/4-inch, maximum width of 1-inch unless specifically allowed otherwise by the sealant manufacturer.

3.04 INSTALLATION OF JOINT SEALERS

A. General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions. Proceed with the work only when weather conditions are favorable for proper cure and development of high early bond strength.

C. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions indicated.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.
    a. Do not leave gaps between ends of joint fillers.

    b. Do not stretch, twist, puncture, or tear joint fillers.

    c. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint filler.

E. Primer: Immediately prior to application of the sealant, clean out all loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete, masonry units, wood, and other porous surfaces in accordance with compound manufacturer's instructions. Do not apply primer to exposed finish surfaces.

F. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
   1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

   2. Provide flush joint configuration per Figure 5B in ASTM C 1193, where indicated.

3.05 CLEAN UP

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.06 PROTECTION

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION

DIVISION 9 – FINISHES

SECTION 09500 – METAL ACOUSTICAL CEILING PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Acoustical metal ceiling panels.
   2. Exposed grid suspension system.
   3. Fasteners, main runners, cross tees, and wall angle moldings.
   4. Perimeter trim.

B. Related Sections:
   1. DIVISION 16 – ELECTRICAL: Coordinate all electrical items.

1.02 REFERENCES

1. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
2. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
3. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
4. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
5. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
6. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E 1264 Classification for Acoustical Ceiling Products.
8. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
9. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
10. ASCE 7 Standard - American Society of Civil Project Managers, Minimum Design Loads for Buildings and Other Structures

1.03 SYSTEM DESCRIPTION

A. Continuous / Wall-to-Wall

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel in selected color; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

1.05 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
   1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Classification.

C. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to, light fixtures, electrical systems, and miscellaneous equipment.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.07 PROJECT CONDITIONS

A. Space Enclosure:
   Exterior Pavilion Ceilings: Do not install ceilings panels in inclement weather. Ensure that wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

1.08 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:
   1. Acoustical Panels: Sagging and warping
   2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:
   1. Acoustical panels: One (1) year from date of substantial completion.
   2. Grid System: One (1) year from date of substantial completion.

C. The Warranty shall not deprive the State of other rights the State may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.09 MAINTENANCE

A. Extra Materials: Deliver extra materials to State. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
   1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

   2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Ceiling System
   1. Ceiling Panels:
      Armstrong World Industries, Inc., or approved equal.

   2. Suspension Systems:
      Armstrong World Industries, Inc., or approved equal.

   3. Aluminum Custom Trims:
      Armstrong World Industries, Inc., or approved equal.

B. Basis of Design:
   MetalWorks Exterior Linear ceiling panels with 8” wide plank profile. Manufactured by Armstrong World Industries, Inc. or approved equal. The use of a manufacturer proprietary product name is not meant to limit competition or exclude other equivalent products from other manufacturers, but to establish a standard of quality. Other manufacturer’s products will be considered upon submittal of proposed ceiling system product data sheets, technical specifications and defining materials used in the assembled ceiling. Test reports, certificates of performance, and any other technical data may be used to show equivalency equal to or superior to the named product.

2.02 ACOUSTICAL CEILING UNITS

A. Acoustic Panels Type AMP-1
   1. Surface Texture: Smooth

   2. Composition: Metal

   3. Color: Provide color chart for color selection.

4. Size: 8”wide x 96” long x 5/8” thick.

5. Edge Profile: Linear

6. Perforation Option: Unperforated

7. Flame Spread: ASTM E 1264; Class A (FM)

8. Recycle Content: Post-Consumer- 0% Pre-Consumer Waste- 25%

9. Acceptable Product: MetalWorks Linear, 5490 as manufactured by Armstrong World Industries or approved equal.

B. Infill Metal Panel Accessories:
   1. Contrast Filler Strip by ceiling panel manufacturer.

2.03 SUSPENSION SYSTEMS

A. Components: Standard metal ceiling carrier by ceiling panel manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Before proceeding with installation work, ensure that wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are near those intended for final occupancy.

3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with electrical fixtures.

B. Coordination:
   1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

   2. Furnish layouts for all metal ceiling carriers and anchors.

3.03 INSTALLATON

A. Follow manufacturer installation instructions and in compliance with ASTM C 636.

B. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

3.04 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09901 - PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. Provide painting and finishing of all new interior and exterior items and surfaces throughout the project.

B. Paint all exposed surfaces of all new work whether scheduled or not, except as otherwise indicated.

C. Surface preparation, priming and coats of paint specified are in addition to shop-priming.

D. “Paint” as used herein means all coatings, primers, and fillers, and other applied materials used as prime, intermediate or finish coats.

E. Paint all new exposed surfaces.

F. Related Sections:
   1. All other sections covering materials or surfaces that need to be painted for protection of substrate onto which paint is applied.

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Schedule of Finishes: Submit painting finish schedule.

C. Color Samples:
   1. Submit finish samples of each color for selection and approval.

D. Schedule of Operations: Submit work schedule showing sequence of operations and dates work will commence.

E. Certifications: Submit asbestos-free, lead-free, zinc-chromate-free, strontium-chromate-free, cadmium-free and mercury-free paint certificates.

F. Product Data Sheets: Submit Manufacturer’s Product Data Sheets.

G. Material Safety Data Sheets: Submit Material Safety Data Sheets.

H. VOC Limits: Submit written Certificates of Compliance.

I. Guaranty: Submit guaranty specified herein.

1.03 GUARANTY

A. The Contractor shall provide a two (2) year guarantee.

B. Contractor shall warrant mildew free painted or coated surfaces.

C. Project Manager shall notify Contractor, in writing, of any failure or defect.

D. Should Contractor fail to respond to a notice to remedy any failure or defect within 10 working days the State shall have the right to repair failure or damage at the Contractor's expense.

1.04 INSPECTION AND APPROVALS

A. The Contractor shall obtain written approval from the Project Manager upon completion of each phase of work:
   1. Surface preparation
   2. Prime
   3. First finish coat
   4. Second finish coat before proceeding into the next phase of work.

B. Contractor shall give the Project Manager one day (24 hours minimum) advance notice of completion of any phase of work.

C. Contractor shall provide necessary access to areas to be inspected.

D. Failure to obtain approval of any phase of work area may result in redoing the operation at no cost to the State.

E. Right of Rejection: The Project Manager shall have the right to reject all work.

1.05 ANALYZING AND TESTING

A. All paints and their applied thickness shall be subject to testing whenever the Project Manager deems necessary.

B. Should testing by a laboratory be required, the laboratory shall be selected by the Project Manager and the cost of testing shall be borne by the Contractor.

C. Should test results show that the paint is in compliance with this specification, the cost will also be borne by the Contractor.

D. All rejected material shall be removed from the job site immediately.

E. Where required paint thickness is deficient, affected surface(s) shall be recoated.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications:
   1. The Contractor shall provide a firm and individuals experienced in applying paints and coatings.
   2. The Contractor shall have a successful record of painting work.

B. Field Samples (Mockups):
   1. Provide a full-coat field sample panel for each type of coating locations directed by Project Manager.
   2. Provide samples at least 4 feet long by 8 feet high.

3. Field samples shall remain in place and shall be accessible throughout the project.

4. Field samples shall remain as part of the completed work.

1.07 SPECIAL REQUIREMENTS

A. Codes: The Contractor shall comply with the State Occupational Safety and Health Law.

B. Protection:
   1. Persons:
      a. The Contractor shall take all precautions to protect the public

      b. The Contractor shall provide, erect and maintain safety barricades around ladders, scaffolds, hoists and wherever Contractor's operations create hazardous conditions in order to protect the public and tenants.

   2. Completed Work: The Contractor shall provide protection of wet paint surfaces.

   3. Protective Covering and Enclosures:
      a. The Contractor shall provide a protective covering over furniture, equipment, floor and other areas that are not scheduled for treatment.

      b. Protective covering shall be clean sanitary drop cloth or plastic sheets.

      c. Paint applied to surfaces not scheduled for treatment shall be returned to their original condition.

      d. Use of masking tape as encouraged.

   4. Safeguarding of Property: Contractor shall take steps to safeguard his work and the property of the State.

   5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and exercise precautions against fire at all times.

C. Storage Area for Materials:
   1. No paint material or equipment may be stored in the building(s).

   2. The Contractor shall furnish a storage facility off site.

D. Sequence of Operations: The sequence of operations shall be:
   1. Surface preparation.

   2. Prime coat.

   3. First finish coat.

   4. Second finish coat.

1.08 AREAS (SURFACES) TO BE PAINTED

A. Exterior Surfaces to be Painted:
   1. All new PVC Downspouts.

1.09 PAINTING NOT INCLUDED

A. The following work are not included as part of field applied paint work.
   1. Pre-Finished Items: Unless otherwise indicated, do not include painting for factory-finished or installer finished items.

   2. Exposed Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper and similar finished materials will not require finish painting.

   3. Labels: Do not paint over any code-required labels or equipment identification, performance rating, name, or nomenclature plates.

1.10 OTHER INCIDENTAL WORK TO BE PERFORMED BY CONTRACTOR

A. Interior:
   1. Unless otherwise specified, the Contractor is responsible for moving about all equipment and miscellaneous items to provide sufficient working space. The Contractor shall protect these items.

B. Landscaping: Shrubbery and plants, where applicable, shall be trimmed 6-inches back from surfaces to be painted and protected from damage or shall be protected and held away by temporary restraints. Do not leave plant protection or temporary restraints over-night.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: All paints shall be asbestos-free.

B. Lead Prohibition: All paints shall be lead-free.

C. Mercury Prohibition: All paints shall be mercury-free.

D. Chromate Prohibition: All paints shall be free of zinc-chromate and/or strontium-chromate.

E. Cadmium Prohibition: All paint shall be cadmium-free.

F. Material shall be equal in quality to that specified under the Schedule of Finishes and any given finish shall be as labeled by one manufacturer.

G. All materials shall be delivered to the job site in undamaged original containers bearing the manufacturer's label and shall be stored in such a manner as to prevent damage.

H. Thinning of paint shall be done using material recommended by manufacturer.

I. Except for metal primers, all exterior and interior paint shall contain the maximum amount of mildewcide per gallon of paint permitted.

J. Supplier shall submit a signed certificate indicating the amount of mildewcide added.

K. Provide all patching and repair materials compatible with paint finishes. Use weather resistant materials for exterior surfaces and surfaces exposed to moisture.

L. Provide all other materials not specified but required.

2.02 SCHEDULE OF FINISHES

A. The Schedule of Finishes is made for the convenience of the Contractor and indicates the types and quality of finishes to be applied to the surfaces.

B. Apply treatment to exposed surfaces.

C. Paint sheen shall be as scheduled and as selected by the Project Manager. The following schedule represents the general character of the paint systems necessary to complete the work. Provide additional comparable systems and for additional sheens as necessary when requested by the Project Manager at no additional cost to the State.

2.03 EXTERIOR PAINT SCHEDULE

Design Consultant to fill in blanks.

A. PVC: Provide the following finish systems over exterior concrete substrates:
   1. Specify paint type and sheen latex and exterior semi-gloss.
      a. Primer: MPI 17.
      b. Intermediate: MP 11.
      c. Top Coat: MP 11.
      d. System DFT: 3.5 mils.

2.04 OTHER MATERIALS: All other materials not specifically listed herein or shown on the drawings, but required for the successful installation and completion of the work are included and are subject to approval of the Project Manager.

PART 3 – EXECUTION

3.01 PAINT APPLICATION

A. General:
   1. All work shall be done in a workmanlike manner by skilled and experienced mechanics.

   2. All materials shall be applied in strict accordance with the manufacturer's specifications.

   3. No painting of unprotected surfaces shall be done in rainy, damp or wet weather.

   4. All mixing shall be done outside the building.

B. Application: Paint application shall be by brush and roller only.

C. Colors: Each coat shall be tinted a different shade from the preceding coat.

D. Finish Film Thickness: Apply primer, intermediate, and finish coats in dry film thickness, recommended in writing by the manufacturer. Verify thickness with film gauges.

3.02 MISCELLANEOUS

A. Installation of Removed Items: After completion of final paint coat, removed items shall be reinstalled by the Trade appropriate for the item.

B. Clean-up:
   1. During the progress of the work, all debris, empty cans, waste, drippings, etc. shall be removed by the Contractor and the grounds about the areas to be painted shall be left clean and orderly daily.

   2. Upon completion of each workday, containers and all other debris shall be removed from the site. All paint splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixtures, floors, glass) shall be removed and the entire job left clean and acceptable.

   3. At completion of the work after Project Manager accepts painted surfaces remove all staging, scaffolding, tools and equipment.

3.03 EXTRA PAINT

A. The Contractor shall provide extra paint used for all surfaces to the State upon final acceptance of the project in unopened one gallon cans in the following quantities:
   1. One (1) gallon can of each paint color.

END OF SECTION

SECTION 09970 – SPECIAL COATINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes coatings for concrete and masonry including the following:
   1. Cleaning products for natural stone.
   2. Clear sealer for natural stone.

B. Related Sections:
   1. SECTION 03732 – CONCRETE SEALER
   2. SECTION 04450 – EXTERIOR STONE CLADDING
   3. SECTION 07920 – JOINT SEALANTS
   4. SECTION 09901 - PAINTING

1.02 SUBMITTALS

A. Submit in accordance with SECTION 01330 – SUBMITTAL PROCEDURES.

B. Product Data: For each coating system indicated, including:
   1. Product characteristics.
   2. Surface preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Application methods.
   5. Cautions for storage, handling and installation.

C. Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products of this Section with minimum ten years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum two years documented experience.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish surfaces for verification of products, colors and sheens.
   2. Finish area designated by Architect.
   3. Do not proceed with remaining work until the Architect approves the mock-up.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:
   1. Product name and type (description).
   2. Application and use instructions.
   3. Surface preparation.
   4. VOC content.
   5. Environmental issues.
   6. Batch date.

B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.

D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.05 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Dry-Treat, Inc., which is located at: 1104 Philadelphia Pike, Wilmington, DE 19809, USA; Email: info@drytreat.com; Web: www.drytreat.com or approved equal.

2.02 CLEANER FOR NATURAL STONE

A. Basis-of-Design Product:
   1. Hanafinn Oxy-Klenza.
      a. Oxy-Klenza is a powerful oxygen-based, chlorine free cleaner for interior and exterior applications for both residential and commercial projects. It is a multi-purpose cleaner that breaks down organic stains and soiling.
      b. This alkaline cleaner is safe for use on natural stone, tile, masonry, concrete, grout, vinyl and unfinished wood.
      c. Typical usage rate is 2/3 of a standard cup per 100 square feet, depending on surface conditions.

2.03 SEALER FOR NATURAL STONE

A. Basis-of-Design Product:
   1. Dry-Treat Stain-Proof Original.
      a. Stain-Proof is a premium impregnating sealer that provides stain protection and protects against efflorescence, freeze-thaw and salt damage.

      b. It is suitable for indoor, outdoor, residential and commercial use.

      c. Coverage is approximately 20 to 250 square feet per quart, depending on the type of surface, porosity and texture of surface, temperature, humidity and method of application.

2.04 OTHER MATERIALS: All other materials not specifically listed herein or shown on the drawings, but required for the successful installation and completion of the work are included and are subject to approval of the Project Manager.

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall review the product manufacturer's special instructions for surface preparation, application, temperature, re-coat times, and product limitations.

B. The Contractor shall review product health and safety precautions listed by the manufacturer.

C. The Contractor shall be responsible for enforcing on site health and safety requirements associated with the Work.

D. Inspect surface for cleanliness and treat as necessary to remove grease, oil, and other contaminants which will prevent products from penetrating.

E. Examine surfaces to receive coatings for surface imperfections and contaminants that could impair performance or appearance of coatings.

F. Correct conditions that could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.

G. Allow newly grouted installations to cure a minimum of 48 hours.

3.02 PREPARATION

A. When applying products, strong cross-ventilation and air movement shall be provided.

B. Ensure surface is clean and dry.

3.03 APPLICATION

A. Consult the manufacturer's recommendations for each coating system's complete and detailed application information.

B. Do not allow products to come in contact with any non-recommended surface. Contractor shall be responsible for protecting all adjacent surfaces from spills, drips, or any other form of coating damage.

C. Contractor shall be responsible for removing spots or repairing damaged surfaces to the satisfaction of the Architect.

3.04 CLEAN-UP

A. Clean-up shall be done to remove all spills, drips, overspray, or other unwanted coating from all surfaces not intended to be coated.

B. All used rags, brushes, roller covers, and other application related materials shall be removed from the work site and disposed in a proper manner and in accordance with local waste regulations.

C. All equipment, staging, ladders, and other contractor materials brought onto the jobsite by the Contractor shall be removed at the conclusion of the job in a timely manner.

3.05 PROTECTION

A. Protect installed products until completion of the project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 13284 – REMOVAL AND DISPOSAL OF MERCURY-CONTAINING LAMPS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section specifies the requirements for protection of workers, prevention of contamination of adjacent areas, performing removal of mercury-containing lamps, post-abatement cleaning, and appropriate disposal of removed materials in the event of a mercury release.

1.02 DESCRIPTION

A. The Contractor shall furnish all labor, materials and equipment necessary to carry out the safe removal and disposal of mercury-containing lamps at the Hawaii State Veterans Cemetery Committal Shelter in compliance with all applicable laws and regulations including all incidental and pertinent operations.

B. The Contractor shall verify the location and amount of mercury-containing lamps at the Hawaii State Veterans Cemetery Committal Shelter to be removed before start of any work.

C. The Contractor shall coordinate the date and time of the fluorescent lamps removal with the Project Manager and Construction Manager.

D. In performing mercury removal, all possible safeguards, precautions and protective measures shall be utilized to prevent exposure of any individual to mercury vapor.

E. The Contractor shall comply with all applicable Federal, State and local regulations. Where requirements of this Specification and the referenced documents vary, the most stringent requirement shall apply.

1.03 REFERENCES

A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only, and include but are not limited to, the following:

B. CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.1000	Air Contaminants
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, and Training Requirements.
49 CFR 178	Shipping Container Specification

C. HAWAII OCCUPATIONAL SAFETY AND HEALTH (HIOSH)

12-114.2	Personal Protective Equipment
12-121.2	Fall Protection
12-122.2	Materials Handling, Storage, Use, and Disposal

1.04 DEFINITIONS

A. Project Manager: The person or persons designated by the State to act on its behalf.

B. Contractor: The Contractor is that individual, or entity under contract to perform the herein listed work.

C. Mercury-Containing Lamp: As used in this Specification shall mean all fluorescent lamps without labeling stating “No Mercury”.

D. Spill: As used in this Specification shall mean uncontained mercury released by a damaged lamp.

1.05 QUALITY ASSURANCE

A. Training: Within one year prior to assignment to mercury work, each employee shall be trained on the hazards of mercury, necessary safety and health precautions, the use of and requirements for protective clothing, and equipment and respirators. Training shall include engineering and other hazard control techniques and procedures.

1.06 REQUIREMENTS

A. The Contractor shall have at all times at his office (one copy) and in view at each job site office (one copy) the following materials:
   1. Title 29 Code of Federal Regulations Part 1910.1000;
   2. Title 40 Code of Federal Regulations Part 262;
   3. Title 40 Code of Federal Regulations Part 263;
   4. Title 49 Code of Federal Regulations Part 172;
   5. Title 49 Code of Federal Regulations Part 178;
   6. Copies of the Contractor’s Mercury-Containing Lamp Removal Plan, and Mercury-Containing Lamp Disposal Plan and Emergency Procedures; and
   7. Copies of all relevant training certificates held by workers and contractors/ supervisors actively engaged in the project.

1.07 SUBMITTALS

A. Pre-Project Submittal: Submit a Pre-Project Submittal to the Project Manager for approval, no more than 10 working days after the written notice to proceed is received by the Contractor. No work shall commence until the Pre-Project Submittal is approved by the Project Manager. The submittal shall include the following:

B. Documentation of Instruction: Each worker and supervisor shall submit current training certificates required for removing mercury-containing fluorescent lamps, as described in section 1.05, Quality Assurance. Certificates shall be signed and dated by the training provider.

C. Mercury-Containing Lamp Removal Plan: The Contractor shall submit to the Project Manager a job-specific plan of the work procedures to be used in the removal and disposal of mercury-containing lamps. The plan shall also include interface of trades, sequencing of mercury related work, respirator and protective equipment requirements, and a detailed description of pollution control methods.

D. Mercury-Containing Lamp Disposal Plan: The plan shall comply with all applicable requirements of Federal, State, and local regulations. The plan shall include:
   1. Identification of mercury waste associated with the work.

   2. Estimated quantities of waste to be generated and disposed of.

   3. Names and qualifications of personnel who shall be working on-site with mercury wastes.

   4. List of waste handling equipment to be used in performing the work, including cleaning, volume reduction, and transport equipment.

   5. Spill prevention, containment, and cleanup contingency measures to be implemented.

E. Emergency Planning Procedures: Emergency planning procedures shall be developed by the Contractor and shall include, but not be limited to, considerations of fire, explosion, electrical hazards, slips, trips and falls and heat related injuries. Contractor shall train the employees on these emergency procedures.

F. Transporter Certification: Submit certification of notification sent to the EPA of mercury waste activities and EPA identification numbers.

G. Permits: Submit copies of all permits and arrangements for transportation and disposal of mercury waste.

H. Entry Log: Maintain a log of all persons who enter the work area while mercury abatement operations are in process. Submit copies weekly to the Project Manager.

I. Waste Disposal Manifest Forms: Submit copies of all transport manifests, trip tickets and disposal receipts for all mercury waste removed from the work area.

1.08 PROTECTION

A. Site Security:
   1. The work area is to be restricted to authorized, trained, and protected personnel, during lamp removal work.

   2. Entry to the work area by unauthorized individuals shall not be permitted without the express approval of the Project Manager. Any such entry shall be reported immediately to the Project Manager by the Contractor.

   3. Subject to the approval of the Project Manager, the Contractor shall have control of security in the work areas and areas surrounding the Contractor's equipment and materials.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. Respirators: Select respirators approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services, for use in atmospheres containing mercury material. Respirators shall comply with the requirements of 29 CFR 1910.134.

B. Protective Clothing: Personnel performing the fluorescent lamps removal work shall be furnished with disposable (polyethylene) gloves, chemical safety goggles and protective clothing (PPE).

C. Warning Signs and Labels: Warning signs shall be visibly posted at all approaches to the mercury control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Provide and affix labels to impermeable bags, mercury waste containers containing mercury materials, scraps, waste, or debris. The labels shall be clearly legible. Mercury labels shall display the following: “Caution: Contains Mercury”. Signs and labels shall comply with the requirements of 29 CFR 1910.145.

D. Mercury Spill Kit: the spill kit shall include several pairs of the following items:

1. Disposable coveralls and polyethylene gloves and foot covers;
2. Chemical safety glasses or face shields;
3. Mercury caution signs displaying “Mercury Spill -- Authorized Personnel Only;”
4. 100 foot caution tape;
5. Absorbent material;
6. Aspirator bulbs;
7. Disposable plastic dustpan;
8. Polyethylene waste bags;
9. Cloth backed tape;
10. Mercury resistant sponges;
11. Paper and writing equipment; and
12. Non-breakable, wide-mouth waste containers with airtight-seal lids.

PART 3 - EXECUTION

3.01 WORK PROCEDURE

A. The Contractor shall furnish labor, materials, services, and equipment necessary for the removal of mercury-containing lamps located in the committal shelter in accordance with Federal, State and local regulations.

B. Personnel shall wear and use protective clothing and equipment as outlined in Section 2.01.

C. Only personnel with appropriate training and protective equipment shall be permitted in the controlled area during fluorescent lamps removal work.

D. Personnel shall package and mark mercury materials as required by EPA, and DOT regulations and dispose of in accordance with all Federal, State, and local regulations.

E. Mercury-containing lamps shall not be broken since mercury may be released into the environment.

3.02 WORK OPERATIONS

A. Ensure that work operations or procedures involving mercury contaminated materials are conducted in accordance with applicable requirements of this Specification, including but not limited to:
   1. Obtaining suitable mercury-containing lamp storage sites;

   2. Notifying the Project Manager prior to commencing the operation;

   3. Reporting leaks and spills to HIDOH, EPA and to the Project Manager;

   4. Cleaning up any spills; and

   5. Maintaining inspection, inventory and spill records.

3.03 MERCURY REMOVAL PROCEDURES

A. Select mercury removal procedures that minimize contamination of work area with mercury contaminated debris/waste. Handle mercury such that neither skin contact nor inhalation occurs. Mercury removal procedures should be described in the removal plan.

B. Removal of Mercury Containing Lamps
   1. Signs shall be visibly posted at a distance from the work area sufficient to permit a person to read the sign and take the necessary protective measures to avoid exposure.

   2. All light fixtures shall be de-energized by a licensed electrician prior to the light fixture removal.

   3. Workers shall wear rubber gloves, safety glasses, and other necessary personal protective equipment at all times during the light fixture removal process.

4. Remove, package and dispose of/recycle mercury containing lamps as specified in this section. Lamps shall be handled in a manner that prevents breakage. Inspect all lamp labels. Lamps labeled “No Mercury” shall be segregated from the hazardous waste stream and disposed of as normal demolition debris. Lamps without the “No Mercury” label shall be assumed to contain mercury.

3.04 MERCURY LAMP DEBRIS CLEANUP REQUIREMENTS

A. Mercury Lamp Breakage: Immediately report to the Project Manager any mercury lamp breakage.

B. Mercury Lamp Debris Control Area: Rope off an area around the edges of any mercury lamp debris and post a “Mercury Spill -- Authorized Personnel Only” caution sign.

C. Mercury Lamp Debris Cleanup: The mercury lamp debris cleanup shall be in accordance with all applicable Federal, State and local regulations. Initiate cleanup of spills as soon as possible, but no later than 24 hours after discovery. Cleanup personnel shall use protective clothing and equipment as outlined in Section 2.01 that prevents both mercury exposure and physical injury due to broken glass. All debris shall be placed in a non-breakable container with an airtight-seal lid. Any items that came in contact with the mercury lamp debris shall be cleaned, labeled and disposed of as mercury contaminated waste.

3.05 STORAGE FOR DISPOSAL

A. Storage Containers for Mercury Lamps: The Contractor shall store mercury lamps in appropriate transport containers. The boxes shall be stored and labeled for transport in accordance with 40 CFR 262 and 40 CFR 263.

B. Labeling of Waste Containers: Label with the following:
   1. Date the item was placed in storage.

   2. Label mercury-containing lamp waste in accordance with 49 CFR 172. Affix labels to all lighting waste containers.

3.06 APPROVAL OF TEMPORARY STORAGE SITE

A. Obtain approval from the Project Manager to store mercury materials and containers.

B. The following criteria shall be used to select a storage site. The storage sites shall have:
   1. An adequate roof and walls to prevent rainwater from reaching the stored mercury;

   2. No drain valves, floor drains, expansion joints, sewer lines or other openings that would permit liquids to flow from the controlled area.

   3. Temporary onsite storage shall not exceed 10 working days from the end of removal work.

3.07 CLEANUP

A. Clean surfaces within mercury control areas daily. Do not allow mercury material, debris and dust to accumulate.

B. Restrict the spread of dust, debris, vapors and fumes; keep waste from being distributed over the general area.

C. Do not remove mercury control areas, roped-off perimeters or warning signs prior to the Project Manager's certification. The Project Manager shall visually inspect the affected areas for any residual mercury material and accumulated dust before the removal of mercury controlled areas.

D. The Contractor shall re-clean areas showing dust or residual mercury material at no additional cost to the Owner.

3.08 DISPOSAL

A. Mercury disposal shall comply with requirements and procedures outlined in 40 CFR 263. Local waste disposal facilities do not accept mercury wastes.

B. Identification Number: Federal regulations 40 CFR 263 require that generators, transporters, commercial storers, and disposers of mercury-containing waste possess U.S. EPA identification numbers.

C. Transporter Certification: Comply with disposal requirements and procedures outlined in 40 CFR 263. Before transporting the mercury lamp waste, sign and date the manifest acknowledging acceptance of the mercury-containing waste. The Contractor shall submit transporter certification of notification sent to EPA of lamp waste activities.

D. Certificate of Disposal and/or Recycling: Certificates for the disposal of mercury lamps, shall be submitted to the Project Manager within 30 days of the date of completion of disposal identified in the manifest was completed. Certificates of Disposal shall include:
   1. The identity of the disposal and/or recycling facility, by name, address, and EPA identification number.

   2. A statement certifying disposal and/or recycling of the identified mercury lamp waste that includes the date(s) of disposal, and the disposal process used.

END OF SECTION

DIVISION 16 - ELECTRICAL

SECTION 16010 - GENERAL ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Instructions to Offerors, the DOD General Conditions and Construction Contracts, Special Provisions preceding these specifications shall govern this section of the work.

1.02 GENERAL REQUIREMENTS

A. Provide all labor, material, equipment, supervision and services required for the construction of the electrical, lighting and communications systems. The finished installations shall be complete, operable and shall include all work specified herein and shown on the Drawings.

B. Include complete testing of all receptacles and wiring at the completion of the work and making any changes or adjustments necessary for the proper functioning of the system. All systems shall be properly adjusted and in working order at time of final acceptance.

C. It is the intent of these Specifications and other Contract Documents to require an installation complete in every detail. Consequently, the Contractor responsible for the details or for any special construction which may be found necessary to properly furnish, install, adjust, test, and place in successful and continuous operation the entire electrical and lighting systems.

1.03 INTENT OF SPECIFICATIONS AND DRAWINGS

A. Specifications and Drawings are prepared in abbreviated form and includes incomplete sentences. Omission of words or phrases are intentional and shall be provided by inference to form complete sentences. Omitted words and phrases such as “the Contractor shall” at imperative sentences shall be provided by inference to form complete sentences.

B. Specifications and Drawings complement each other and what is specified, scheduled or mentioned by one shall be binding as if called for by both.

1.04 DEFINITIONS

A. Provide: "Furnish, install, test and deliver electrical work in operating and ready to use condition".

B. Wiring: "Provide all raceways, junction boxes, conductors, devices, protection equipment, installation of motor controller (furnished by others) when required, etc., including testing for a complete, operative and ready to use electrical system”.

C. Equal: "Material, equipment, or system including all necessary labor, modifications, and accessories satisfying the requirements of the contract documents to provide features or have operating characteristics equal or better than that specified".

D. Complete: "Furnish installation that is operative, tested, ready to use, and which satisfies the intent of the contract documents, including all necessary accessories and modifications".

E. Contractor: "General Contractor responsible for all work shall assign work to Subcontractors. Except where noted, work of this Section shall be assigned to the Electrical Subcontractor".

1.05 DESCRIPTION OF WORK

A. Electrical Work: Work shall include but shall not be limited to:
   1. Complete disconnecting and removal of existing electrical lighting fixtures, devices and wiring as shown on drawings.

   2. Complete new lighting fixtures and wiring.

   3. Complete testing and as-built drawings.

B. Non-Electrical Work: Drywall, concrete, masonry, miscellaneous metals, and painting by respective Sections of Contract. Make detailed arrangements with appropriate Contractors and coordinate work prior to bidding and during construction.

1.06 QUALITY ASSURANCE

A. Materials and Equipment: Materials and equipment shall conform to requirements of applicable technical sections and publications specified therein and shall be as shown on the drawings. Materials and equipment shall be new and shall be the products of the manufacturers regularly engaged in the manufacture of such products. All items shall essentially duplicate materials and equipment that have been in satisfactory use at least 5 years prior to bid opening and shall be supported by a service organization that is, in the opinion of the Project Manager, reasonably convenient to the site of installation.

B. Materials and Equipment Submittals: Submittals shall include manufacturer's names and material or equipment identification such as styles, types, or catalog numbers, to permit ready and complete identification. Catalog cuts or brochures shall be included for raceway, wires, circuit breakers, wiring devices and apparatus.
   1. Where items are specified by manufacturer's name or catalog number, substitutions will not be permitted.

   2. Shop drawings shall be identified by manufacturer's name and type, and accompanied by complete descriptive data, electrical and physical characteristics of the equipment and manufacturer's bulletins.

   3. Burden of proof will be the responsibility of the Contractor. Submittals shall be sufficiently detailed to permit evaluation of the proposed items. Inadequacy of Submittal will be sufficient cause to disapprove a proposed substitution. All prospective bidders must submit descriptive information on proposed material for pre-bidding approval, where an item is detailed but no manufacturer is named.

1.07 DEPARTURES

A. Departures resulting from substitution of materials or system shall be accompanied by appropriate changes in all affected work of every trade. Such changes shall be at no increase in the contract amount and shall be the responsibility of the Subcontractor or Supplier responsible for the departures. Changes proposed by the Contractor shall be based on a system approach and shall be allowed if implemented without decrease in quality in performance or operations, increase in utility costs, or adverse affect on the available physical space to install the equipment. Such departures shall be submitted and noted in shop drawings for approval by the Project Manager.

   Departures initiated by other trades, requiring changes in the electrical system as well as other systems, shall be accompanied by appropriate changes to all affected work of every trade, at no increase in contract amount, by the trade responsible for the departures.

B. The General Contractor shall be responsible to coordinate, approve, and select systems that do not impose unaccounted-for-impact on the electrical work. It shall be understood that after the award of contract, all departures having electrical impact, unless otherwise noted, have been reviewed and approved by the General Contractor. Therefore all appropriate changes to the electrical system required to accommodate the departures shall be at no additional cost to the State.

1.08 SUBMITTALS

A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES.

B. Catalog Cuts: Catalog cuts shall be submitted for the following equipment:
   1. Lighting fixtures.
   2. Panelboard.
   3. Raceway, wires and wiring devices.
   4. Any built-to-order equipment.

C. Certificate of Compliance: Where required by section specifying the equipment, the Contractor shall submit 6 copies of certificates of compliance in accordance with the requirements of the General Provisions. The certificates shall include but not be limited to factory test reports.

D. Approval Requirements:
   1. Approval for material and equipment will be based on manufacturer's published data. Where materials or equipment are specified to be constructed and tested, or both, in accordance with the standards of the National Electrical Manufacturer's Association (NEMA) or the American National Standard Institute (ANSI), the Contractor shall submit proof that the items furnished under this Section of the specifications conform to such requirements.

   2. A certification or published catalog specification data statement to the effect that the item is in accordance with the referenced NEMA standard by a company listed as a member company of NEMA for the section whose standards cover the item under consideration, will be acceptable as sufficient evidence that the item conforms to the requirements of the National Electrical Manufacturer's Association.

3. A manufacturer's statement, indicating complete compliance of each item with the applicable ASTM, ANSI or other commercial standard specified, shall be submitted and will be acceptable as proof of compliance. Conformance with the agency requirements does not relieve the item from complying with any other requirements of the specifications.

E. Equipment and Material Guarantees:
   1. The Contractor shall guarantee all equipment and material specified, for a period of 12 months from the date such material is accepted by the Project Manager, against defects in design, performance and workmanship. Guarantees shall be supported by manufacturer's written warranties and shall be signed by an official of the manufacturer's organization.

   2. Replacement or repairs shall be made promptly upon receipt of notice by the Project Manager of failure under normal and proper use and maintenance.

   3. All costs of replacement and repair shall be borne by the Contractor provided that a report substantiating such defect or failure to conform to specifications is promptly given to the Contractor.

PART 2 - PRODUCTS

2.01 ASBESTOS PROHIBITION

A. No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

2.02 MATERIALS

A. All materials shall be new, except as specifically noted, and shall bear the label of Underwriters' Laboratories, Inc., wherever standards have been established and label service is normally and regularly furnished by the Agency.

PART 3 - EXECUTION

3.01 MATERIALS AND EQUIPMENT FURNISHED BY THE CONTRACTOR

A. The Contractor shall provide all electrical equipment and materials, wiring, supports, and such additional parts as are necessary to make the installation complete. All Contractor furnished materials and equipment are subject to the approval of the Project Manager.

3.02 PROTECTION DURING STORAGE

A. All materials and equipment shall be stored in a safe manner. Secure from weather and protect from fire. All materials shall be stored above the ground or floor level to avoid damage by moisture.

3.03 PROTECTION OF WORK IN PROGRESS

A. All electrical materials and equipment shall be completely protected during the installation. Equipment shall be securely protected against physical or chemical damage. Damage to materials or equipment due to Contractor's neglect shall be repaired or replaced to the satisfaction of the Project Manager by and at the expense of the Contractor.

3.04 PROGRESS OF WORK AND COORDINATION

A. The electrical work shall be coordinated with the work of other Contractors and trades.

3.05 RULES AND REGULATION

A. The installation shall conform to the applicable rules and regulations of the City and County of Honolulu and NFPA-70, National Electrical Code-2008, other standards and publications specified in the technical sections.

3.06 COORDINATION

A. The contract drawings indicate the extent and general location and arrangement of lighting fixtures, panelboard, electrical equipment, conduit and wiring. Electrical equipment shall be located so as to avoid interference with mechanical or structural features. Any outlet, light fixture, wiring, and other electrical equipment may be relocated within 10 feet-0 inches of the location shown on the drawings before installation is initiated at direction of the Project Manager and without additional increase in contract amount.

3.07 WORKMANSHIP

A. All materials and equipment shall be installed in accordance with approved recommendations of the manufacturer and shall conform to the requirements of the contract drawings, and as described in these specifications. The installation shall be accomplished by workers skilled in this type of work.

3.08 EQUIPMENT WIRING AND CONNECTIONS

A. All wiring and connection for ventilation equipment, and electrical equipment, as indicated on the electrical drawings, shall be furnished and installed under this Section of the specifications, except as otherwise noted herein.

3.09 FIELD TESTS

A. After the installation is complete, and at such time the Project Manager may direct, the Contractor shall conduct equipment operational field tests for approval. The Contractor shall place at his disposal all assistance, materials and services required to perform such tests. The tests shall be performed in the presence of the Project Manager.

3.10 AS-BUILT DRAWINGS

A. Submit As-Built drawings in accordance with General Condition Requirements.

END OF SECTION

SECTION 16400 - ELECTRICAL WORK

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The General Instructions to Offerors, the DOD General Conditions and Construction Contracts, Special Provisions preceding these specifications shall govern this section of the work.

1.02 RELATED SECTIONS

A. General Electrical Requirements is specified in SECTION 16010 - GENERAL ELECTRICAL REQUIREMENTS.

1.03 DRAWINGS

A. Specifications are accompanied by drawings of diagrammatic electrical plans showing locations of outlets, fixtures, and other electrical equipment. Locations are approximate. Before installing, study adjacent construction details and make installation in most logical manner. Any outlet, wiring, or other electrical equipment may be relocated within 10 feet-0 inches of location shown before installation at direction of the Project Manager without additional charge to the State.

B. Before installing, verify all dimensions and sizes of equipment at job site. Circuit and conduit routing is typical and may be altered in any logical manner; however, all changes shall be approved by the Project Manager and shown on "as-built" drawings.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. All materials, equipment, and devices shall, as a minimum, meet the requirements of UL where UL standards are established for those items, and the requirements of NFPA 70. All items shall be new unless specified or indicated otherwise. Brand names and catalog number indicate standards of design and quality required. In case of obsolescence, supersedure, or error in catalog number, the associated description and intent implied by the application shall govern.

2.02 RACEWAYS AND FITTINGS

A. Rigid Steel Conduit: Zinc coated in accordance with ANSI C80.1 and UL-6 (Use in exterior).

B. Electrical Metallic Tubing (EMT): ANSI C80.3. (Use in interior).

C. Liquid-Tight Flexible Metal Conduit (Steel): UL 360. (Use in interior or exterior).

D. Polyvinyl Chloride (PVC), Schedule 80. (Use in interior or exterior).

E. Fittings for Metal Conduit, Electrical Metallic Tubing, and Flexible Metal Conduit: UL 514. All ferrous fittings shall be cadmium or zinc-coated in accordance with UL 514.

F. Fittings for Electrical Metallic Tubing (EMT) shall be the compression type.

G. Minimum Raceway Size: 3/4 inch diameter, inside.

2.03 OUTLET BOXES AND COVERS

A. UL 514, cadmium or zinc-coated if of ferrous metal.

2.04 CABINETS AND JUNCTION BOXES (WITH VOLUME GREATER THAN 100 CUBIC INCHES)

A. UL 50, hot-dip zinc-coated if of sheet steel.

2.05 WIRES AND CABLES

A. Wires and cables shall meet the applicable requirements of ASTM and UL for the type of insulation, jacket, and conductor specified or indicated. Wires and cables manufactured more than 12 months prior to date of delivery to the site shall not be used.

1. Conductors: Conductors No. 10 AWG and smaller shall be solid and those No. 8 AWG and larger shall be stranded. Unless indicated otherwise, conductor sizes shown are based on copper. All conductors shall be copper.

2. Minimum Conductor Size: Minimum size shall be No. 12 AWG.

3. Color Coding: All branch circuit conductors shall be color-coded. Color shall be green for grounding conductors, and white for neutrals, except where neutrals of more than one system are installed in same raceway or box, the other neutral shall be white with a colored (not green) stripe. The color of the ungrounded conductors in different voltage systems shall match existing color-coding. If not available, use the following:

120/208 volt, 3-phase:	Phase A - black
	Phase B - red
	Phase C - blue
	Neutral - white
	Ground - green

4. Insulation: Unless specified or indicated otherwise, or required to be otherwise by NFPA 70, all power wires shall be 600-volt, Type THWN, XHHW, or THHN, except that grounding wire may be Type TW.

5. Equipment Grounding Conductors: ASTM B 1, solid bare copper wire for sizes No. 8 AWG and smaller; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger.

2.06 SPLICES AND TERMINATION COMPONENTS

A. UL 486A and UL 486B, as applicable for wire connectors, and UL 510 for insulating tapes. Connectors for wires No. 10 AWG and smaller shall be insulated pressure-type in accordance with UL 486A or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

2.07 HARDWARE, SUPPORT, BACKING, ETC.

A. Provide all hardware, supports, backing, and other accessories necessary to install electrical equipment. Wood materials shall be termite treated, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be brass or bronze. All wood screws shall be brass or galvanized steel.

2.08 WIRING DEVICES

A. Weatherproof Receptacle: Provide GFI type receptacle in flush cast metal box with gasketed, cast metal weatherproof cover plate. Cover plates shall be listed for "wet locations" while in use. Receptacle shall be weather resistant, ivory phenolic molded body, NEMA 5-20R, 20A, 125V, 2-pole, 3-wire, grounded, side wired, U-shaped grounding slot, parallel double wipe phosphor bronze spring tensioned contacts, automatic grounding clip, solid state ground fault sensing and test circuit designed to trip open when ground current exceeds 5.0 milliamperes, resettable, and with rating engraved on body. Manufacture and install according to NEC Article Nos. 210 and 406. Hubbell No. GFR-5362-SGI. Arrow Hart, Hubbell, Bryant or approved equal.

B. Equal devices by Arrow Hart, Bryant, General Electric, Leviton and Hubbell are approved.

2.09 LIGHTING FIXTURE

A. Lighting Fixtures: Provide lighting fixtures completely assembled with wiring and mounting devices and ready for installation at the locations noted. Install lighting fixtures to be supported independent of the ceiling system. Furnish fixtures complete with lamps and drivers required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General Requirements: Electrical installations shall conform to the requirements of NFPA 70 and to the requirements specified herein.

B. Wiring Methods: Wiring method shall be insulated conductors installed in conduit, except where specifically indicated or specified otherwise, or required by NFPA 70 to be installed otherwise. An insulated equipment-grounding conductor shall be provided in all branch circuits, including lighting circuits.
   1. Electrical Metallic Tubing: Use in interior locations.

   2. Non-Metallic Conduit: Use with ground wire. Use in interior or exterior locations.

   3. Exposed Exterior - Rigid steel conduit or PVC.

C. Conduit Installation: Where exposed, install conduit parallel with or at right angles to ceilings, walls, and structural members.
   1. Conduit Support: Support conduit by pipe straps, wall brackets, hangers, or ceiling trapeze. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; by machine screws, welded threaded studs, or spring-tension clamps on steel work.

2. Make changes in direction of runs with symmetrical bends or cast metal fittings. Make field made bends and offsets with a hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of all obstructions.

3. Install pull wires in empty conduits in which wire is to be installed. The pull wire shall be No. 14 AWG zinc-coated steel or plastic having not less than 200-pound tensile strength. Leave not less than 12 inches of slack at each end of the conduit.

4. Fasten conduits to sheet metal boxes and cabinets with 2 locknuts where required by NFPA 70, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use at least a single locknut and bushing. Locknuts shall be the type with sharp edges for digging into the wall of metal enclosures. Install bushings on the ends of conduits and provide insulating type where required by NFPA 70.

D. Boxes, Outlets, and Supports: Provide boxes in the wiring or raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be of the cast metal hub type when located in normally wet locations, when surface mounted on outside of exterior surfaces, when installed exposed up to 7 feet above interior floors and walkways, and when installed in hazardous areas. Boxes in other locations shall be sheet steel. Each box shall have the volume required by NFPA 70 for the number of conductors enclosed in the box. Boxes for use in masonry block for tile walls shall be square-cornered tile type, or standard boxes having square-cornered tile type covers. Provide gaskets for cast metal boxes installed in wet locations and boxes installed flush with the outside of exterior surfaces.
   1. Boxes for use with raceway systems shall not be less than 1-1/2 inches deep, except where shallower boxes required by structural conditions are approved. Boxes for other than lighting fixture outlets shall be not less than 4 inch square, except that 4 inch x 2 inch boxes may be used where only one raceway enters the outlet.

   2. Pull Boxes: Construct of not less than the minimum size required by NFPA 70 or code-gauge aluminum or galvanized sheet steel, except where cast metal boxes are required in locations specified above. Furnish boxes with screw-fastened covers. Where several feeders pass through a common pull box, tag the feeders to indicate clearly the electrical characteristics, circuit number, and panel designation.

E. Mounting Heights: Mount panelboard so the height of the operating handle at its highest position will not exceed 66 inches from the floor. Mounting heights of lighting switches, receptacles and other devices shall be from the center of device or outlet to finish floor.

F. Conductor Identification: Provide conductor identification within each enclosure where a tap, splice, or termination is made. For Conductors No. 6 and smaller, color-coding shall be by factory-applied color-impregnated insulation.

G. Splices: Make splices in accessible locations. Make splices in Conductors No. 10 AWG and smaller with an insulated pressure type connector.

H. Grounding and Bonding: In accordance with NFPA 70. Ground all exposed non-current carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in non-metallic raceways, and neutral conductor of wiring systems.

I. Grounding Conductor: Provide an insulated, green colored equipment grounding conductor in all branch circuits. This conductor shall be separate from the electrical system neutral conductor.

J. Repair of Existing Work: Layout the work carefully in advance. Where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for the proper installation, support, or anchorage of the conduit, raceways, or other electrical work, do this work carefully. Repair any damage to buildings, piping, or equipment using skilled mechanics of the trades involved.

3.02 FIELD OPERATING TESTS

A. The Contractor shall provide personnel to conduct all tests. As an exception to requirements that may be stated elsewhere in the contract, the Project Manager shall be given 5 working days notice prior to each test.
   1. Lighting System Test: Test the lighting system to assure operation.

3.03 FINISHING

A. Patch, repair, and restore all existing elements cut or drilled for installation of electrical system. Drilling, cutting, patching, repairing, and restoring shall be subject to approval of the Project Manager.

B. Attach electrical equipment to wall or partitions with bolts, nuts and washers. Close unused knockouts on existing outlets with metal cap.

C. Wipe clean all new exposed equipment enclosures and raceways with rag and solvent. Paint all new exposed equipment enclosures and raceways, color and finish to match existing. Factory finished equipment shall not be painted unless otherwise instructed.

D. Provide nameplate for electrical panelboard. Laminated plastic, black/white, engraved with 3/16-inch high commercial letters to exposed white. Screw mounted. Designate panel name, indicate voltage, phase and wires.

E. Complete panel directories with typewriter.

3.04 INSTALLATION OF LIGHTING FIXTURES

A. Support fixtures securely and safely by means of fixture studs in outlet boxes or other approved means. Provide accessories, such as straps, mounting plates, stems, nipples, or brackets for proper installation. All lay-in type light fixtures shall be fastened to ceiling grid with manufacturer provided t-bar lock clips.

END OF SECTION