

4. TECHNICAL SPECIFICATIONS

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SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Shop drawings and submittals shall be made in accordance with DHHL's General Conditions, Section 5.5.1 – "SHOP DRAWINGS" and Section 6.3 – "SUBSTITUTION OF MATERIALS AND EQUIPMENT"

1.02 OTHER SUBMITTALS REQUIRED BEFORE CONSTRUCTION

The Contractor shall submit the following items prior to or at the pre-construction meeting or unless otherwise noted:

1.03 SHOP DRAWINGS, SAMPLES, CATALOG CUTS, AND CERTIFICATES

- A. Submittal Schedule: Prior to the submission of any shop drawings or submittals, the Contractor shall submit to the Construction Manager and Design Consultant for review, a submittal schedule. The schedule shall identify the subject matter of each submittal, the corresponding specification section number and the proposed date of submission. During the progress of work, the Contractor shall revise and resubmit the submittal schedule as directed by the Project Manager.
- B. The Contractor shall submit for review to the Construction Manager, or to a representative designated by the Project Manager, electronically or submit four (4) copies, if directed by the Project Manager of all shop drawings, samples, catalog cuts and certificates. Two (2) copies will be returned to the Contractor with information of review action. The Contractor shall submit additional quantities for their subcontractor's or supplier's use. Each shop drawing, certificate of compliance, sample, and equipment list shall be checked and certified correct by the Contractor, and shall be identified with the applicable information specified hereinafter under "Submittal Identification."

Items are to be reviewed prior to commencing fabrication or delivery of material to the job site.

- C. Each copy of the drawings, certificates, catalog cuts, and lists reviewed by the Design Consultant will be stamped "REVIEW ACTION" with the appropriate action noted therein. The review of the Design Consultant shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Acceptance of such drawings will not relieve the Contractor the responsibility of conforming to the contract drawings and specifications or for any error or omission which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Each shop drawing submitted for review shall have, in the lower right-hand corner just above title, a white space 4" x 4" in which the Design Consultant can place the stamp and indicate action taken. The

Contractor shall also inform their subcontractors to provide this space in their preparation of shop drawings.

1.07 TEST REPORTS

Six copies of test reports for any material used in this Contract shall be submitted when specified or required by the Project Manager.

1.08 SUBMITTAL IDENTIFICATION

A. To avoid rejection and to clarify each submittal, the General Contractor shall have a rubber stamp made up in the following format:

B. CONTRACTOR NAME: _____
PROJECT: _____
IFB NO: _____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR. IT IS CERTIFIED 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.

DATE RECEIVED _____

SPECIFICATION SECTION _____

SPECIFICATION PARAGRAPH _____

DRAWING NUMBER _____

SUBCONTRACTOR NAME _____

SUPPLIER NAME _____

MANUFACTURER NAME _____

CERTIFIED BY: _____

C. This stamp "filled in" should appear on each reproducible shop drawing, on the cover sheet of copies of test and mill reports, certificates of compliance, catalog

cuts, brochures, etc. The stamp should be placed on a heavy stock paper merchandise (approximately 3" x 6") and one tag tied to each sample submitted for approval. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample they can be matched up again.

The back of this tag will be used by the Project Manager for receipt, approval, and log stamp for any comments that relates to the sample.

- D. Submission Number: Each submission is to be sequentially numbered in the space provided in the Contractor's stamp. Correspondence and transmittal will refer to this number.
- E. The Contractor shall ensure that all submittals, including shop drawings, are complete and in conformance to the requirements of the Contract specifications prior to submissions to the State for review and acceptance. Incomplete submittals will not be processed by the State and returned to the Contractor for correction. Any cost impacts and delays in the Project schedule as a result of incomplete submittals shall be the responsibility of the Contractor.

1.10 GUARANTEES

Guarantee periods shall start at the time of acceptance in writing by the State.

All guarantees and warranties shall be made out to the "State of Hawaii." Supplier and subcontractor guarantees shall be co-signed by the Contractor.

The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor's own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

NO PROGRESS PAYMENT WILL BE PAID UNTIL ALL REQUIRED SUBMITTALS ARE SUBMITTED IN THE REQUIRED TIME.

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

SECTION 01505 – MOBILIZATION AND DEMOBILIZATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section covers the requirements for mobilization and demobilization are hereby incorporated into and made a part of these specifications by reference unless otherwise modified hereinafter.

1.02 MOBILIZATION

The Contractor shall mobilize and transport his construction plant and equipment including materials and supplies for operation to the site of work, construct temporary buildings and facilities as necessary, and assemble the equipment at the site as soon as possible after receipt of Notice to Proceed, subject to the provisions of the General Provisions.

1.03 DEMOBILIZATION

The Contractor shall demobilize and transport his construction plant and equipment including materials, supplies and temporary buildings off the site as soon as possible after construction is completed. Demobilization shall include all cleanup required under this contract and as directed by the Engineer. Demobilization and final cleanup shall be completed prior to final acceptance.

1.04 PERFORMANCE BOND

The Contractor shall file and pay for the performance and payment bonds according to the Instruction for Bid Submittal, except that the value of the bonds shall equal one hundred percent (100%) of the amount of the contract basic bid amount plus one hundred percent (100%) of the amount of the extra work.

Payment for the Contractor's bond premium will be made in accordance to the terms stated in Part 4 below.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

- A. Mobilization shall not be measured for payment. The maximum bid allowed for "Mobilization" is an amount not to exceed size (6) percent of the sum of all items (excluding this item and all Allowances). If the proposal submitted by the bidder indicates an amount in excess of the allowable maximum, the indicated amount or amounts shall be reduced to the allowable maximum; the "Sum of All Items," in the proposal schedule shall be adjusted to reflect any such reduction. For the

purpose of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the "Sum of All Items" adjusted in accordance with the foregoing shall be used and the bidder's proposal shall be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith.

- B. Demobilization will not be measured for payment. A separate line item called "Demobilization" will be added to the Contractor's Schedule of Values after the contract has been awarded. The total amount for this item shall be 2.5% of the Contractor's total bid amount and will be deducted from other line items in the schedule of values as negotiated between the Contractor and the State. **THE CONTRACTOR SHALL NOT MODIFY THE PROPOSAL SCHEDULE BY ADDING A "DEMOBILIZATION" BID ITEM TO THE PROPOSAL SCHEULE.**

4.02 BASIS OF PAYMENT

- A. Mobilization will be paid for at the contract lump sum price under Mobilization. Partial payment will be made as follows:
1. When 2 ½ percent of the original contract amount is earned, 50 percent of the bid amount will be paid.
 2. When 5 percent of the original contract amount is earned, 75 percent of the bid amount will be paid.
 3. When 10 percent of the original contract amount is earned, 100 percent of the bid amount will be paid.
- Nothing herein shall be construed or limit or preclude partial payments otherwise provided by the contract.
- B. Partial payment will not be paid for Demobilization. Full payment will be made on the Contractor's final payment request. This will occur after the Contractor has fulfilled all of the requirements of the Contract bid documents to the satisfaction of the State and issuance of the Final Acceptance letter to the Contractor by the State.

END OF SECTION

SECTION 01750 - GUARANTEE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Guarantee shall be made in accordance with Section 7.35 – “GUARANTEE OF WORK” of the DHHL’s General Conditions.

1.01 GUARANTEES

The Contractor guarantees all materials and equipment furnished to be in operable condition upon final acceptance of the work and that all such materials and equipment conform to the requirements of this contract and be fit for the use intended.

He further guarantees all such materials and equipment against defects and poor workmanship and, to the extent that he is responsible for design, the Contractor guarantees the design to meet the criteria and operating requirements specified against failure to perform in accordance with such criteria and operating requirements.

The period of this guarantee shall commence upon acceptance of the work by the DHHL, and shall extend through the project performance evaluation period not to exceed 1 year for all materials and equipment, provided that this period shall be extended from the time of correction of any defect or failures, corrected under the terms of this guarantee, for a like period for the corrected work.

The Contractor shall correct all defects or failures discovered within the guarantee period. The DHHL will give the Contractor prompt written notice of such defects or failures following their discovery. The Contractor shall commence corrective work within five (5) days following notification and shall diligently prosecute such work to completion. The Contractor shall bear all costs of corrective work, which shall include necessary disassembly, transportation, reassembly and retesting, as well as repair or replacement of the defective material or equipment, and any necessary disassembly and reassembly of adjacent work.

Any period that a particular equipment is not operable due to its failure shall not be considered as a part of the guarantee period. The guarantee period shall be extended for a like period. If due to failure of other equipment the equipment is unable to perform its intended function, the guarantee period shall be extended for a like period. Time that equipment is operating shall be counted as applying to the warranty. Such time shall be determined by use of plant operator's log or other suitable documentation.

If the Contractor falls to perform corrective work in the manner and within the time

stated, the Department of Hawaiian Home Lands (DHHL) may proceed to have such work performed at the Contractor's expense and his sureties will be liable therefor. The DHHL shall be entitled to reasonable attorney's fees and court costs necessarily incurred by the Contractor's refusal to honor and pay such costs of corrective work. The Contractor's performance bond shall continue in full force and effect during the period of this guarantee.

The rights and remedies of the DHHL under this provision do not preclude the exercise of any other rights or remedies provided by this contract or by law with respect to unsatisfactory work performed by the Contractor.

This guarantee shall be deemed supplemental to guarantee provisions provided in other sections of the specifications for the individual units and systems of units so specified.

Guarantee periods shall start at the time of acceptance in writing by the State. All guarantees and warranties shall be made out to the "State of Hawaii." Supplier and subcontractor guarantees shall be co-signed by the Contractor. The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor's own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.

END OF SECTION

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 00850 – DRAWING INDEX

1.01 CONTRACT DRAWINGS AND SPECIFICATIONS

A. The Contractor shall:

1. Check all drawings furnished immediately upon receipt;
2. Compare all drawings and verify the figures before laying out the work;
3. Promptly notify the DHHL of any discrepancies; and
4. Be responsible for any errors which might have been avoided by complying with this paragraph B.

B. Large scale drawings shall govern over small scale drawings. Figures marked on drawings shall be followed in preference to scale measurements.

C. Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. Any omission shall be performed as if fully and correctly set forth and described in the drawings and specifications.

D. The work shall conform to the specifications and the contract drawings on the following index of drawings:

<u>DRAWING #</u>	<u>TITLE</u>
001	TITLE SHEET
002	GENERAL NOTES
C001	SITE PLAN & ESCP DETAILS
C002	ESCP NOTES
A001	FINISH FLOOR PLAN
A002	REFLECTED CEILING PLAN
A003	ROOF PLAN
A004	ELEVATIONS
A005	ELEVATIONS
A006	DOOR & WINDOW SCHEDULES
R001	REFERENCE IMAGES

SECTION 02 41 20
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes removal of designated construction; dismantling, cutting and alterations as indicated and necessary for the completion of the work; disposal of materials; identification of utilities; and protection of items to remain.
- B. Related Requirements:
 - 1. Section 06 10 00 – Rough Carpentry.
 - 2. Section 06 20 00 – Finish Carpentry.
 - 3. Section 07 46 23 – Wood Siding.
 - 4. Section 09 64 00 – Tongue and Groove Wood Flooring.
 - 5. Section 22 42 13 – Commercial Water Closets, Urinals, and Bidets.
 - 6. Section 31 41 00 – Shoring and Bracing.

1.2 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures.
- B. Shop Drawings: Indicate demolition and removal sequence; location and construction of temporary work.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 – Closeout Procedures.
- B. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions.
- C. Operation and Maintenance Data: Procedures for submittals.

1.4 COORDINATION

- A. Section 01 30 00 – Administrative Requirements.
- B. Coordinate demolition with work specified in individual Sections.

1.5 PROJECT CONDITIONS

- A. Conduct demolition to avoid interference with adjacent and occupied building areas.

1.6 ALTERATION PROCEDURES

- A. Assign work of moving, removal, cutting and patching, to trades qualified to perform the work in manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.
- B. Cutting and Removal:

1. Perform cutting and removal as necessary to complete the Work specified in individual Sections.
 2. Remove minimum necessary and in a manner to avoid damage to adjacent work.
 3. Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in straight line at natural point of division.
- C. Protection:
1. Protect existing finishes, equipment, and adjacent work scheduled to remain from damage or disfigurement.
 2. Protect existing and new work from weather and extremes of temperature.
 3. Environmental Conditions:
 - a. Provide temporary enclosure, as necessary to separate work areas from existing building and from areas scheduled for continued operation during the Work.
 - b. Provide weather protection.

PART 2 PRODUCTS

2.1 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING

- A. General: Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work.
- B. Existing Construction: Generally, contract documents will not define products or standards of workmanship present in existing work; the contractor shall identify products by inspection and testing; and workmanship by use of selected existing work as a sample for comparison.
- C. Presence of Product, Finish or Type of Construction: Perform patching, extending or matching as necessary to make Work complete and consistent to identical standards of quality.

PART 3 EXECUTION

3.1 PREPARATION

- A. Notify Engineer a minimum of 72 hours prior to start of Work.
- B. Provide adequate protective materials, methods, and procedures, to prevent damage from weather, vehicles, or pedestrians.
- C. Where demolition work involves the removal of brackets, flanges, fasteners, supports, connectors, concrete, or other means of attaching or securing components to the structure, or where demolition work will otherwise reduce or compromise the integrity, strength, performance, or safety of structure, decking, railings, or other components or safety devices, provide positive methods to prevent access to and use of that area.

- D. Provide temporary railing and guardrails where existing railings and guardrails have been removed. Maintain temporary railing and guardrails in good condition, necessary to provide adequate safety and protection.
- E. Provide, erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, contractor's employees, and existing improvements to remain.
- F. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued owner occupancy.
- G. Protect existing materials and existing improvements that are not to be demolished.
- H. Protect building components during and after demolition from exposure to weather.
- I. Where Work requires the disconnection or repair of utilities, notify affected utility companies before starting work and comply with their requirements.
- J. Mark location and termination of utilities.
- K. Prevent debris from entering floor drains.
- L. Use vacuum-assisted equipment and sprinkle work with water where applicable to prevent the spread of dust. Provide hoses and water connections for this purpose.

3.2 DEMOLITION

- A. Demolish in an orderly and careful manner.
- B. Where demolition of posts, beams, or other structural elements is required, provide adequate shoring and bracing under Section 31 41 00, to prevent movement of the structure.
- C. Remove demolished materials, waste, and debris from site, daily, except where specifically noted otherwise.
- D. Upon completion of work, leave areas in clean condition.
- E. Remove temporary work.

3.3 CLEANING

- A. Section 01 73 00 – Execution.
- B. Progress Cleaning: Perform cleaning during the progress of the work daily and as follows:
 1. Maintain work areas in a clean and orderly condition at all times, to facilitate performance and to eliminate safety hazards.
 2. Spillage, Overspray, or Heavy Collection of Dust: Clean immediately.
 3. Work of Trades: At completion of work of each trade, clean area and make surfaces ready for work of successive trades.

- C. Final Cleaning: At completion of Alteration Work in each area, provide final cleaning and return space to condition suitable for use by Facility.

END OF SECTION

SECTION 02 42 10

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for the following:
 - 1. Recycling nonhazardous construction waste.
 - 2. Disposing of nonhazardous construction waste.

1.2 DESCRIPTION

- A. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.
- B. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
 - 1. Waste Management Plan development and implementation.
 - 2. Techniques to minimize waste generation.
 - 3. Sorting and separating of waste materials.
 - 4. Salvage of existing materials and items for reuse or resale.
 - 5. Recycling of materials that cannot be reused or sold.
- C. At a minimum the following waste categories shall be diverted from landfills:
 - 1. Soil.
 - 2. Inerts (e.g. concrete, masonry and asphalt).
 - 3. Clean dimensional wood and palette wood.
 - 4. Green waste (biodegradable landscaping materials).
 - 5. Engineered wood products (plywood, particle board and I-joists, etc).
 - 6. Metal products (e.g. steel, wire, beverage containers, copper, etc).
 - 7. Cardboard, paper and packaging.
 - 8. Bitumen roofing materials.
 - 9. Plastics (eg, ABS, PVC).
 - 10. Carpet and/or pad.
 - 11. Gypsum board.
 - 12. Insulation.
 - 13. Paint.
 - 14. Fluorescent lamps.

1.3 TERMINOLOGY

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.

- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations. Construction waste includes packaging.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: (1) Removal off-site of construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction. (2) Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: Recovery of construction waste for subsequent processing in preparation for reuse. The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
 - 1. On-site Recycling – Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
 - 2. Off-site Recycling – Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.

- O. Return: To give back reusable items or unused products to vendors for credit.
- P. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

1.4 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures.
- B. For Engineer’s information only, prepare and submit a written demolition debris management plan. The plan shall include, but not be limited to, the following information:
 - 1. Procedures to be used for debris management.
 - 2. Techniques to be used to minimize waste generation.
 - 3. Analysis of the estimated job site waste to be generated:
 - a. List of each material and quantity to be salvaged, reused, recycled.
 - b. List of each material and quantity proposed to be taken to a landfill.
 - 4. Detailed description of the Means and Methods to be used for material handling.
 - a. On site: Material separation, storage, protection where applicable.
 - b. Off site: Transportation means and destination. Include list of materials.
 - 1) Description of materials to be site-separated and self-hauled to designated facilities.
 - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
 - c. The names and locations of mixed debris reuse and recycling facilities or sites.
 - d. The names and locations of trash disposal landfill facilities or sites.
 - e. Documentation that the facilities or sites are approved to receive the materials.
- C. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- D. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

1.6 RECORDS

- A. Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration.

PART 2 PRODUCTS

2.1 MATERIALS

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.
- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

PART 3 EXECUTION

3.1 RECYCLING IMPLEMENTATION

- A. General: Provide handling, containers, storage, signage, transportation, and other items as required during the entire duration of the Contract.
- B. Training: Train workers, subcontractors, and suppliers on proper recycling procedures, as appropriate for the Work occurring at Project site.
- C. Site Access and Temporary Controls: Conduct waste operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be recycled.
 - 2. Comply with Section 01 50 00 – Temporary Facilities and Controls, for controlling dust and dirt, environmental protection, and noise control.

3.2 COLLECTION

- A. Provide necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to

3.3 RECYCLING CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.5 DISPOSAL OF WASTE

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be removed from the site and legally disposed of at a landfill or incinerator acceptable to authorities having jurisdiction.
- C. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on-site.

- D. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- E. Burning: Do not burn waste materials.
- F. Disposal: Remove waste materials from Owner's property and legally dispose of them.

3.6 REPORT

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.
- B. Quantify materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.
- C. Quantify materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.

END OF SECTION

SECTION 02 43 18
FOUNDATION LEVELING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Jacking, shimming, and the addition, modification or replacement of support framing necessary to provide leveling of interior wood flooring.

1.2 RELATED WORK

- A. Section 02 41 20 – Selective Demolition.
- B. Section 03 30 00 – Cast-In-Place Concrete.
- C. Section 06 10 00 – Rough Carpentry.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Lumber: Section 06 10 00.
- B. Metal Plates and Connectors: Section 05 50 00.

PART 3 EXECUTION

3.1 PREPARATION

- A. Section 01 73 00 – Execution.
- B. Remove and dispose of existing wood flooring under Section 02 41 20.
- C. Inspect existing floor framing and structural supports to identify insect activity, damage, or distress. Notify Engineer immediately if such conditions are found.
- D. Using a laser level or other methods, identify the high and low areas of the floor framing.
- E. Perform an evaluation to assess the condition of the foundation, identify the causes of any settlement or unevenness, and determine the appropriate leveling method. Submit proposed method of leveling to Engineer for approval.
- F. Shoring and Bracing Structure:
 - 1. Brace and support structure during leveling operations to prevent movement that may result in damage to the structure or improvements under Section 31 41 00.
 - a. If damage does result to structure or improvements, make necessary repairs or reconstruction, at Contractor's expense, as directed by the Engineer.

3.2 EXECUTION

- A. Leveling Method: Based on the site evaluation and soil analysis, select the appropriate leveling method. These methods may include but are not limited to:
1. Jacking.
 2. Piering.
 3. The removal of existing or installation of new shims.
 4. The addition, modification or replacement of support framing as necessary to provide leveling of interior wood flooring.
 5. Soil Stabilization.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete and reinforcement.
- B. Related Sections:
 - 1. Section 31 23 00 – Earthwork.

1.2 REFERENCES

- A. ACI 301 (American Concrete Institute) – Standard Specification for Structural Concrete for Buildings.
- B. ACI 305R (American Concrete Institute) – Hot Weather Concreting.
- C. ASTM C33 – Concrete Aggregates.
- D. ASTM C94 – Ready-Mixed Concrete.
- E. ASTM C150 – Portland Cement.
- F. ASTM C260 – Air Entraining Admixtures for Concrete.
- G. ASTM C494 – Chemicals Admixtures for Concrete.
- H. International Building Code (IBC), 2006 Edition, and Supplements.

1.3 SUBMITTALS

- A. Mix Design: Submit proposed mix design for Engineer's review and approval a minimum of 7 days prior to placement of concrete.
- B. Product Data: Submit data on attachment accessories and admixtures.
- C. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.4 CLOSEOUT SUBMITTALS

- A. Provide closeout submittals required by individual sections, to include:
 - 1. Action submittals.
 - 2. Closeout submittals.
 - 3. Maintenance material submittals.
- B. Project Record Documents: Accurately record actual locations of embedded utilities and components that are concealed from view.

1.5 COORDINATION

- A. Coordinate the installation of concrete with landscape grading and soil treatment for termite control.
- B. Coordinate the installation of concrete with the placement of accessories.

PART 2 PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Comply with ACI 347R. Provide new or good finish form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other ACI 347R approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Form oils or waxes shall not be used for concrete surfaces intended to be painted.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes not larger than 1-1/2 inches in diameter in concrete surface.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed, unless otherwise noted on the drawings.
- B. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M, and as follows:
 - 1. Steel Reinforcement: ASTM A 615/A 615M, Grade 60, deformed.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I or Type II.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and not detrimental to concrete.

2.4 ADMIXTURES

- A. Air Entraining Admixtures: ASTM C260.
- B. Chemical: ASTM C494, Type A or D, Water Reducing, Retarding and Accelerating.
- C. Pozzolan: ASTM C618.
- D. Plasticizing: ASTM C1017.

2.5 ACCESSORIES

- A. Bonding Agent: Two component modified epoxy resin.

2.6 CONCRETE MIX

- A. Mix concrete in accordance with ACI 301. Deliver concrete in accordance with ASTM C94.
- B. Select proportions for normal weight concrete in accordance with ACI 301 field test data.

- C. Provide concrete to the following criteria:

<u>Unit</u>	<u>Measurement</u>
Compressive Strength (28 day)	4,000 psi
Water/Cement Ratio (maximum)	0.5 by weight (mass)
Aggregate Size (maximum)	3/4-inch

- D. Use calcium chloride only when approved.
- E. Use set retarding admixtures only when approved.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that earthwork is complete and that excavation meets specified lines and elevations.

3.2 PREPARATION

- A. Where new concrete abuts existing concrete, abrade surface of existing concrete to 1/4-inch amplitude.
- B. Moisten base materials and adjoining concrete surfaces immediately prior to concrete placement.
- C. Remove mud, water, wood scraps, and other debris from the areas in which concrete will be placed.
- D. Thoroughly clean the areas to ensure proper placement and bonding of concrete.
- E. Thoroughly clean all transporting and handling equipment.

3.3 PLACEMENT - REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Place reinforcement as indicated on Drawings or as directed by Engineer.
- C. Place, support and secure reinforcement against displacement. Do not deviate from required position.

- D. The use of wood, brick or rock supports and spacers inside the forms is not permitted.
- E. Accommodate placement of formed openings.
- F. Obstructions: Wherever conduits, piping, inserts, sleeves, etc., interfere with the placement of reinforcing steel, obtain the Engineer's approval of method of procedure before and concrete is placed. Bending the bars around openings or sleeves is not permitted.
- G. Maintain concrete cover around reinforcement. If not indicated on Drawings, conform to UBC-97, Section 1907.7 – Concrete Protection for Reinforcement, or as follows:

<u>Item</u>	<u>Coverage</u>
Concrete cast against and permanently exposed to earth:	3 inch (76 mm)
Concrete exposed to earth or weather:	
No. 6 through No. 18 bar	2 inch (51)
No. 5 bar, W31 or D31 wire and smaller	1 ½ inch (38 mm)
Concrete not exposed to weather or in contact with ground:	
No. 14 and No. 18 bar	1 ½ inch (38 mm)
No. 11 bar and smaller	1 inch (25 mm)

- H. Tying: Rigidly and securely tie reinforcing with steel tie wire, with wire ends bent away from concrete surface.
- I. Stagger splices in adjacent bars wherever possible. Standard splices shall be lapped at ends placing bars in positive contact and tightly wire tied. Lapped joints shall be 40 diameters or 2 feet minimum.
- J. Welding: Do not weld joints in reinforcing bars unless required by the Engineer. Comply with the AWS D1.4 for welding reinforcing steel. Before welding, determine the weldability of reinforcing bars by a laboratory chemical analysis of the steel. Only steel complying with the chemical requirements of AWS D1.4 may be welded.
- K. Unless permitted by Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete. Improperly and excessively bent bars shall be replaced.

3.4 PLACEMENT – CONCRETE

- A. Place concrete in accordance with ACI 305 R.
- B. Notify Engineer minimum 24 hours prior to commencement of operations.
- C. Place concrete continuously. Do not interrupt successive placement; do not permit cold joints to occur.
- D. No concrete shall be placed before all work that is to be embedded is set. Reinforcing or other materials that have been set shall not be disturbed.
- E. Subgrade shall be moist but not saturated when concrete is placed.
- F. Place concrete immediately after mixing. No concrete shall be placed or used after it has begun to be set and no retempering will be allowed.

- G. Convey concrete to site and deposit without separation of the ingredients. Do not place concrete with a free unconfined fall in excess of 5 feet or allow concrete to cascade through reinforcing steel in such manner as to promote segregation.
- H. Place concrete continuously. Do not interrupt successive placement. Do not permit cold joints to occur.
- I. Maintain reinforcing in proper position on chairs during concrete placement. Distribution of concrete shall be even and continuous and no pour joints shall show.
 - 1. Work concrete thoroughly around reinforcement and into corners.
 - 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- J. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
- K. Remove splash or accumulations of hardened or partially hardened concrete.

3.5 CONCRETE FINISHING

- A. Finish concrete surfaces in accordance with ACI 301.
- B. Steel Trowel Finish: After vibrating concrete to consolidate, steel trowel wear surface until surface is free of trowel marks and uniform in texture and appearance.
 - 1. Do not air entrain concrete. Do not allow entrapped air content to exceed 3 percent.
- C. Scoring: While concrete is still plastic, score the surface to provide slip-resistant grooves to match size, spacing, and appearance of existing.

3.6 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Cure in accordance with ACI 301.

3.7 FIELD QUALITY CONTROL

- A. Section 01 40 00 – Quality Requirements: Testing and Inspection Services.
- B. Field inspection and testing will be performed in accordance with ACI 301 and under provisions of Section 01 40 00.
- C. Provide free access to Work and cooperate with appointed firm.
- D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

- E. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- F. Three concrete test cylinders will be taken for every 100 or less cu yds (76 or less cu m) of concrete placed.
- G. One slump test will be taken for each set of test cylinders taken.
- H. One air content test will be made for each set of test cylinders taken.

3.8 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately after concrete placement.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.
- C. Patch imperfections in accordance with ACI 301.

3.9 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings.
- B. Related Requirements:
 - 1. Section 06 10 00 – Rough Carpentry.

1.2 REFERENCES

- A. American Iron and Steel Institute (AISI):
 - 1. AISI S100-12 – Specification for Design of Cold-Formed Steel Structural Members.
- B. ASTM International (ASTM):
 - 1. ASTM A27/A27M-13 – Standard Specification for Steel Castings, Carbon, for General Application.
 - 2. ASTM A36/A36M-12 Standard Specification for Carbon Structural Steel.
 - 3. ASTM A47/A47M-99(2014) – Standard Specification for Ferritic Malleable Iron Castings.
 - 4. ASTM A48/A48M-03(2012) – Standard Specification for Gray Iron Castings.
 - 5. ASTM A307-12 – Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
 - 6. ASTM A325 – High Strength Bolts for Structural Steel Joints.
 - 7. ASTM A386 – Zinc-Coating (Hot-Dip) on Assembled Steel Products.
 - 8. ASTM A488/A488M-12 – Standard Practice for Steel Castings, Welding, Qualifications of Procedures and Personnel.
 - 9. ASTM A500/A500M-10a – Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 10. ASTM A501-07 – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 - 11. ASTM A780/A780M-09 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - 12. ASTM A992/A992M-11 – Standard Specification for Structural Steel Shapes.
 - 13. ASTM B221-13 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 14. ASTM B632/B632M-08 – Standard Specification for Aluminum-Alloy Rolled Tread Plate.
 - 15. ASTM F593-02(2008)e1 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - 16. ASTM F1667-15 – Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

- C. American Welding Society (AWS):
 - 1. AWS A2.0 – Standard Welding Symbols.
 - 2. AWS D1.1 – Structural Welding Code.
- D. International Building Code (IBC) 2006 Edition – International Code Council (ICC).
- E. Society for Protective Coatings (SSPC):
 - 1. SSPC-5P3 – Power Tool Cleaning.
 - 2. SSPC-5P6/NACE 3 – Commercial Blast Cleaning.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
- C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- D. Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.
- E. Samples: Submit 2 sets of representative samples of railing materials and finished products as may be requested by Architect.

1.4 QUALITY ASSURANCE

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly.
- B. Disassemble units only as necessary for shipping and handling limitations.
- C. Clearly mark units for reassembly and coordinated installation.

1.5 QUALIFICATIONS

- A. Welders Certificates: Submit under provisions of Section 01 33 00, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.6 COORDINATION

- A. Coordinate the work with installation of associated substrates as the work of this Section proceeds.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.

PART 2 PRODUCTS

2.1 MATERIALS – STEEL

- A. Metal Surfaces, General: For fabrication of miscellaneous metal work, which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Steel Sections: ASTM A36/A36M.
- C. Structural Steel Wide Flanges Shapes: ASTM A992/A992M.
- D. Plates: ASTM A283.
- E. Fasteners:
 - 1. General: Provide zinc-coated fasteners for exterior and interior use. Select fasteners for the type, grade and class required.
 - 2. Bolts and Nuts: Regular hexagon head type, ASTM A325 or ASTM A307, Grade A, except where specified of stainless steel.
 - 3. Plain Washers: Round, carbon steel, ANSI B18.22.1, except where specified of stainless steel.
 - 4. Lock Washers: Helical spring type carbon steel, ANSI B18.21.1.
 - 5. Screws: ANSI B18.2.1, ANSI B18.6.2, and ANSI BI 8.6.3.
 - 6. Toggle Bolts: ANSI B18.2.1 as required.
 - 7. Expansion Anchors: CID A-A-1924 of Group II, Type 4, Class 1. Provide embedment as required by manufacturer.
- F. Welding Materials: AWS D1.1; type required for welded materials.

2.2 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 metal fabrications.
- B. Fabricate items of sizes, shapes and dimensions required. Furnish steel washers.

2.3 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Provide miscellaneous steel framing and supports and other members as required to complete work.
- B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes, plates, and steel bars, for supports, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Galvanize all miscellaneous frames and supports.

2.4 FABRICATION

- A. Fit and shop assemble in largest practical sections for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.

- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface.
 - 1. Make exposed joints butt tight, flush, and hairline.
 - 2. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Provide flush countersunk screws or bolts unobtrusively located consistent with design of component except as noted otherwise.
- F. Supply components required for anchorage of fabrications.
 - 1. Fabricate anchors and related components of same material and finish as fabrication, except as noted otherwise.

2.5 FABRICATION TOLERANCES

- A. Square: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation from Plane: 1/16 inch in 48 inches.

2.6 FINISHES – STEEL

- A. Prepare surfaces to be primed in accordance with SSPC SP 2.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Do not prime surfaces where field welding is required.
- D. Prime paint items with one coat.
- E. Structural Steel Members:
 - 1. Galvanize after fabrication to ASTM A123/A123M.
 - 2. Provide minimum 1.25 oz/sq ft galvanized coating.
- F. Non-structural Items:
 - 1. Galvanize after fabrication to ASTM A123/A123M.
 - 2. Provide minimum 1.25 oz/sq ft galvanized coating.
- G. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide
- H. Touch-Up Primer for Galvanized Surfaces: ZRC cold-galvanizing paint, with 94 percent zinc by weight in dried condition.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 – Execution: Examination.
- B. Verify that field conditions are acceptable and are ready to receive work.
- C. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.3 INSTALLATION – GENERAL

- A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Items set into concrete or masonry.
 - 1. Provide temporary bracing for such items until concrete or masonry is set.
 - 2. Place in accordance with setting drawings and instructions.
 - 3. Build strap anchors, into masonry as work progresses.
- C. Field weld in accordance with AWS standards.
 - 1. Design and finish as specified for shop welding.
 - 2. Use continuous weld unless specified otherwise.
- D. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified.
- E. Spot prime abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.
- F. Isolate aluminum from dissimilar metals and from contact with concrete and masonry materials as required to prevent electrolysis and corrosion.

3.4 SUPPORTS

- A. Anchorage to Structure:
 - 1. Secure supports to concrete inserts by bolting or continuous welding as shown.
 - 2. Locate supports where required for items shown.

3.5 ADJUSTING AND CLEANING

- A. Clean after installation exposed prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the metal manufacture and protect from damage until completion of the project.
- B. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

- C. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

NO OF SECTION

SECTION 06 05 73
WOOD TREATMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preservative treatment for lumber, millwork and plywood.
- B. Related Requirements:
 - 1. Section 06 10 00 – Rough Carpentry.
 - 2. Section 06 20 00 – Finish Carpentry.

1.2 REFERENCES

- A. American Wood Protection Association (AWPA) Publications.
 - 1. P18-07 – Standard for Nonpressure Preservatives.
 - 2. P25-08 – Standard for Inorganic Boron (SBX).
 - 3. P34-09 – Standard for Copper Naphthanate (CuN-W).
 - 4. M4-08 – Standard for the Care of Pressure Treated Wood Products.
 - 5. T1-09 – Processing and Treatment Standard, Use Category System.

1.3 DEFINITIONS

- A. Certification: Certification that treatment meets or exceeds the requirements set forth by the preservative manufacturer and approved by the Department of Planning & Permitting, City & County of Honolulu.
- B. Markings: Each piece of pressure treated lumber and plywood shall be made permanently identifiable with a distinct colorant or label representative of the type and quality of treatment.
- C. Treatment Manufacturer: Entities who market specific chemical formulations and methods of treatment under specific proprietary names.
- D. Treatment Plant: Entities that possess the physical facilities to treat wood products in accordance with the Treatment Manufacturer's requirements and is a certified Applicator of the Treatment Manufacturer.

1.4 SUBMITTALS

- A. Product Data: Submit treatment data, including chemical formulations, MSDS sheets, treatment methods, and expected penetration and retention rates for each wood species required to be treated in Project.
- B. Manufacturer's Instructions: Submit manufacturers written instructions for handling, disposing, and field treating treated lumber.
- C. Certificate of Treatment: Submit certificate of treatment showing compliance with these specifications, both as to kiln drying and type of treatment performed, including dip treatment.
- D. Certification: Submit written certification that wood products used and left in place on this job was treated in accordance with these specifications and that cuts

and penetrations made subsequent to the treatment were coated with preservatives in compliance with the requirements of this Section.

- E. Material Safety Data Sheet (MSDS): Submit MSDS for products used and keep one posted at the project site.
- F. Treatment Schedule: Prior to treatment, submit complete list of wood products and the proposed treatment material proposed for each. Include itemization by species if treated with different preservative material.
- G. Contract Closeout Submittals: Section 01 77 00 – Closeout Procedures.
 - 1. Project Record Documents
 - 2. Warranties.

1.5 QUALITY ASSURANCE

- A. Section 01 40 00 – Quality Requirements.
- B. Treatment Intent: Treatment to be types effective in Hawaii against wood decaying fungi growth and against wood destroying insects. Insecticide treatments shall be specifically effective against dry wood termite species and subterranean termite species, including *Coptotermes formosanus*.
- C. Preservatives containing arsenic such as Chromated Copper Arsenate (CCA) and Ammoniacal Copper Zinc Arsenate (ACZA) shall not be used.
- D. Perma-Clear 65 or other zinc naphthanate and permethrin products shall not be used.
- E. Comply with State OSHL and pollution control regulations of the State of Hawaii and EPA.
- F. Do not use treatments containing EPA banned chemicals.
- G. Treatment materials shall be specifically recommended by the manufacturer for species of wood, use intended, and exposure indicated.
- H. Pressure Treatment:
 - 1. Standards: American Wood Protection Association (AWPA) Standards U1 and T1.
 - 2. Treatment Certification: Submit Treatment Plant’s written certification that Project products have been treated in conformance with Treatment Manufacturer’s and Contract requirements. Certificates shall indicate each treated specie and related standards, treatment process, penetration, and retention rates.
 - 3. Identification Indicating Treatment Quality: Comply with following:
 - a. Insecticide Pressure Treatment:
 - i) Provide certificate from treatment plant. Provide “Hawaii Standard” designation wherever possible.
 - ii) Color dye used will be acceptable visual representation of treatment of wood products, but shall not relieve Treatment Plant for providing proper penetration and retention rates.
 - iii) Imprint wood products with Treatment Manufacturer’s quality stamp.

I. Identification Marks:

1. Apply marks such as those which identify the treatment products, company, or certify compliance, to products which are concealed in the Work or where such products are scheduled to receive opaque coatings.
2. Those products in which identification marks would otherwise be exposed to view in the work, such as those to receive transparent coatings, are to be left off the product.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Meet the requirements of AWPA Standard M4.
- B. Storage: Store treated products off ground, protect from moisture and provide ventilation.
- C. Keep treated lumber dry through delivery, fabrication, and erection.

1.7 WARRANTY – PRESERVATIVE TREATED PRODUCTS

- A. Provide Contractor's written material and labor warranty to replace treated wood attacked by subterranean termites within a period of five years from the date of project acceptance, up to a total cost of \$5,000.00, or is attacked by dry wood termites or deteriorates due to dry rot within the first five years of the project acceptance date.
- B. The Surety shall not be held liable beyond two years of the project acceptance date.

PART 2 PRODUCTS

2.1 GENERAL

- A. Wood treated with oil-borne preservatives shall be kiln-dried before treatment to an average moisture content of 12 percent to 15 percent per AWPA standards.
- B. Wood treated with water-borne preservatives (with the exception of Hi-Bor (DOT) treated wood) shall be air dried or kiln-dried before treatment to an average moisture content of 18 percent or less per AWPA standards.
- C. Wood treated with Hi-Bor (DOT) shall be treated as wet as possible.
- D. Lumber shall be milled to finish size and shape prior to treating, and it shall be treated before assembly. Plywood may be treated in regular panel sizes.

2.2 MATERIALS

- A. Water-Borne Preservatives: Water-Borne Preservatives shall be Hi-Bor (DOT' in accordance with American Wood Preservers Association (AWPA) Standard PS "Standards for Waterborne Preservatives". Preservatives shall be EPA registered. (Hawaii use only treatment is not acceptable).
 1. Water-Borne Preservatives used to coat end cuts and penetrations in HI-BOR (DOT) treated wood shall be Clear-Bor F.T. or an equivalent solution of 10 percent inorganic boron.

2. The end coating solution must be approved and labeled by the Environmental Protection Agency and must be accepted by the State of Hawaii, Department of Agriculture, Pesticides Branch, for this purpose.
 3. Treatment solution shall have a colorant added which will tint the wood surface to indicate treatment where wood will be unexposed. The Contractor shall be held responsible for all bleed through of dye.
- B. Oil-Borne Preservatives: For interior finish trim only. Oil-Borne Preservatives shall be TRIB 11 (0.50 percent by weight chlorpyrifos, 0.75 percent by weight 3-iodo-2-propynyl butyl carbamate [IPBC]) or DAP Inc. "Premium Woodlife" (for dip treatment only), manufactured to the manufacturer's quality control and EPA registered. The solvent used in formulating the preservative solution shall meet the requirements of AWWA hydrocarbon solvent Type C, Standard P9 - "Standard for Solvents for Organic Preservative Systems".
- C. Fire Retardant Treatment:
1. Fire retardant preservative for interior use shall be DRICON FRT as manufactured by Koppers Company, Inc., Flameproof LHC by Osmose Wood Preserving Company, Inc., Protex by Hoover Universal Wood Preserving Division, or approved equal.
 - a. Preservative must be certified as resistant to attack by termites, rot, corrosiveness, and hydroscopicity.
 - b. Preservative shall comply with the requirements of UL 723, ASTM E 84, NFPA 255.
 - c. Moisture content shall be in accordance with the following:
 - i) Lumber: AWWA Standard C20 "Structural Lumber - Fire Retardant Treatment by Pressure Processes".
 - ii) Plywood: AWWA Standard 027 "Plywood - Fire Retardant Treatment by Pressure Processes".
 2. Fire Retardant preservative for exterior use shall be NCX as manufactured by Koppers Company, Inc. or approved equal.
 - a. Preservative shall conform of ASTM D 2898, meet the requirements of Factory Mutual and UL and shall bear the quality mark of both.

PART 3 EXECUTION

3.1 WOOD PRESERVATION WITH WATER-BORNE PRESERVATIVES

- A. Unless otherwise stipulated, all lumber and plywood shall be pressure treated.
- B. Lumber and plywood, except as stipulated in paragraphs entitled "Wood Preservation By Pressure Treatment With Oil-Borne Preservatives" and "Wood Preservation By Dip Treatment" below, shall be treated with Hi-bor (DOT), using the full cell pressure method in conformance with Hi-Bor (DOT), using the full cell pressure method in conformance with AWWA Standard C1 - "All Timber Products -Preservative Treatment by Pressure Processes". Lumber and plywood treated with Hi-Bor (DOT)) shall attain the following penetration and retention requirements:

1. Lumber (DOT): 0.40-inch penetration and 0.45 pound per cubic foot retention.
2. Plywood (DOT): Full penetration and 0.45 pound per cubic foot retention.
3. Assey Zone: 1/64-inch to 3/4-inch deep.

3.2 WOOD PRESERVATION BY PRESSURE TREATMENT WITH OIL-BORNE PRESERVATIVES

- A. Exposed lumber 1-1/2 inch (net thickness) and over that will be unpainted or receive a clear finish shall be unincised and pressure treated in accordance with the process specifications noted in the latest edition of AWWPA Standards *C1*, *C2*, and *C9*.
- B. Wood shall be kiln-dried to an average moisture content of 12 to 15 percent per AWWPA standards prior to treatment.
- C. Treated wood shall attain the following net retention requirements: 0.0175 pound of Chlorpyrifos per cubic foot of wood and 0.035 pound of 3-Iodo-2 propynyl butyl carbamate per cubic foot of wood.
- D. Lumber and plywood shall be thoroughly dried and virtually odor-free prior to installation.

3.3 WOOD PRESERVATION BY DIP TREATMENT

- A. All finish lumber under 1-1/2 inch net thickness; 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 shall be immersion treated for a minimum period of 15 minutes in any of the preservatives listed in paragraph entitled "Oil-Borne Preservatives" above or in accordance with the requirements of the Window and Door Manufacturers Association (WDMA) Industry Standard I.S. 4 or in a solution of 1 quart chlopyrifos in 55 gallons of a 0.50 percent IPBC solution.
- B. All lumber and plywood shall be thoroughly dried and virtually odor-free prior to installation.

3.4 WOOD PRESERVATION WITH FIRE RETARDANT PRESERVATIVES

- A. All lumber and plywood as required by Code or specifically indicated on the Drawings shall be treated with fire retardant preservative in accordance with AWWPA Standards *C20* and *C27*. Pressure impregnate with fire retardant chemicals to meet the follow criteria:
 1. Flame Spread Rating: 25 or less; UL 723, ASTM E 84, or NFPA 225
 2. Finished product must be stainable and paintable adversely affect bond or color of final finish.
- B. Each piece of fire retardant treated lumber or plywood shall be provided with a UL label. Material to be used in exposed finish work shall be labeled with a pressure sensitive tag or otherwise identified as fire retardant treated material. Do not mark or stamp material to be exposed in the finish work.

- C. Fine hardwoods may be finished with FRT clear brush-on type materials and overcoated, where material may be handled, with clear spar varnish, subject to Architects approval.

3.5 INSTALLATION

- A. Wherever it is necessary to end cut or penetrate into (such as by drilling or notching) treated wood on the job, all such cuts and penetrations shall be treated in accordance with AWWPA Standard M4 using two heavy brush coats of a treating solution noted in the following schedule.
- B. Where allowed by preservative manufacturer, spray bored holes with "Hudson Bay" type sprayer, 2 coats. Exception: Cuts and penetrations made in Hi-Bor (DOT) treated wood 2 inches or less in nominal thickness need not be field treated.

INITIAL WOOD TREATMENT	FIELD TREATMENT
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TRIB II	Wolman (R) Clear
Hi-Bor (DOT)	Clear-Bor F.T. (with colorant added where colorant used in initial treatment.)

- C. Hi-Bor (DOT) 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 finishing material.
- D. Comply with instructions and recommendations of the preservative treatment manufacturer and wood treatment applicator.

3.6 PLANT TREATMENT

- A. Treat items after fabrication wherever possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment, or as specified.
- B. Subsequent to treating, dry at the plant all treated lumber and plywood to an average moisture count not to exceed 19 percent for framing lumber, 18 percent for plywood, and 15 percent for finish lumber.
- C. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

3.7 FIELD APPLICATION

- A. Thoroughly treat all cuts, holes, notches, splits, etc. made during construction with the concentrated preservative used in the treating plant treatment in compliance with AWWPA M-4.
- B. Follow manufacturer's safety precautions for cutting and handling treated wood products.

3.8 CLEAN UP

- A. Section 01 74 19 – Construction Waste Management and Disposal.

- B. Dispose of treated wood in a sanitary landfill or other authorized disposal area.
Do not burn treated wood.

END OF SECTION

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood framing, sheathing, blocking, and supports; fasteners, connectors, holdowns.
- B. Related Requirements:
 - 1. Section 05 50 00 – Metal Fabrications.
 - 2. Section 06 05 73 – Wood Treatment.
 - 3. Section 07 90 00 – Sealants.

1.2 REFERENCES

- A. American Wood Preservers Association (AWPA):
 - 1. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties – Preservative Treatment by Pressure Processes; American Wood-Preservers' Association
 - 2. AWPA C9 - Plywood – Preservative Treatment by Pressure Processes; American Wood-Preservers' Association
 - 3. AWPA C27 - Plywood – Fire-Retardant Treatment by Pressure Processes; American Wood – Preservers' Association
 - 4. AWPA U1 – Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association
- B. The American Plywood Association (APA) U.S. Product Standard PS 1-95: "For Construction & Industrial Plywood with Typical APA Trademarks."
- C. AWPA C1 (American Wood Preservers Association) – All Timber Products - Preservative Treatment by Pressure Process.
- D. PS 1 – Construction and Industrial Plywood (1995); National Institute of Standards and Technology (Department of Commerce).
- E. PS 20 – American Softwood Lumber Standard (2005); National Institute of Standards and Technology (Department of Commerce)
- F. WWPA (Western Wood Products Association) – Lumber Grading Rules.

1.3 SUBMITTALS

- A. Product Data: Submit technical data on plywood and wood preservative materials.

1.4 QUALITY ASSURANCE

- 1. Grading and Inspection:
- 2. Grade marking: All lumber shall be graded in accordance with the latest grading rules of the Lumber Manufacturer's Inspection bureau under whose jurisdiction the lumber is manufactured and sold. Each piece of lumber shall bear the grade and trademarks of a competent and reliable

organization whose regular business is to establish lumber grades. West Coast Lumber Inspection Bureau Rules #17 Latest Edition shall govern grading of Douglas Fir.

3. Certificate of Inspection: In lieu of the grade marking called for above, it will be acceptable if each shipment of lumber is accompanied by a certificate of inspection issued by a competent and reliable organization whose regular business it is to establish lumber grades.
- B. Except when lower moisture content is required by grade specified at time of use, maximum moisture content of lumber shall not exceed 19 percent by weight.
 1. Boards and dimension lumber 4" and thinner which include the designation "S-DRY" in grade stamp, will be considered to meet said moisture content requirements, if such lumber has been stored, transported or handled after grading to minimize exposure to conditions that could increase its moisture content.
 2. Lumber certified as air dried to a moisture content not exceeding that specified will be considered to meet moisture content requirement, provided such lumber after being certified, has been stored, transported or handled in a manner to minimize exposure to conditions that could increase its moisture content and provided further, that each load delivered to job site is accompanied by such certification.
 - C. Lumber specified by grade to have moisture content below 19 percent shall be stored, transported and handled in a manner as to minimize exposure to conditions that could increase its moisture content. Moisture content at time of use shall not exceed limit established by grade specified.
 - D. Lumber not designated "S-DRY" or certified air dried to specified moisture content, and all lumber delivered to job site in wet condition, shall be stick-piled and stored for proper ventilation and drying, and shall only be used as released by the Architect.
 - E. Sustainable Harvested Wood: Certification Organizations shall be accredited by the Forest Steward-ship Council.
 - F. Recycled Content Materials: Where recycled lumber materials are used for structural applications, include lumber certification and quality grading.
 - G. Engineered Wood Products:
 1. Determine formaldehyde concentrations in air from wood products under test conditions of temperature and relative humidity in accordance with ASTM D6007 or E1333.
 2. Determine Volatile Organic Compounds VOC, excluding formaldehyde, emitted from manufactured wood-based panels in accordance with ASTM D6330.
 - H. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - I. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWPA standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver undamaged products to site in manufacturer's sealed containers or wrappings with legends in-tact. Store on site secure from weather, soil and physical damage.
- B. Store lumber and timber framing off the ground, on sills, located in a well-drained area, and stacked to insure proper ventilation. Protect from moisture and the elements.
- C. Store rough hardware, carpenters iron and miscellaneous items off the ground, in weatherproof sheds; protect metal items from rust.
- D. Protect fire retardant materials against high humidity and moisture during storage and erection.
- E. Identify materials improperly stored or that become wet, warped, or damaged. Conspicuously mark as rejected, and remove from the job site.

1.6 COORDINATION

- A. Coordinate the work with installing associated metal flashings, penetrations, or other components, as the work of this Section proceeds.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.
- B. Take measurements and field-verify conditions and dimensions prior to construction and/or fabrication.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

- A. Lumber Grading Rules: WWPA.
- B. Miscellaneous Framing: Douglas Fir-Larch species, S4S, grade No. 1 or better, 19 percent maximum moisture content after treatment, pressure preservative treated.
- C. Plywood: APA/EWA Rated Sheathing, 1/2-inch thickness, 4 ft by 8 ft sheets, Structural I, Grade A-C; Exposure Durability 1; sanded.
- D. Lumber for Shimming, Blocking, and concealed framing: Softwood lumber of Douglas Fir-Larch species.

2.2 ROUGH HARDWARE AND ADHESIVES:

- A. Holdowns:
 - 1. Manufacturer: Simpson Strong-Tie, 1-800-599-5099, www.strong-tie.com, or approved equal.
 - 2. Products:

- a. HDU: Single-piece formed holddown, formed from No. 14 gage galvanized steel, with pre-punched holes for SDS wood screws, and a base plate formed from No. 3 gage galvanized steel.
- B. Connectors:
 1. Manufacturer: Simpson Strong-Tie, 1-800-599-5099, www.strong-tie.com, or approved equal.
 2. Products: As scheduled on Drawings.
- C. Anchors, Plates, Angles: Section 05 50 00 – Metal Fabrications.
- D. Anchor Adhesive: SET-XP High Strength Epoxy-Tie Anchoring Adhesive, Simpson Strong-Tie.
- E. Fasteners:
 1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, stainless steel elsewhere.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.

3.2 INSTALLATION – WOOD CONSTRUCTION

- A. Set structural members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Place horizontal members, crown side up.
- D. Construct load-bearing framing members full length without splices.
- E. Fit boards tightly together.
- F. Provide appropriate connectors at wood-to-wood junctures. Do not toenail unless specifically permitted.
- G. Install fasteners flush with the surface unless specified otherwise.
- H. Blunt nail tips or drill pilot holes as necessary to prevent splitting of wood. Replace split boards with new.
- I. Predrill pilot holes for screws. Bore holes for screw the same diameter and depth as shank, with hole for threaded portion not larger than diameter of thread base. Driven screws will be rejected and damaged wood will be replaced.
- J. Treat site-sawn cuts with preservative wood treatment prior to assembly.

3.3 INSTALLATION – HARDWARE

- A. Install hardware in accordance to manufacturer's instructions or as shown on Drawings.

- B. For manufactured connectors, use manufacturer's supplied fasteners. Install the quantity, type and size of fastener in the correct holes for the connector specified.
- C. Holdowns: Install in accordance with manufacturer's instructions. Refer to Section 05 50 00 – Metal Fabrications for anchors, threaded rods.

3.4 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply two coats of preservative treatment on site-sawn cuts.
- C. Allow preservative to dry prior to priming and erecting members.

3.5 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/16 inch.

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes wood framing, sheathing, and trim.
- B. Related Sections:
 - 1. Section 02 41 20 – Selective Demolition.
 - 2. Section 06 05 73 – Wood Treatment.
 - 3. Section 07 46 00 – Siding.
 - 4. Section 07 92 00 – Sealants.
 - 5. Section 09 91 13 – Exterior Painting.
 - 6. Section 09 91 23 – Interior Painting.

1.2 REFERENCES

- A. ASTM International (ASTM):
- B. ASTM F593-17 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- C. ASTM F1667-15 – Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- D. APA/EWA (APA/The Engineered Wood Association) – Certification.
- E. AWI – Quality Standards.
- F. AWPA C1 (American Wood Preservers Association) – All Timber Products - Preservative Treatment by Pressure Process.
- G. WWPA (Western Wood Products Association) – Lumber Grading Rules.

1.3 SUBMITTALS

- A. Provide technical data for products used in this Section.
- B. Provide a detailed cost breakdown for by Unit for Work of this Section.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with AWI quality standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in covered location out of direct sunlight.
- B. Store products to prevent warping, checking, or other damage.
- C. Identify materials improperly stored or that become wet, warped, or damaged. Conspicuously mark as rejected, and remove from the job site.

1.1 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply products during inclement weather, or when inclement weather is expected within four hours.
- B. Do not apply products when relative humidity is outside the humidity range required by the manufacturer.
- C. Do not apply products to surfaces that are not dry.
- D. Do not apply products when surface or ambient temperatures are outside the ranges required by the manufacturer.
- E. Maintain on-site equipment, such as plastic sheeting and tarps, to provide emergency temporary protection in the event of sudden storms or inclement weather.

1.6 COORDINATION

- A. Coordinate the work with installing associated metal flashings, penetrations, or other components, as the work of this Section proceeds.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.
- B. Take measurements and field-verify all conditions and dimensions prior to construction and/or fabrication.

1.8 WARRANTY

- A. Composite Materials: Provide manufactures warranty against rot, decay, splitting, checking, splintering, fungal damage, and termite damage for a period of 10 years from the date of installation.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

- A. Lumber Grading Rules: WWPA.
- B. Miscellaneous Framing: Douglas Fir-Larch species, S4S, grade No. 1 or better, 19 percent maximum moisture content after treatment, pressure preservative treated.
- C. Plywood: APA/EWA Rated Sheathing, 5/8-inch thickness, 4 ft by 8 ft sheets, Structural I, Grade A-C; Exposure Durability 1; sanded.

2.2 ACCESSORIES

- A. Lumber for Shimming, Blocking, and concealed framing: Softwood lumber of Douglas Fir-Larch species, Construction Grade.
- B. Connectors:
 - 1. Manufacturer: Simpson Strong-Tie, 1-800-599-5099, www.strong-tie.com.
- C. Fasteners

1. General: Provide stainless steel fasteners for all locations meeting ASTM F593.
 2. Nails: 304 stainless steel, ring shank, blunt diamond point, 0.225-inch diameter head, 0.095-inch minimum diameter shank, of sufficient length to penetrate 1-1/2 inch minimum into solid framing and or through sheathing.
 3. Screws: #8 type 316 stainless steel, of sufficient length to penetrate 1-1/2 inch minimum into solid framing.
 4. Bolts and Nuts: Regular hexagon head type, ASTM F593.
 5. Plain Washers: Round, stainless steel.
 6. Lock Washers: Helical spring type stainless steel, ANSI B18.21.1.
 7. Toggle Bolts: ANSI B18.2.1 as required.
 8. Expansion Anchors: CID A-A-1924 of Group II, Type 4, Class 1. Provide embedment as required by manufacturer.
 9. Angles, Brackets: Nails, hot-dipped galvanized, as recommended or provided by hardware manufacturer; size to suit application.
 10. Wood Framing: Nails; hot-dipped galvanized; size to suit application.
- D. Sealant: Specified in Section 07 90 00.
- E. Primer: Specified in Section 09 91 13.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 – Execution: Examination.
- B. Verify adequacy of backing and support framing.

3.2 GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated.

3.3 INSTALLATION – WOOD CONSTRUCTION

- A. Set and secure materials and components in place, plumb and level.
- B. Carefully scribe work abutting other components, with maximum gaps of 1/16-inch. Do not use additional overlay trim to conceal larger gaps.
- C. Use whole boards only. Do not splice.
- D. Fit boards tightly together.
- E. Install fasteners flush with the surface unless specified otherwise. Pre-drill holes.
- F. Blunt nail tips or drill pilot holes as necessary to prevent splitting of wood. Replace split boards with new.

- G. Provide appropriate connectors at wood-to-wood junctures. Do not toenail.
- H. Space pickets uniformly at less than 4 inches o.c. Secure pickets with two stainless steel screws at each fastening location.
- I. Sand sawn edges to remove burrs and rough edges.
- J. Treat site-sawn cuts with preservative wood treatment prior to assembly. Allow preservative treatment to dry thoroughly before priming.
- K. Back prime concealed sides and edges of boards with two coats of wood primer, under Section 09 91 13.

3.4 SITE APPLIED WOOD TREATMENT

- A. Comply with requirements of Section 06 05 73.
- B. Apply preservative treatment in accordance with manufacturer's instructions.
- C. Brush-apply two coats of preservative treatment on site-sawn cuts.
- D. Allow preservative to dry prior to priming and erecting members.

3.5 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/8 inch.

END OF SECTION

SECTION 07 01 50.19
PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal of existing roof coverings, accessories, and attachments, in preparation for installation of a new roof system.
- B. Related Sections:
 - 1. Section 02 41 20 – Selective Demolition.
 - 2. Section 02 42 10 – Construction Waste Management and Disposal.
 - 3. Section 06 10 00 – Rough Carpentry.
 - 4. Section 07 31 29 – Wood Shakes.

1.2 ENVIRONMENTAL REQUIREMENTS

- A. Do not remove existing roofing membrane when weather conditions threaten the integrity of the building contents or intended continued occupancy.
- B. Maintain continuous temporary protection during and prior to installation of new roofing system.

1.3 COORDINATION AND SCHEDULING

- A. Schedule work of this section to coincide with commencement of installation of new roofing system.
- B. Remove only existing roofing materials that can be replaced with new materials the same day or as the weather will permit.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Temporary Protection: Sheet fiber reinforced plastic. Provide weights to retain sheeting in position.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions are in accordance with Drawings.
- B. Verify that existing roof surface is clear and ready for work of this Section.

3.2 PREPARATION

- A. Notify Engineer a minimum of 7 days prior to start of work.
- B. Provide, erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, Owner, Contractor's employees, and existing improvements to remain.
- C. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise.

- D. Erect and maintain weatherproof closures for exterior openings.

3.3 MATERIALS REMOVAL

- A. Coordinate work of this section with Section 02 41 20 – Selective Demolition and Section 07 31 29 – Wood Shakes.
- B. Conduct demolition to avoid interference with adjacent and occupied building areas.
- C. Remove or hammer down old nail and staple heads flush with the surface.
- D. Protect existing materials and existing improvements that are not scheduled for demolition.
- E. Remove existing roofing materials from designated roofs, to include edge flashings, valley flashings, step flashings, counter flashings, vent stack flashings, vent hoods, wood shakes, roofing membranes and other existing roofing materials down to structural deck.
- F. Remove wall coatings, sealants and waterproofing to structural substrate to permit access and installation of new flashing and sealants.
- G. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect in accordance with requirements of Section 01600.
- H. After removal is complete, sweep deck surface clean of loose matter. Remove loose refuse and dispose off site.

3.4 TEMPORARY PROTECTION

- A. Protect finished Work.
- B. Provide temporary protective sheeting over uncovered deck surfaces.
- C. Retain sheeting in position with weights or temporary fasteners.
- D. Provide for surface drainage from sheeting to existing drainage facilities.
- E. Do not permit traffic over unprotected or repaired deck surface.

END OF SECTION

SECTION 07 31 29

WOOD SHAKES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood shakes; moisture shedding interlayment.
- B. Related Sections:
 - 1. Section 02 41 20 – Selective Demolition.
 - 2. Section 06 05 73 – Wood Treatment.
 - 3. Section 06 10 00 – Rough Carpentry.
 - 4. Section 07 01 50.19 – Preparation for Reroofing.
 - 5. Section 07 62 00 – Sheet Metal Flashing and Trim.

1.2 REFERENCES

- A. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials.
- B. NRCA (National Roofing Contractors Association) – Steep Roofing Manual.
- C. RCSHSB (Red Cedar Shingles and Handsplit Shakes Bureau) – Grading Rules for Red Cedar Shingles and Handsplit Shakes.
- D. UL 580 (Underwriters Laboratories, Inc.) – Tests for Wind Uplift Resistance of Roof Assemblies.
- E. UL 790 (Underwriters Laboratories, Inc.) – Tests for Fire Resistance of Roof Covering Materials.

1.3 SUBMITTALS

- A. Product Data: Submit data indicating material characteristics, performance criteria, and limitations.
- B. Manufacturer's Installation Instructions: Submit installation criteria and procedures.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALIFICATIONS

- A. Roofing Contractor:
 - 1. Company specializing in performing the work of this Section, as a licensed business for at least five years, with a minimum of five years documented experience.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Steep Roofing Manual and RCSHSB instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Stand roll materials on end, with selvage edges up.
- D. Identify materials improperly stored or that become wet, warped, or damaged. Conspicuously mark as rejected, and remove from the job site.
- E. Store metal flashing in such a way as to prevent wrinkling, twisting, scratching and other damage.
- F. Materials stored on roof levels for immediate use shall be:
 - 1. Distributed to prevent concentrated loads that may impose excessive strain on deck or structural members.
 - 2. Positively secured to prevent displacement by excessive wind forces.

1.7 WARRANTY

- A. Provide Manufacturer's 50 Year Warranty for wood shakes.
- B. Provide Manufacturer's 50 Year Warranty for fire treatment.
- C. Provide Contractor's 5-Year, Leak-free, Material and Labor Warranty.

1.8 EXTRA MATERIALS

- A. Supply 5 bundles of extra field shakes.
- B. Supply 2 bundles of extra hip and ridge shakes.

PART 2 PRODUCTS

2.1 WOOD SHAKES

- A. Manufacturers:
 - 1. Watkins Sawmills, Ltd., or approved equal.
 - 2. Substitutions: Or approved equal.
- B. Wood Shakes:
 - 1. Model: 3/4" Heavy; handsplit and resawn, Class B Fire Treated.
 - 2. Size: 24 inches long by 3/4 inch thick at butt ends
 - 3. Grade: Premium Grade (100% Edge Grain) in accordance with RSCHSB.
 - 4. Hips and Ridge Caps: No. 1, 24" Heavy Shake Ridge, Class B Fire Treated.
- C. Starter: Model: #2, 18" Perfection Cedar Shingle, Class B Fire Treated.

3.2 ACCESSORIES

- A. Interlayment: ASTM D226, Type II (No. 30) Shake Liner unperforated asphalt saturated felt, 22-inch width.

- B. Underlayment: ASTM Type I (No. 30) Shake Liner unperforated asphalt saturated felt, 36-inch width.
- C. Flashing Membrane: Jiffy Seal JS45, 12 wide, foil-backed, peel-and-stick, self-adhered membrane.
- D. Nails: Bostitch, ring shanked, blunt diamond point, 0.195 diameter head, 0.090 diameter shank, 304 stainless steel, of sufficient length to penetrate 3/4-inch minimum into roof sheathing or through.
- E. Metal Flashing: Section 07 62 00.
- F. Sealant: Section 07 90 00.
- G. Site Preservative Treatment: Section 06 05 73.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect exposed framing, sheathing, and structural members for damage, termite infestation, or rot. Notify Engineer immediately if any of preceding conditions are discovered. Do not proceed with roofing operations until defective conditions are corrected.
- B. Verify plumbing stacks and roof penetrations are secured in place and flashed to deck surface.
- C. Verify roof openings are correctly framed and solidly set.
- D. Verify that site conditions meet the requirements of the shake manufacturer for issuance of manufacturer's full warranty. Notify Engineer immediately if conditions exist which may deny, restrict, or otherwise adversely affect full coverage of shake product under manufacturer's warranty.

3.2 PREPARATION

- A. Provide written notice to Engineer of scheduled tear-off a minimum of 7 days prior to commencement of work.
- B. Verify that existing roofing materials have been removed and the deck has been cleaned in accordance with Section 07 01 50.19.
- C. Inspect to verify that existing spaced sheathing is uniformly installed at 10-inches o.c. Fill in additional sheathing boards where necessary to provide firm bearing at 10-inches o.c. under Section 06 10 00.
- D. Inspect to verify that existing sheathing is in good condition and acceptable for the subsequent installation of roofing materials.
- E. Verify that site-applied insecticide treatment has been completed under Section 06 05 73.

3.3 INSTALLATION – INTERLAYMENT AND UNDERLAYMENT

- A. At rakes and eaves, install one initial layer of 36 inch wide, Type II (No. 30), asphalt saturated, non-perforated underlayment. Install prior to Shake Liner and drip edge metal flashing.
- B. Install one layer of 22 inch wide, Type II (No. 30), Shake Liner, interlayment perpendicular to slope of roof, with end laps a minimum of 6 inches, and weather-lapped to reveal 10-inch exposure. Extend Shake Liner a minimum of 4 inches up vertical walls beneath counter flashing.
- C. Verify that top edge of interlayment is supported on sheathing. Where top edge of interlayment is not supported, install additional sheathing boards.

3.4 INSTALLATION – METAL FLASHING

- A. Install in accordance with Section 07 62 00 – Sheet Metal Flashing.

3.5 INSTALLATION – SHAKES

- A. Lay shakes and integral interleaved protective interlayment in accordance with RCSHSB requirements to produce straight coursing pattern with 10-inch weather exposure to produce a double thickness over roof area.
- B. Provide starter course of wood shingles at eaves.
- C. Position field shakes to provide minimum 1/4-inch to maximum 1/2-inch gap between adjacent shakes.
- D. Project starter and first course of shakes 1 inch (25 mm) beyond face of fascia boards.
- E. Adjust spacing of courses to provide a uniform, consistent exposure at top course.
- F. Fasten each shake with two fasteners, positioned 1 to 1-1/2 inches from each side and between 1 and 1-1/2 inches above the exposure line.
 - 1. Provide 100 percent more fasteners in first three courses of shakes at eaves and in 3 feet wide perimeter at rakes, ridge, and corners.
- G. Drive fasteners flush with the surface, penetrating through the shake below. Do not underdrive or overdrive.
- H. Drive fasteners 3/4 inch minimum into supporting sheathing or through.
- I. Do not install two fasteners in line in the same grain; offset nails 1inch minimum.
- J. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of flashing.
- K. Complete installation to provide weather tight service.

3.6 SITE-APPLIED WOOD TREATMENT

- A. Apply preservative sealer in accordance with manufacturer's instructions.
- B. Brush apply one coat of preservative treatment on wood in contact with roofing and related metal flashings.
- C. Treat site-sawn cuts.

D. Allow preservative to dry prior to erecting members.

3.7 FIELD QUALITY CONTROL

A. Provide field inspection by the Roofing Manufacturer's Representative at no additional cost to the Owner.

B. Correct identified defects or irregularities.

3.8 CLEANING

A. Remove markings, labels, tags, staples, nails, and debris from finished surfaces.

B. In areas where finished surfaces are soiled by work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.

C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.9 PROTECTION

A. Protect building surfaces against damage from roofing work.

B. Where traffic must continue over finished roof, protect surfaces.

END OF SECTION

SECTION 09 64 20
WOOD FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Site finished, tongue and groove, wood board siding; nailed.
- B. Related Work:
 - 1. Section 02 41 20 – Selective Demolition.
 - 2. Section 06 05 73 – Wood Treatment.
 - 3. Section 06 10 10 – Rough Carpentry.
 - 4. Section 06 20 00 – Finish Carpentry.
 - 5. Section 09 91 13 – Exterior Painting.

1.2 REFERENCES

- A. American Wood Preservers Association (AWPA):
 - 1. AWPA U1 – Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association
- B. AWPA C1 (American Wood Preservers Association) – All Timber Products - Preservative Treatment by Pressure Process.
- C. PS 20 – American Softwood Lumber Standard (2005); National Institute of Standards and Technology (Department of Commerce
- D. WWPA (Western Wood Products Association) – Lumber Grading Rules.

1.3 SUBMITTALS

- A. Product Data: Submit technical data on wood products.

1.4 QUALITY ASSURANCE

- A. Grading and Inspection:
 - 1. Grade marking: Lumber shall be graded in accordance with the latest grading rules of the Lumber Manufacturer's Inspection bureau under whose jurisdiction the lumber is manufactured. Each piece of lumber shall bear the grade and trademarks of a competent and reliable organization whose regular business is to establish lumber grades. West Coast Lumber Inspection Bureau Rules #17 Latest Edition shall govern grading of Douglas Fir.
 - 2. Certificate of Inspection: In lieu of the grade marking called for above, it will be acceptable if each shipment of lumber is accompanied by a certificate of inspection issued by a competent and reliable organization whose regular business it is to establish lumber grades.
- B. Except when lower moisture content is required by grade specified at time of use, maximum moisture content of lumber shall not exceed 8 percent by weight.

- C. Lumber certified as kiln dried to a moisture content not exceeding that specified will be considered to meet moisture content requirement, provided such lumber after being certified, has been stored, transported or handled in a manner to minimize exposure to conditions that could increase its moisture content and provided further, that each load delivered to job site is accompanied by such certification.

1.5 SUBMITTALS

- A. Shop Drawings: Indicate floor joint pattern and termination details.
 - 1. Indicate provisions for expansion and contraction, base, and base corner details.
- B. Product Data: Submit data for flooring and floor finish materials.
- C. Samples: Submit two sample boards 10-inches in length.

1.6 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 MOCK-UP

- A. Construct mock-up, 10 x 10 feet (3 x 3 mm), which includes typical field and edge conditions.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.8 PRE-INSTALLATION MEETING

- A. Convene minimum one week prior to commencing Work of this section.
- B. Review procedures such as procedures for acclimation of flooring materials.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install wood flooring until wet construction work is complete and ambient air at installation space has moisture content stabilized between 35 and 50 percent and temperature is stabilized between 65- and 80-degrees F.
 - 1. Do not install wood flooring until wood materials have been acclimated to ambient temperature and humidity conditions for a minimum of 72 hours. Stack wood for acclimation procedures to facilitate cross-ventilation of wood materials.
- B. Maintain room temperature and humidity for a period of two days prior to delivery of materials to installation space, during installation, and continuously after installation.

PART 2 PRODUCTS

2.1 WOOD BOARD SIDING – NAILED

- A. Wood Flooring:
 1. Douglas Fir, vertical grain, clear.
 2. Moisture Content: 7 to 9 percent.
 3. Actual Thickness: 13/16-inch (25 mm).
 4. Actual Width: 3-1/4 inches (83 mm).
 5. Edge: Tongue and Groove.
 6. End: Square
- B. Flooring Nails: Type recommended by flooring manufacturer.
- C. Base Materials:
 1. Wood Base: Remove existing wood base under Section 02 41 20. Store and protect base for reinstallation.
 2. Replace damaged base with same species as flooring; match existing size and profile.
 3. Refurbish existing wood base. Remove loose paint and sand to remove surface defects.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify damaged wood floor joists have been replaced and top of joists are level, smooth and flat to plus or minus 1/4-inch in 10 feet (6 mm in 3 m).
- B. Verify that required floor mounted utilities are in proper location.
- C. Verify that wood flooring has been acclimated to ambient temperatures, and that acclimation and ambient temperatures.

3.2 PREPARATION

- A. Broom clean substrate.

3.3 INSTALLATION

- A. Wood Flooring:
 1. Install in accordance with NWFA instructions; blind-nail into wood floor joists.
 2. Lay flooring parallel to length of room areas. Verify alignment as work progresses.
 3. Arrange flooring with square ends set flush and tight.
 4. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar. Provide divider strips.
 5. Install edge strips at unprotected or exposed edges, and where flooring terminates. Secure metal strips installation of flooring with stainless steel screws.
 6. Install flooring tight to floor access covers.
 7. Provide 1/2-inch (13 mm) expansion space at fixed walls and other interruptions.

- B. Install base at floor perimeter to cover expansion space. Miter inside and outside corners.
- C. Finishing: Specified in Section 09 91 23 – Interior Painting.

3.4 CLEANING

- A. Clean surfaces in accordance with NWFA instructions.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Protect installed flooring with sheets of Masonite on kraft paper.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof flashings at valleys and roof penetrations.
- B. Related Work:
 - 1. Section 07 31 29 – Wood Shakes.
 - 2. Section 07 01 50.19 – Preparation for Reroofing.
 - 3. Section 07 90 00 – Sealants.

1.2 REFERENCES

- A. ASTM B209/B209M B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ASTM D226 – Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. ASTM D4586 – Specification for Asphalt Roof Cement, Asbestos Free.
- D. FS TT-C-494 – Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- E. NRCA (National Roofing Contractors Association) – Roofing and Waterproofing Manual, 5th Edition.
- F. SMACNA – Architectural Sheet Metal Manual, Seventh Edition, 2012.

1.3 SYSTEM DESCRIPTION

- A. Work of this Section is to physically protect membrane roofing terminations that would permit water leakage to building interior.

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in sheet metal flashing work with five years minimum experience.

1.5 SUBMITTALS

- A. Submit shop drawings and product data.
- B. Describe material profile, jointing pattern, jointing details, fastening methods, and installation details for each condition encountered.

1.6 STORAGE AND HANDLING

- A. Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation.
- B. Prevent contact with materials during storage that may cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 FLASHING MATERIALS AND ACCESSORIES

- A. Copper Sheet: ASTM B370, cold-rolled 16-oz/sq ft (0.5 mm) thick; natural finish.
- B. Lead Sheet: ASTM B749, 2.5-lb/sq ft 0.039 inch (0.99 mm) thick.

2.2 ACCESSORIES

- A. Fasteners:
 - 1. Use copper nails in contact copper metal.
 - 2. Minimum diameter for copper nails: 3 mm (0.109 inch).
 - 3. Length to provide not less than 22 mm (7/8-inch) penetration into anchorage.
- B. Protective Backing Paint: Bituminous.
- C. Sealant: Type specified in Section 07 90 00.
- D. Plastic Cement: ASTM D4586, Type I-asphaltic base cement.
- E. Solder: ASTM B32.

2.3 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Form material with flat lock seam.
- E. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- F. Fabricate exposed vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.4 FINISH

- A. Backpaint or otherwise separate differing metals with protective felt ply or backing paint to a minimum thickness of 15 mils DFT.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed, and secure.
- C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, anchor plates, and cleats before starting installation.

3.3 INSTALLATION – VALLEY FLASHING

- A. Install in accordance with manufacturer's instructions and NRCA Roofing and Waterproofing Manual.
- B. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- C. Form pieces in longest practicable lengths.
- D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- E. Apply sealant compound between metal flashings and felt flashings under the provisions of Section 07 90 00.
- F. Seam and seal all joints.
- G. Apply plastic cement compound between metal flashings and felt flashings.
- H. Seal metal joints watertight.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum board and joint treatment.
- B. Related Sections:
 - 1. Section 02 41 20 – Demolition of Designated Construction.
 - 2. Section 06 10 00 – Rough Carpentry.
 - 3. Section 09 91 23 – Interior Painting.

1.2 REFERENCES

- A. ASTM C36 – Gypsum Wallboard.
- B. ASTM C475 – Joint Compound and Joint Tape for Finishing Gypsum Board.
- C. ASTM C630 – Water-Resistant Gypsum Backing Board.
- D. ASTM C1002 – Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
- E. ASTM E119 – Test Methods for Fire Tests of Building Construction and Materials.
- F. GA-214 (Gypsum Association) – Recommended Specification: Levels of Gypsum Board Finish.
- G. GA-216 (Gypsum Association) – Recommended Specifications for the Application and Finishing of Gypsum Board.
- H. GA-600 (Gypsum Association) – Fire Resistance Design Manual.
- I. UL (Underwriters Laboratories, Inc.) – Fire Resistance Directory.

1.3 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies

1.4 SUBMITTALS

- A. Shop Drawings: Indicate special details associated with fireproofing.
- B. Product Data: Submit data on metal framing, gypsum board, joint tape.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with GA-214, GA-216 and GA-600.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

- B. Installer: Company licensed in the State of Hawaii and specializing in performing Work of this section with minimum three years documented experience.

1.7 PRE-INSTALLATION CONFERENCE

- A. Convene minimum one week prior to commencing Work of this section.
- B. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - 1. Attendance: Architect, Contractor, Project Superintendent, Job Foreman, and Roofing Manufacturer's Technical Representative.
 - 2. Agenda:
 - a. Review Specifications.
 - b. Quality control.
 - c. Roofing details and procedures.
 - d. Critical work sequencing.
 - 3. Examine and make notes of job conditions prior to installation.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Manufacturers:
 - 1. Celotex Building Products.
 - 2. G-P Gypsum Corp.
 - 3. National Gypsum Co.
 - 4. United States Gypsum Co.
 - 5. Substitutions: Section 01600 – Product Requirements: or approved equal.

2.2 COMPONENTS

- A. Gypsum Board Materials:
 - 1. Standard Gypsum Board: ASTM C36; Type X, 5/8 inch thick, maximum available length in place; ends square cut, tapered edges.
 - 2. Fire Rated Gypsum Board: ASTM C36; fire resistive type, UL or WH rated; 5/8 inch thick, maximum available length in place; ends square cut, tapered edges.
 - 3. Moisture Resistant Gypsum Board: ASTM C630; 5/8 inch thick, maximum available length in place; ends square cut, tapered edges.

2.3 ACCESSORIES

- A. Corner Beads: Vinyl, CB – 114 x 114.
- B. Joint Materials: ASTM C475; reinforcing tape, joint compound, adhesive, and water.
- C. Fasteners: ASTM C1002, Type S12.
- D. Anchorage to Substrate: Tie wire, nails, screws and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

3.2 INSTALLATION

- A. Gypsum Board Installation:
 - 1. Install gypsum board in accordance with GA-216 and GA-600.
 - 2. Erect single layer board in most economical direction, with ends and edges occurring over firm bearing.
 - 3. Erect exterior gypsum sheathing in accordance with ASTM C1280, horizontally, with edges butted and ends occurring over firm bearing.
 - 4. Use screws when fastening gypsum board to furring or framing.
 - 5. Double Layer Applications: Use gypsum backing board for first layer, placed perpendicular to framing or furring members. Use fire rated gypsum-backing board for fire rated partitions and ceilings.
 - 6. Place second layer perpendicular to first layer. Offset joints of second layer from joints of first layer.
 - 7. Erect exterior gypsum soffit board perpendicular to supports, with staggered end joints over supports.
 - 8. Seal plenum walls airtight.
 - 9. Treat cut edges and holes in exterior gypsum soffit board with sealant.
 - 10. Place control joints consistent with lines of building spaces.
 - 11. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- B. Joint Treatment:
 - 1. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 2. Feather coats on to adjoining surfaces so that camber is maximum 1/32 inch.

3.3 ERECTION TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.4 SCHEDULES

- A. Finishes in accordance with GA-214 Level:
 - 1. Level 1: Components concealed from view.
 - 2. Level 3: Walls exposed to view.
 - 3. Level 4: Ceilings exposed to view.

END OF SECTION

SECTION 09 64 20
WOOD FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Section includes site finished, wood, tongue and groove, flooring, nailed.
- B. Related Work:
 - 1. Section 02 41 20 – Selective Demolition.
 - 2. Section 06 10 10 – Rough Carpentry.
 - 3. Section 06 20 00 – Finish Carpentry.
 - 4. Section 09 91 23 – Interior Painting.

1.2 REFERENCES

- A. American Wood Preservers Association (AWPA):
 - 1. AWPA U1 – Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association
- B. AWPA C1 (American Wood Preservers Association) – All Timber Products - Preservative Treatment by Pressure Process.
- C. PS 20 – American Softwood Lumber Standard (2005); National Institute of Standards and Technology (Department of Commerce)
- D. Wood Flooring Installation Guide (2019) – National Wood Flooring Association (NWFA).
- E. WWPA (Western Wood Products Association) – Lumber Grading Rules.

1.3 SUBMITTALS

- A. Product Data: Submit technical data on plywood and wood preservative materials.

1.4 QUALITY ASSURANCE

- A. Grading and Inspection:
 - 1. Grade marking: Lumber shall be graded in accordance with the latest grading rules of the Lumber Manufacturer's Inspection bureau under whose jurisdiction the lumber is manufactured. Each piece of lumber shall bear the grade and trademarks of a competent and reliable organization whose regular business is to establish lumber grades. West Coast Lumber Inspection Bureau Rules #17 Latest Edition shall govern grading of Douglas Fir.
 - 2. Certificate of Inspection: In lieu of the grade marking called for above, it will be acceptable if each shipment of lumber is accompanied by a certificate of inspection issued by a competent and reliable organization whose regular business it is to establish lumber grades.

- B. Except when lower moisture content is required by grade specified at time of use, maximum moisture content of lumber shall not exceed 8 percent by weight.
- C. Lumber certified as kiln dried to a moisture content not exceeding that specified will be considered to meet moisture content requirement, provided such lumber after being certified, has been stored, transported or handled in a manner to minimize exposure to conditions that could increase its moisture content and provided further, that each load delivered to job site is accompanied by such certification.

1.5 SUBMITTALS

- A. Shop Drawings: Indicate floor joint pattern and termination details.
 - 1. Indicate provisions for expansion and contraction, base, and base corner details.
- B. Product Data: Submit data for flooring and floor finish materials.
- C. Samples: Submit two sample boards 10-inches in length.

1.6 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 MOCK-UP

- A. Construct mock-up, 10 x 10 feet (3 x 3 mm), which includes typical field and edge conditions.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.8 PRE-INSTALLATION MEETING

- A. Convene minimum one week prior to commencing Work of this section.
- B. Review procedures such as procedures for acclimation of flooring materials.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install wood flooring until wet construction work is complete and ambient air at installation space has moisture content stabilized between 35 and 50 percent and temperature is stabilized between 65- and 80-degrees F.
 - 1. Do not install wood flooring until wood materials have been acclimated to ambient temperature and humidity conditions for a minimum of 72 hours. Stack wood for acclimation procedures to facilitate cross-ventilation of wood materials.
- B. Maintain room temperature and humidity for a period of two days prior to delivery of materials to installation space, during installation, and continuously after installation.

PART 2 PRODUCTS

2.1 WOOD FLOORING – NAILED

- A. Wood Flooring:
 - 1. Douglas Fir, vertical grain, clear.
 - 2. Moisture Content: 7 to 9 percent.
 - 3. Actual Thickness: 1-inch (25 mm).
 - 4. Actual Width: 3-1/4 inches (83 mm).
 - 5. Edge: Tongue and Groove.
 - 6. End: Square
- B. Flooring Nails: Type recommended by flooring manufacturer.
- C. Base Materials:
 - 1. Wood Base: Remove existing wood base under Section 02 41 20. Store and protect base for reinstallation.
 - 2. Replace damaged base with same species as flooring; match existing size and profile.
 - 3. Refurbish existing wood base. Remove loose paint and sand to remove surface defects.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify damaged wood floor joists have been replaced and top of joists are level, smooth and flat to plus or minus 1/4-inch in 10 feet (6 mm in 3 m).
- B. Verify that required floor mounted utilities are in proper location.
- C. Verify that wood flooring has been acclimated to ambient temperatures, and that acclimation and ambient temperatures.

3.2 PREPARATION

- A. Broom clean substrate.

3.3 INSTALLATION

- A. Wood Flooring:
 - 1. Install in accordance with NWFA instructions; blind-nail into wood floor joists.
 - 2. Lay flooring parallel to length of room areas. Verify alignment as work progresses.
 - 3. Arrange flooring with square ends set flush and tight.
 - 4. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar. Provide divider strips.
 - 5. Install edge strips at unprotected or exposed edges, and where flooring terminates. Secure metal strips installation of flooring with stainless steel screws.
 - 6. Install flooring tight to floor access covers.

7. Provide 1/2-inch (13 mm) expansion space at fixed walls and other interruptions.
- B. Install base at floor perimeter to cover expansion space. Miter inside and outside corners.
- C. Finishing: Specified in Section 09 91 23 – Interior Painting.

3.4 CLEANING

- A. Clean surfaces in accordance with NWFA instructions.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Protect installed flooring with sheets of Masonite on kraft paper.

END OF SECTION

SECTION 09 65 16
RESILIENT SHEET FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vinyl sheet flooring.

1.2 REFERENCES

- A. ASTM E648-19ae1 – Standard Test Method For Critical Radiant Flux Of Floor-Covering Systems Using A Radiant Heat Energy Source.
- B. ASTM F1913-19 – Standard Specification For Vinyl Sheet Floor Covering Without Backing.
- C. NFPA[®] 253-23 – Standard Method of Test for Critical Radiant Flux of Floor Covering Systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of flooring. Include flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 1. Show details of special patterns.
- C. Samples: For each exposed product and for each color and texture specified in manufacturer's standard size, but not less than 6-by-9-inch (150-by-230-mm) sections.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.5 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. Resilient Sheet Flooring: Furnish not less than 10 linear feet (3 linear m) or fraction thereof, in roll form and in full roll width, for each type, color, and pattern of flooring installed.

1.6 QUALITY ASSURANCE

- A. Materials Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum ten (10) years documented experience.
- B. Applicator: Company specializing in the installation of resilient sheet flooring products with minimum three (3) years documented experience approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store rolls upright.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C), in spaces to receive resilient sheet flooring during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 UNBACKED VINYL SHEET FLOORING

- A. Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers:
 - 1. Armstrong Flooring, Inc.
 - 2. Mannington Commercial, Inc.
 - 3. Mohawk Industries, Inc.
 - 4. Shaw Industries, Inc.
 - 5. Substitutions: Or approved equal.
- B. Products:
 - 1. Product Standard: ASTM F1913.
 - 2. Total Thickness: 0.080 inch (2.0 mm).
 - 3. Wear Layer Thickness: Minimum 0.51 mm (0.020 inches).

4. Wearing Surface: Smooth.
 5. Sheet Width: Manufacturer's standard. Provide maximum size sheet produced by manufacturer to minimize joints.
- C. Seamless-Installation Method: Chemically bonded.
 - D. Colors and Patterns: As selected by Engineer from full range of industry colors. Provide vinyl sheet color and pattern from one production run.

2.3 INSTALLATION MATERIALS

- A. Leveling Compound: Provide cementitious type with latex or polyvinyl acetate resins additive.
- B. Primer: Type recommended by adhesive or flooring manufacturer.
- C. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
 1. Adhesives shall have a VOC content of 60 g/L or less.
 2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Sealant: 07 90 00.

2.4 SEAMLESS-INSTALLATION ACCESSORIES:

- A. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
 1. Bonding compound shall have a VOC content of 510 g/L or less.
 2. Bonding compound shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Edge Strips:
 1. Extruded aluminum, mill finish, mechanically cleaned.
 2. 28 mm (1-1/8 inch) wide, 6 mm (1/4 inch) thick, bevel one edge to 3 mm (1/8 inch) thick.
 3. Drill and counter sink edge strips for flat head screws. Space holes near ends and approximately 225 mm (9 inches) on center.
 4. Fasteners: Stainless steel, type to suit application.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing vinyl sheet flooring have been removed under Section 02 41 20. Dispose of flooring materials under 02 42 10.
- B. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- C. Verify that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Perform flooring manufacturer's recommended bond, substrate moisture content, and pH tests. H. Do not proceed with installation if conditions are not within manufacturer's requirements.
- B. Broom or vacuum clean substrates immediately before flooring installation.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Primer: Apply primer according to manufacturer's instructions. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
- E. Do not install resilient sheet flooring until it is the same temperature as the space where it is to be installed.
 - 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
- F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
 - 1. Maintain uniformity of flooring direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches (152 mm) away from parallel joints in flooring substrates.
 - 3. Match edges of flooring for color shading at seams.
 - 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern

between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

- H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 SEAMLESS INSTALLATION

- A. Chemically Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless flooring.
- B. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
 - 1. Apply two coats.
- E. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation and field application of paints and coatings to designated surfaces of Project.
- B. Related Work:
 - 1. Section 06 20 00 – Finish Carpentry.
 - 2. Section 09 64 00 – Tongue and Groove Wood Flooring (Exterior).
 - 3. Section 07 90 00 – Sealants.

1.2 REFERENCES

- A. ASTM International (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; Tel: (877) 909-2786; Fax: (610) 832.9585; web: <https://www.astm.org>.
 - 1. ASTM D16-14 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - 2. ASTM D1730-09(2014) Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
 - 3. ASTM D1732-03(2013) Standard Practices for Preparation of Magnesium Alloy Surfaces for Painting.
 - 4. ASTM D4258-05(2012) – Standard Practice for Surface Cleaning Concrete for Coating.
 - 5. ASTM D4414-95(2013) – Standard Practice for Measurement of Wet Film Thickness by Notch Gages.
 - 6. ASTM D6386-16a – Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.
 - 7. ASTM D7396-14 – Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting.
 - 8. ASTM NACE/ASTMG193-12d –Standard Terminology and Acronyms Relating to Corrosion.
- B. Painting and Decorating Contractors of America (PDCA), 2316 Millpark Drive Maryland Heights, MO 63043; Tel: (800)-332-7322; web: <http://www.pdca.org>.
 - 1. PDCA P1-13 – Touch Up Painting and Damage Repair: Financial Responsibility and Definition of a Properly Painted Surface.
 - 2. PDCA P5-13 – Benchmark Sample Procedures for Paint and Other Decorative Coating Systems.

3. PDCA P11-13 – Painter’s Caulk, Implied Requirements.
4. PDCA P14-13 – Levels of Surface Preparation for Repainting and Maintenance Projects Receiving Architectural Coatings.
5. PDCA (Painting and Decorating Contractors of America) – Architectural Specifications Manual.

1.3 SUBMITTALS

- A. Product Data: Provide data on all finishing products and special coatings.
- B. Brushout Samples: Submit three applied samples, 8 by 10 inches in size, illustrating colors and textures selected for each surface finishing product scheduled.
- C. Manufacturer's Instructions: Indicate special surface preparation procedures, and substrate conditions requiring special attention.

1.4 QUALIFICATIONS

- A. Applicator: Company licensed by the State of Hawaii, specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.
- B. Qualification of Painters: Use adequate numbers of skilled journeymen who have been thoroughly trained and experienced in the crafts required in the Section.

1.5 FIELD SAMPLES

- A. Provide field samples of paints and coatings under provisions of Section 01 40 00.
- B. Provide field sample, illustrating special coating colors and finishes for each coat of field color. Locate where directed.
- C. Provide two samples of trim board, a minimum of 4 feet in length, showing final finish.

1.6 PURCHASE, DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site in accordance with manufacturer’s instructions.
- B. Purchase paints and coatings through an authorized distributor of the manufacturer.
- C. Deliver products to site in sealed and labeled containers as supplied by the manufacturer; inspect to verify acceptability.
- D. On site storage shall be allowed at Owner's discretion and in a location designated by Owner. Only approved materials shall be stored at job site.
- E. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

- F. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F in ventilated area and as required by manufacturer's instructions.
- G. Contractor is solely responsible for safety and security of stored materials and equipment.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply products during inclement weather, or when inclement weather is expected within four hours.
- B. Do not apply products when relative humidity is outside the humidity range required by the manufacturer.
- C. Do not apply products to surfaces that are not dry.
- D. Do not apply products when surface or ambient temperatures are outside the ranges required by the manufacturer.
- E. Maintain on-site equipment, such as plastic sheeting and tarps, to provide emergency temporary protection in the event of sudden storms or inclement weather.

1.8 COORDINATION

- A. Coordinate with Section 06 20 00 and other sections requiring coordination with the Work of this Section.

1.9 WARRANTY

- A. Material: Provide manufacturer's five-year material warranty.
- B. Labor: Provide Contractor's two-year labor warranty. Include coverage for installed products and accessories that exhibit excessive fade, discoloration, loss of adhesion or cohesion, or do not cure.
- C. Upon written notification of failure due to defective materials or application, repair or replace failure at no cost to Owner.

1.10 EXTRA MATERIALS

- A. Provide five 1-gallon cans of each color, type, and surface texture to Owner.
- B. Label each container with color, type, texture, room locations, and in addition to the manufacturer's label.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Pittsburg Paint Corporation.
- B. Pratt & Lambert.

- C. Sherwin Williams.
- D. Substitutions: Or approved equal.

2.2 MATERIALS

- A. Coatings: Ready mixed by the manufacturer, except field-catalyzed coatings. Factory-tint each coat to a darker shade and mark each color shade on the product label as to number of coat.
- B. Mildewcide: Non-mercurial, equal to .0125 of paint weight, or as recommended by the manufacturer.
- C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.2 ACCESSORIES

- A. Surface Repair and Patching Materials:
 - 1. Walls/Siding: Sherwin-Williams Shrink-Free Spackling Paste, or approved equal.
 - 2. Wood: Sherwin-Williams Wood Putty, or approved equal.
 - 3. Metal: Bondo BHS Metal Repair Compound, 3M.
 - 4. Substitutions: Or approved equal.
- B. Thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate conditions are ready to receive work.
- B. Examine scheduled surfaces prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surface is below 15 percent.
- D. Application of first coat constitutes assurance by Contractor that surfaces are properly prepared.

3.2 PREPARATION

- A. Provide Engineer with written notice a minimum of 72 hours prior to commencement of work.
- B. Provide written notice to unit residents of impending work, which may restrict their access, a minimum of 72 hours prior to commencement of work. Notice to contain the date of work commencement and the time period during which unit access will be restricted.

- C. Test surfaces to verify adhesion and compatibility with existing coatings prior to start of work. Provide one test for each field condition. Notify Engineer of test schedule, procedures, and locations of each test sample a minimum of 72 hours prior to conducting test.
- D. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- E. Correct defects in existing surfaces to match adjacent.
- F. Remove staples and hooks and hammer down nails that are not fully penetrated flush with surface.
- G. Use drop cloths to protect floors and adjacent surfaces from paint smears, spatters and droppings. Cover light fixtures and remove hardware not to be painted. Mask off areas where required.

3.2 APPLICATION – SURFACE PREPARATION

- A. Clean surfaces that affect Work of this section.
 - 1. Pressure wash exterior surfaces to receive paints or coatings with clean water at 1,500-psi minimum tip pressure. Where pressure cleaning is not practical or would cause water penetration or damage to building surfaces, a wash consisting of 2.5 pounds trisodium phosphate in 5 gallons water applied with stiff brush and rinsed well is acceptable. Allow thorough drying before proceeding with painting.
 - 2. Remove dirt, grease, soap, and oil buildup with the appropriate cleaner. Rinse thoroughly and allow drying.
 - 3. Remove spots of oil, grease, and mildew stains with a solution of trisodium phosphate; rinse well and allow drying.
 - 4. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow drying.
 - 5. Mildew:
 - a. Impervious Surfaces: Remove mildew with a solution of 3 quarts household bleach, 1 quart ZEHRUNG JOMAX activator, and 4 gallons water prior to cleaning.
 - b. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting.
- B. Surface Preparation:
 - 1. Remove checked, peeling, or blistered existing paints and coatings, loose mortar, scale, rust, alkali powder, or other contaminants down to a well-adhered surface.
 - 2. Patch holes and cracks with appropriate spackling or patching compound. Allow to dry and then sand smooth, to make touch up patches inconspicuous.
 - 3. For glossy or nonporous surfaces, sand lightly to a dull finish or use an abrasive cleanser.
 - 4. Remove sanding dust or cleanser residue prior to painting.
- C. Seal with shellac or other stain-blocking product stains or marks, such as water,

smoke, ink, pen, pencil, or grease, which may bleed through surface finishes.

- D. Wood Doors, Frames, and Trim:
 - 1. Remove existing signage and attachments scheduled for demolition prior to start of work of this Section under Section 02 41 20. Remove glue, sealants, and other residue.
 - 2. Remove nails, screws, staples, hangers, and other non-standard attachments from unit doors. Return clips, hangers, frames, and other devices removed from doors to unit resident.
 - 3. Remove loose paint and feather edges to make touch up patches inconspicuous.
 - 4. Remove existing paint drips, runs, brush hair, and encapsulated debris and repair surface to match adjacent.
 - 5. Fill holes, depressions, dents, joints and cracks with patching paste.
 - 6. Sand surface to remove gloss and to provide a smooth, uniform surface.
 - 7. Correct minor defects in existing surfaces.
- E. Concrete/Masonry Surfaces:
 - 1. Allow new surfaces to cure according to the supplier's recommendations.
 - 2. Remove all form release and curing agents.
 - 3. Correct minor defects and rough surfaces to match adjacent.
- F. Handrails and Railings: Sand and scrape to remove loose paint and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent.
- G. Galvanized Surfaces: Remove surface contamination and oils and clean with solvent.
- H. Metal Surfaces (General): Sand and scrape to remove loose paint and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent.
- I. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces and metal items including shop primed items.
- H. Exterior Wood Scheduled to Receive Paint Finish: Sand surface lightly to remove gloss and promote adhesion. Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound or wood filler after prime coat has been applied.

3.3 APPLICATION – GENERAL

- A. Mix and apply products in accordance with manufacturer's instructions.
- B. Apply paints and coatings at package consistency, unless specifically directed by manufacturer's instructions or requirements of this Section.
- C. Do not apply finishes to surfaces that are not dry.
- D. Add aggregate or employ application techniques as necessary to match texture of adjacent surfaces.
- E. Allow applied coat to dry before next coat is applied.

- F. Apply each coat to a uniform finish, free of brush or roller marks, or other imperfections.
- G. Use masking tape where needed to prevent drips and to provide a sharp, clean termination.

3.4 APPLICATION – DOORS

- A. Use identical product batch number to ensure color consistency, or box all materials to provide a uniform appearance and color.
- B. Provide color check samples for Owner’s approval under “Field Samples” of this Section.
- C. Sand lightly between coats to achieve required finish.
- D. Solvent wipe surfaces to remove sanding dust, dirt, or other contaminants.
- E. Allow previous coat to dry for 12 hours before recoating, or as recommended by manufacturer.
- F. Apply each coat to smooth, uniform finish, free of brush or roller marks, or other imperfections.

3.5 CLEANING

- A. Collect waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.
- B. As work proceeds, promptly remove spilled, splashed, or splattered finishes.
- C. Cleaning of applicator tools, buckets etc. on site is prohibited without specific permission from Owner, and then only in designated areas. These designated areas shall in turn be cleaned daily at the completion of Work. Paint and other waste material will not be disposed of on ground or in public street gutters or on site, but shall be returned to Contractor's place of business and disposed of properly in accordance with environmental regulations.

3.6 SCHEDULE – COLORS

- A. Match existing colors.
- B. Brush outs where required shall be supplied by the manufacturer.

3.7 SCHEDULE – FINISHES

- A. Products of the paint system selected shall be from the same manufacturer, unless otherwise indicated.
- B. Concrete and Masonry (Concrete Masonry Units [CMU]):
 - 1. Pittsburgh Paints:
 - a. 1st Coat (CMU): Perma-Crete 4-100 Concrete Block & Masonry Surfacer/Filler at 80-100 sq ft/gal.
 - b. 1st Coat (Concrete): Perma-Crete 4-106 Interior/Exterior Alkali Resistant Primer at 80-100 sq ft/gal.

- c. 2nd Coat: Sun Proof 76-45 100% Acrylic Exterior Satin, at 4.0 mils wet, 1.2 mils DFT.
 - d. 3rd Coat: Sun Proof 76-45 100% Acrylic Exterior Satin, at 4.0 mils wet, 1.2 mils DFT.
 - 2. Pratt & Lambert:
 - a. 1st Coat (CMU): Acrylic Block Filler Z846, at 50-88 sq ft/gal.
 - b. 1st Coat (Concrete): Pro-Hide Gold Interior-Exterior Acrylic Surface Conditioner, at 200-300 sq ft/gal.
 - c. 2nd Coat: Pro-Hide Gold, Z/F 8600, Exterior Latex Semi-Gloss House & Trim Finish, at 4.0 mils wet, 1.5 mils DFT.
 - d. 3rd Coat: Pro-Hide Gold, Z/F 8600, Exterior Latex Semi-Gloss House & Trim Finish, at 4.0 mils wet, 1.5 mils DFT.
 - 3. Sherwin Williams:
 - a. 1st Coat (CMU): S-W Loxon Block Surfacer LX01W0200, at 50-100 sq ft/gal.
 - b. 1st Coat (Concrete): S-W Loxon Concrete & Masonry Primer LX02W0050, at 200-300 sq ft/gal.
 - c. 2nd Coat: S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils DFT.
 - d. 3rd Coat: S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils DFT.
- C. Ferrous Metals:
 - 1. Pittsburg Paint:
 - a. 1st Coat: Speedhide Rust Inhibitive Primer 6-208, 6-212, at 4.0 mils wet, 2.3 mils DFT (400 sq ft/gal.).
 - b. 2nd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, at 5.5 to 8.3 mils wet, 2.0 to 3.0 mils DFT.
 - c. 3rd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, at 5.5 mils wet, 2.0 mils DFT.
 - 2. Pratt & Lambert:
 - a. 1st Coat: Rust Inhibitive Metal Primer S-4556 Red Oxide, at 5-8 mils wet, 3.0-5.0 mils DFT (350-420 sq ft/gal).
 - b. 2nd Coat: Acrylic Waterborne DTM Acrylic Gloss Z6800 Series, at 6.0 mils wet, 2.5 mils DFT.
 - c. 3rd Coat: Acrylic Waterborne DTM Acrylic Gloss Z6800 Series, at 6.0 mils wet, 2.5 mils DFT.
 - 3. Sherwin Williams:
 - a. 1st Coat: Pro Industrial Procryl Primer, B66W1310, at 1.9 to 3.8 mils DFT, 5.0 to 10.0 mils wet, (150 to 320 sq ft/gal).
 - b. 2nd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
 - c. 3rd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
- D. Galvanized Surfaces (Unpainted): Remove surface contamination and oils and wash with solvent.
 - 1. Pittsburg Paint:
 - a. 1st Coat: 6-209 SpeedHide Alkyd Primer, at 1.5 to 2 mils DFT.

- b. 2nd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, at 5.5 to 8.3 mils wet, 2.0 to 3.0 mils DFT.
 - c. 3rd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, at 5.5 mils wet, 2.0 mils DFT.
 - 2. Pratt & Lambert:
 - a. 1st Coat: Suprime 3 Latex Primer, at 1.5 to 2 mils DFT.
 - b. 2nd Coat: Acrylic Waterborne DTM Acrylic Gloss Z6800 Series, at 6.0 mils wet, 2.5 mils DFT.
 - c. 3rd Coat: Acrylic Waterborne DTM Acrylic Gloss Z6800 Series, at 6.0 mils wet, 2.5 mils DFT.
 - 3. Sherwin-Williams:
 - a. Pro Industrial Procril Primer, B66W1310, at 1.9 to 3.8 mils DFT, 5.0 to 10.0 mils wet, (150 to 320 sq ft/gal).
 - b. 2nd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
 - c. 3rd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
- E. Galvanized Handrails (Previously Painted): Brush two finish coats per coat.
 - 1. Pittsburg
 - a. 1st Coat: Speedhide Rust Inhibitive Primer 6-208, 6-212, at 4.0 mils wet, 2.3 mils DFT (400 sq ft/gal.).
 - b. 2nd Coat: PPG Pitt-Tech 90-1100 Series, at 1.5 to 2.0 mils DFT.
 - c. 3rd Coat: Pittsburg PPG Pitt-Tech 90-1100 Series, at 1.5 to 2.0 mils DFT.
 - 2. Pratt & Lambert:
 - a. 1st Coat: Rust Inhibitive Metal Primer S-4556 Red Oxide, at 5-8 mils wet, 3.0-5.0 mils DFT (350-420 sq ft/gal).
 - b. 2nd Coat: Accolade Exterior Gloss 2/F4300, at 1.5 to 2.0 mils DFT.
 - c. 3rd Coat: Accolade Exterior Gloss 2/F4300, at 1.5 to 2.0 mils DFT.
 - 3. Sherwin-Williams:
 - a. Pro Industrial Procril Primer, B66W1310, at 1.9 to 3.8 mils DFT, 5.0 to 10.0 mils wet, (150 to 320 sq ft/gal).
 - b. 2nd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
 - c. 3rd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
- F. Heavily Rusted Metal: Remove rust and contamination to sound metal. Pre-prime with the following:
 - 1. 1st Coat: Simpson Rust Buster, at 1.5 to 2.0 mils DFT.
- G. Exterior Wood, Hardboard Siding, and Trim: One coat of primer at 1.2 to 1.5 mils DFT.
 - 1. Pittsburg Paint:
 - a. 1st Coat: GP Gripper 3110 Series, at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat: Pittsburg Paint 70-300 Series Manor Hall, 100% Acrylic Latex, at 1.1 to 1.3 mils DFT.
 - c. 3rd Coat: Pittsburg Paint 70-300 Series Manor Hall, 100% Acrylic Latex, at 1.1 to 1.3 mils DFT.

2. Pratt & Lambert:
 - a. 1st Coat: Pro-Hide Gold, Z/F 8460, Exterior Latex Primer.
 - b. 2nd Coat: Pro-Hide Gold, Z/F 8600, Exterior Latex Semi-Gloss House & Trim Finish.
 - c. 3rd Coat: Pro-Hide Gold, Z/F 8600, Exterior Latex Semi-Gloss House & Trim Finish.
 3. Sherwin-Williams:
 - a. 1st Coat: S-W-A-100 Exterior Latex Wood Primer, B42W41.
 - b. 2nd Coat: A-100 Exterior Satin Latex Paint A82 at 1.1 to 1.3 mils DFT.
 - c. 3rd Coat: A-100 Exterior Satin Latex Paint A82 at 1.1 to 1.3 mils DFT.
- H. Wood (bare wood): One coat of primer finished sides; two coats end grain.
1. Pittsburg Paint:
 - a. 1st Coat: 17-941 NF Sealgrip Universal Alkyd Primer, at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat (End Grain): 17-941 NF Sealgrip Universal Alkyd Primer, at 1.1 to 1.4 mils DFT.
 - c. 3rd Coat: Pittsburg Paint 70-300 Series Manor Hall, 100% Acrylic Latex, at 1.1 to 1.3 mils DFT.
 - d. 4th Coat: Pittsburg Paint 70-300 Series Manor Hall, 100% Acrylic Latex, at 1.1 to 1.3 mils DFT.
 2. Pratt & Lambert:
 - a. 1st Coat: Suprime 8 Exterior Alkyd Wood Primer, at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat (End Grain): Suprime 8 Exterior Alkyd Wood Primer, at 1.1 to 1.4 mils DFT.
 - c. 3rd Coat: Accolade 2/F4100 semi-gloss at 1.1 to 1.3 mils DFT.
 - d. 4th Coat: Accolade 2/F4100 semi-gloss at 1.1 to 1.3 mils DFT.
 3. Sherwin-Williams:
 - a. 1st Coat: A-100 Alkyd Wood Primer, Y24W20.
 - b. 2nd Coat (End Grain): A-100 Alkyd Wood Primer, Y24W20.
 - c. 2nd Coat: A-100 Exterior Satin Latex Paint A82 at 1.1 to 1.3 mils DFT.
 - d. 3rd Coat: A-100 Exterior Satin Latex Paint A82 at 1.1 to 1.3 mils DFT.
- I. Exterior Ceilings, and Soffits: One primer and one finish coat.
1. Pittsburg Paint:
 - a. 1st Coat: GP Gripper 3110 Series, at at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat: 70-300 Series Manor Hall, 100% Acrylic Latex, at 1.1 to 1.3 mils DFT.
 2. Pratt & Lambert:
 - a. 1st Coat: Pro-Hide Gold, Z/F 8460, Exterior Latex Primer.
 - b. 2nd Coat: 17-941 NF Sealgrip Universal Alkyd Primer, at 1.1 to 1.4 mils DFT.
 3. Sherwin-Williams:
 - a. 1st Coat: S-W-A-100 Exterior Latex Wood Primer, B42W41.

- b. 2nd Coat: A-100 Exterior Satin Latex Paint A82 at 1.1 to 1.3 mils DFT.
- J. Wood Doors:
- 1. Pittsburg Paint:
 - a. 1st Coat: 17-921 100% Acrylic Primer/Sealer, at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, 1.1 to 1.3 mils DFT.
 - c. 3rd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, 1.1 to 1.3 mils DFT.
 - 2. Pratt & Lambert:
 - a. 1st Coat: Suprime 8 Exterior Alkyd Wood Primer, at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat: Accolade Exterior Gloss 2/F4300.
 - c. 3rd Coat: Accolade Exterior Gloss 2/F4300.
 - 3. Sherwin-Williams:
 - a. 1st Coat: S-W-A-100 Exterior Latex Wood Primer, B42W41.
 - b. 2nd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
 - c. 3rd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
- K. Exterior Wood Decking (Previously Painted):
- 1. Sherwin Williams:
 - a. 1st Coat: Armorseal Treadplex, at 345 to 460 sq. ft./gal, 4.0 wet mils. 1.52 mils DFT, with 3.2 oz per gallon Shark Grip Additive.
 - 2nd Coat: Armorseal Treadplex, at 345 to 460 sq. ft./gal, 4.0 wet mils. 1.52 mils DFT, with 3.2 oz per gallon Shark Grip Additive.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation and field application of paints and coatings to designated interior surfaces of Project.
- B. Related Work:
 - 1. Section 07 90 00 – Sealants.

1.2 REFERENCES

- A. ASTM International (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; Tel: (877) 909-2786; Fax: (610) 832.9585; web: <https://www.astm.org>.
 - 1. ASTM D16-14 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - 1. ASTM D3359-17 – Standard Test Method for Measuring Adhesion by Tape Test.
 - 2. ASTM D4414-95(2013) – Standard Practice for Measurement of Wet Film Thickness by Notch Gages.
- B. Painting and Decorating Contractors of America (PDCA), 2316 Millpark Drive Maryland Heights, MO 63043; Tel: (800)-332-7322; web: <http://www.pdca.org>.
 - 1. PDCA P1-13 – Touch Up Painting and Damage Repair: Financial Responsibility and Definition of a Properly Painted Surface.
 - 2. PDCA P5-13 – Benchmark Sample Procedures for Paint and Other Decorative Coating Systems.
 - 3. PDCA P11-13 – Painter’s Caulk, Implied Requirements.
 - 4. PDCA P13- 13 – The Inspection and Acceptance of Architectural Paints on the Interior Surfaces of Structures When Dry Film Thickness is Specified.
 - 5. PDCA P14-13 – Levels of Surface Preparation for Repainting and Maintenance Projects Receiving Architectural Coatings.

1.3 SUBMITTALS

- A. Submit full range color sample chips to indicate where colour availability is restricted.
- B. Product Data: Provide manufacturer’s technical product data on finishing products and special coatings.
- C. Samples: Submit three applied samples, 8 by 10 inches in size, illustrating colors and textures selected for each surface finishing product scheduled.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures, and

substrate conditions requiring special attention.

- E. Submit product data for the use and application of paint thinner.
- F. Submit MSDS – Material Safety Data Sheets. Indicate VOCs during application and curing.
- G. Upon completion, submit records of products used, records to be included in Operating and Maintenance Manuals. List products in relation to finish system and include the following:
 - 1. Product name, type and use.
 - 2. Manufacturer's product number.
 - 3. Color numbers.
 - 4. MPI Environmentally Friendly Classification System Rating.
 - 5. Manufacturer's Material Safety Data Sheets (MSDS).

1.4 QUALIFICATIONS

- A. Applicator: Company licensed by the State of Hawaii, specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.
- B. Qualification of Painters: Use adequate numbers of skilled journeymen who have been thoroughly trained and experienced in the crafts required in the Section.

1.5 FIELD SAMPLES

- A. Provide field samples of paints and coatings under provisions of Section 01 40 00.
- B. Provide field sample, consisting of one unit door and one interior door, along with casing and trim, illustrating full paint system. Locate where directed.
- C. Approved field samples may remain as part of the Work.

1.6 PURCHASE, DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site in accordance with manufacturer's instructions.
- B. Purchase paints and coatings through an authorized distributor of the manufacturer.
- C. Deliver products to site in sealed and labeled containers as supplied by the manufacturer; inspect to verify acceptability.
- D. On site storage shall be allowed at Owner's discretion and in a location designated by Owner. Only approved materials shall be stored at job site.
- E. Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- F. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F in ventilated area and as required by manufacturer's instructions.
- G. Contractor is responsible for security of stored materials and equipment.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply products when relative humidity is outside the humidity range required by the manufacturer.
- B. Do not apply products to surfaces that are not dry.
- C. Do not apply products when surface or ambient temperatures are outside the ranges required by the manufacturer.

1.8 COORDINATION

- A. Coordinate interior painting with completion of work by other trades.

1.9 SCHEDULING

- A. Submit work schedule for various stages of painting for approval. Submit schedule minimum of five (5) working days in advance of proposed operations.
- B. Schedule painting operations to minimize disruption of resident activities.

1.10 WARRANTY

- A. Material: Provide manufacturer's one-year material warranty.
- B. Labor: Provide Contractor's one-year labor warranty. Include coverage for installed products and accessories that exhibit excessive fade, discoloration, loss of adhesion or cohesion, or do not cure.
- C. Upon written notification of failure due to defective materials or application, repair or replace failure to the approval of, and at no cost to Owner.

1.11 EXTRA MATERIALS

- A. Provide five 1-gallon cans of each color, type, and surface texture to Owner.
 - 1. Deliver to Owner's storage facility and place where directed.
 - 2. Submit a receipt of delivery signed by Owner.
- B. Label each container with color, type, texture, room locations, and in addition to the manufacturer's label.

PART 2 PRODUCTS

2.2 MANUFACTURERS

- A. Pittsburg Paint Corporation.
- B. Pratt & Lambert.
- C. Sherwin Williams.
- D. Dura Seal Products.
- E. Substitutions: Or approved equal.

2.3 MATERIALS

- A. Coatings: Ready mixed by the manufacturer, except field-catalyzed coatings. Factory-tint each coat to a darker shade and mark each color shade on the product

label as to number of coat.

- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.1 ACCESSORIES

- A. Surface Repair and Patching Materials:
 1. Walls: Sherwin-Williams Shrink-Free Spackling Paste, or approved equal.
 2. Wood: Sherwin-Williams Wood Putty, or approved equal.
 3. Metal: Bondo BHS Metal Repair Compound, 3M.
 4. Substitutions: Or approved equal.
- B. Thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

PART 2 EXECUTION

3.1 EXAMINATION

- A. Verify substrate conditions are ready to receive work.
- B. Examine scheduled surfaces prior to commencement of work. Report any condition that may potentially affect proper application. Do not proceed until unsatisfactory conditions have been corrected.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surface is below 12 percent.
- D. Application of first coat constitutes assurance by Contractor that surfaces are properly prepared.

3.2 PREPARATION

- A. Provide Architect with written notice a minimum of 72 hours prior to commencement of work.
- B. Test surfaces to verify adhesion and compatibility with existing coatings prior to start of work. Provide one test for each field condition. Notify Architect of test schedule, procedures, and locations of each test sample a minimum of 72 hours prior to conducting test.
- C. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing. Provide masking where attachments cannot be removed or where surface may be damaged by removal.
- D. Patch holes and correct defects in existing surfaces to match adjacent.
- E. Use drop cloths to protect floors and adjacent surfaces from paint smears, spatters and droppings. Cover light fixtures and remove hardware not to be painted. Mask off areas where required.

3.2 SURFACE PREPARATION

- A. Clean surfaces that affect Work of this section.

1. Remove dirt, grease, soap, and oil buildup with the appropriate cleaner.
 2. Remove spots of oil, grease, and mildew stains.
 3. Patch holes and cracks with appropriate spackling or patching compound. Allow to dry and then sand smooth, to make touch up patches inconspicuous.
 4. Remove sanding dust and cleanser residue prior to painting.
- B. Wood Scheduled to Receive Paint Finish: Sand surface lightly to remove gloss and promote adhesion. Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill dents and scratches with tinted wood filler or other appropriate patching material after prime coat has been applied.
- C. General Sealing:
1. Provide in accordance with Section 07 90 00.
 2. Apply a bead of sealant in corners and at transitions between abutting construction and at the juncture between differing materials.
- D. Wood Flooring: Sand floors according to NWFA specifications. Clean to remove dust, grit, and foreign matter. Fill dents and scratches with wood filler or other appropriate patching material after prime coat has been applied.

3.3 APPLICATION – GENERAL

- A. Mix and apply products in accordance with manufacturer's instructions.
- B. Apply paints and coatings at package consistency, unless specifically directed by manufacturer's instructions or requirements of this Section.
- C. Do not apply finishes to surfaces that are not dry.
- D. Add aggregate or employ application techniques as necessary to match texture of adjacent surfaces.
- E. Allow applied coat to dry in accordance with manufacturer's recommendation, with consideration of existing environmental conditions, before next coat is applied.
- F. Apply each coat to a uniform finish, free of brush or roller marks, or other imperfections.
- G. Use masking tape where needed to prevent drips and to provide a sharp, clean termination.

3.4 APPLICATION – DOORS

- A. Use identical product batch number to ensure color consistency, or box all materials to provide a uniform appearance and color.
- B. Provide color check samples for Architect's approval under "Field Samples" of this Section.
- C. Sand lightly between coats to achieve required finish.
- D. Solvent wipe surfaces to remove sanding dust, dirt, or other contaminants.
- E. Allow previous coat to dry for 4 hours before recoating, or as recommended by manufacturer.

- F. Apply each coat to smooth, uniform finish, free of brush or roller marks, or other imperfections.

3.5 APPLICATION – INTERIOR WOOD FLOORING

A. Primer:

1. Apply Dura Seal® Quick Dry Sealer with a natural China bristle brush or lambswool applicator at a coverage rate of 500 square feet per gallon.
2. Allow surface to dry thoroughly a minimum of 2 hours. Note: Drying time will be increased by high humidity, low temperature, lack of air movement or heavier application.
3. Buff surface with a new 180 grit screen or used 150 grit screen; vacuum thoroughly and tack.

B. Painting:

1. Stir product well before and occasionally during use.
2. Apply product with a brush or a lamb's wool applicator in thin coats, at a coverage rate of 500 square feet per gallon (750 square feet per gallon for 450 V.O.C compliant product). NOTE: Application of
3. thicker coats result in extended dry time.
4. Allow product to dry at least eight hours. Abrade with a maroon pad with sanding strips or a 120-grit screen. If allowed to dry more than 24 hours abrade thoroughly. Tack floor with a cloth moistened with mineral spirits to remove dust.
5. Apply a second coat of product in the same manner as the first coat.

3.6 CLEANING

- A. Collect waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.
- B. As work proceeds, promptly remove spilled, splashed, or splattered finishes.
- C. Cleaning of applicator tools, buckets etc. on site is prohibited without specific permission from Owner, and then only in designated areas. These designated areas shall in turn be cleaned daily at the completion of Work. Paint and other waste material will not be disposed of on ground or in public street gutters or on site, but shall be returned to Contractor's place of business and disposed of properly in accordance with environmental regulations.

3.7 SCHEDULE – FINISHES

- A. Products of the paint system selected shall be from the same manufacturer, unless otherwise indicated.
- B. Interior Wood Walls:
 1. Pittsburg Paints:
 - a. 1st Coat: Speedhide zero Interior Zero VOC Latex Primer 6-4900XI, at 1.2 mils DFT (0.029 mm).
 - b. 2nd Coat: 6-4510XI Speedhide zero Interior Zero VOC Semi-Gloss Latex, interior semigloss acrylic enamel, at 1.3 mils DFT (0.033 mm).

- c. 3rd Coat: 6-4510XI Speedhide zero Interior Zero VOC Semi-Gloss Latex interior semigloss acrylic enamel, at 1.3 mils DFT (0.033 mm).
 - 2. Sherwin-Williams:
 - a. 1st Coat: PrepRite Problock Interior Latex Primer, at 350-400 sq. ft./gal @ 4 mils wet; 1.0 mil DFT.
 - b. 2nd Coat: ProMar 200 Interior Latex, Eggshell, at 350-400 sq. ft./gal @ 4 mils wet; 1.7 mils DFT.
 - c. 3rd Coat: ProMar 200 Interior Latex, Eggshell, at 350-400 sq. ft./gal @ 4 mils wet; 1.7 mils DFT.
- C. Restrooms (Interior) Gypsum Board:
 - 1. Pittsburg Paints:
 - a. 1st Coat: Speedhide zero Interior Zero VOC Latex Primer 6-4900XI, at 1.2 mils DFT (0.029 mm).
 - b. 2nd Coat: 6-4510XI Speedhide zero Interior Zero VOC Semi-Gloss Latex, interior semigloss acrylic enamel, at 1.3 mils DFT (0.033 mm).
 - c. 3rd Coat: 6-4510XI Speedhide zero Interior Zero VOC Semi-Gloss Latex interior semigloss acrylic enamel, at 1.3 mils DFT (0.033 mm).
 - 2. Sherwin-Williams:
 - a. 1st Coat: PrepRite Problock Interior Latex Primer, at 350-400 sq. ft./gal @ 4 mils wet; 1.0 mil DFT.
 - b. 2nd Coat: ProMar 200 Interior Latex, Eggshell, at 350-400 sq. ft./gal @ 4 mils wet; 1.6 mils DFT.
 - c. 3rd Coat: ProMar 200 Interior Latex, Eggshell, at 350-400 sq. ft./gal @ 4 mils wet; 1.6 mils DFT.
- D. Wood Doors, Casing, and Trim; Base Board:
 - 1. Pittsburg Paint:
 - a. 1st Coat: 17-921 100% Acrylic Primer/Sealer, at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, 1.1 to 1.3 mils DFT.
 - c. 3rd Coat: 90-374 100% Acrylic DTM Industrial Gloss Enamel, 1.1 to 1.3 mils DFT.
 - 2. Pratt & Lambert:
 - a. 1st Coat: Suprime 8 Exterior Alkyd Wood Primer, at 1.1 to 1.4 mils DFT.
 - b. 2nd Coat: Accolade Exterior Gloss 2/F4300, at 350-400 sq. ft./gal @ 4 mils wet; 1.6 mils DFT.
 - c. 3rd Coat: Accolade Exterior Gloss 2/F4300, at 350-400 sq. ft./gal @ 4 mils wet; 1.6 mils DFT.
 - 3. Sherwin-Williams:
 - a. 1st Coat: PrepRite Problock Interior Latex Primer, at 350-400 sq. ft./gal @ 4 mils wet; 1.0 mil DFT.
 - b. 2nd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.

- c. 3rd Coat: Pro Industrial Waterbase Alkyd Urethane Enamel, B53, at 1.4 to 1.7 mils DFT.
- E. Wood Flooring:
 - 1. Dura Seal:
 - a. 1st Coat: Dura Seal® 500 Quick Dry Sealer at 500 sq. ft./gal.
 - b. 2nd Coat: Dura Seal® Polyurethane at 500 sq. ft./gal.
 - c. 3rd Coat: Dura Seal® Polyurethane at 500 sq. ft./gal.

3.8 SCHEDULE – COLORS

- A. Match existing colors.
- B. Provide brush outs supplied by the manufacturer.

END OF SECTION

SECTION 31 23 00
EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavation; filling and backfilling; fill for over-excavation; rough contouring; consolidation and compaction; finish grading.
- B. Related Requirements:
 - 1. Section 02 41 20 – Selective Demolition.
 - 2. Section 22 13 16 – Sanitary Waste and Vent Piping.

1.2 REFERENCES

- A. ASTM C136/C136M-19 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D1557-12(2021) – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- C. ASTM D2487-17e1 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- D. ASTM D6938 (2017a) - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- E. ASTM D8167/D8167M-23 – Standard Test Method For In-Place Bulk Density Of Soil And Soil-Aggregate By A Low-Activity Nuclear Method (Shallow Depth).
- F. ASTM D7928-21e1 - Standard Test Method For Particle-Size Distribution (Gradation) Of Fine-Grained Soils Using The Sedimentation (Hydrometer) Analysis.
- G. Local utility standards when working within 24 inches of the respective utility lines.
- H. Standard Specifications for Public Works Construction, City and County of Honolulu, 1986.

1.3 DEFINITIONS

- A. Utility: Any buried pipe, conduit, or cable.
- B. Top Soil: The top 4-inch layer in excavations across lawn or planting area.

1.4 SUBMITTALS

- A. Samples: Provide samples of materials as required by the Engineer that will be used from furnished material.
- B. Materials Source: Submit name of imported materials suppliers.
- C. Test Reports: Field density test reports. Submit gradation test for all furnished material.

1.5 CLOSEOUT SUBMITTALS

- A. Accurately record actual locations of new and existing utilities, by horizontal dimensions, elevations or inverts, and slope gradients.
- B. Accurately record actual locations of capped utilities and subsurface obstructions.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the Standard Specifications for Public Works Construction of the City and County of Honolulu.

1.7 COORDINATION

- A. Convene minimum one week prior to commencing Work of this section.
- B. Review preparation and installation procedures and coordinating and scheduling required with related work.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. General Fill: Excavated native material or borrow material, free of subsoil, roots, grass, weeds, large stone, and foreign matter, consisting of coarse-grained soil with clay binders and fine-grained soils having expansion value less than 3 percent and with CBR value of 8 or greater; containing not more than 50 percent rock or hard lumps of earth larger than 3 inches in greatest dimension.
- B. Structural Fill: Structural fill used below foundations should consist of a mineral soil free of organic material, loam, debris, frozen soil or other deleterious material which may be compressible or which cannot be properly compacted. Structural fill should conform to the following gradation requirements:
 - 1. Gradation per ASTM C136:

SIEVE SIZE	% Passing
2"	100
No. 4	20 - 70
No. 40	5 - 35
No. 200	0 - 10

- C. Structural fill should be placed in layers no thicker than 8 inches, as placed, and compacted with suitable compaction equipment to at least 95 percent of maximum dry density as determined by ASTM D1557. Lift thickness should be reduced to 4 inches in confined areas accessible only to hand guided compaction equipment.
- D. Unsuitable Material: Highly organic soil ASTM D2487, Group PT or CH, topsoil, roots, vegetable matter, trash and debris.
- E. Base: Crushed stone, free of vegetable matter and other deleterious substances, capable of meeting compaction requirements, conforming to the following:

1. Gradation per ASTM C136:

SIEVE SIZE	% Passing
2"	100
1 1/2"	90
3/4"	79
4	47
200	6

F. Pipe Zone Material: Granular material such as sand, crushed fine aggregate, or finely graded coral, free of vegetable matter and other deleterious substances, capable of meeting compaction requirements, conforming to the following:

1. Gradation per ASTM C136:

Sieve Size	% Passing (By Weight)
1"	100
3/4"	90-100
No. 4	35-65
No. 16	15-40
No. 200	2-10

G. Drainage Gravel: Natural gravel, free of clay, organic matter or other objectionable material. For grains retained on No. 4 sieve, the grain shape shall be rounded or sub-rounded, as defined by ASTM D-2488, and shall conform to the following:

1. Gradation per ASTM C136:

Sieve Size	% Passing (By Weight)
1/2"	100
No. 4	75-100
No. 50	0 - 70
No. 100	0 - 30
No. 200	0 - 15

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 73 00 – Execution: Examination.
- B. Identify required lines, levels, contours, and datum.
- C. Verify field measurements prior to fabrication or construction.
- D. Verify that survey benchmark and intended elevations for the Work are as indicated.

3.2 PREPARATION

- A. Section 01 33 00 – Coordination and Project Conditions.
- B. Notify Engineer a minimum of 72 hours prior to commencement.
- C. Stake and flag locations of known utilities. Locate, identify, and protect utilities that remain from damage.

3.3 PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.
- B. Protect above and below grade utilities that remain.
- C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- D. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from damage by excavating equipment and vehicular traffic.

3.4 STOCKPILING

- A. Stockpile excavated material in area designated on site to depth not exceeding 8 feet (2.5 m) and protect from erosion. Stockpile material on impervious material on 36 mil Hypalon material and covered over with the same material, until disposal.
- B. Separate differing materials with dividers or stockpile apart to prevent mixing.
- C. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- D. Remove excess topsoil, not intended for reuse, from site.

3.5 PUMPING, DRAINAGE, AND DEWATERING

- A. Remove water, including rainwater, encountered during the course of the foundation and substructure work, by the use of pumps, drains, and other approved methods.
- B. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary dams, curbs, and ditches as may be required.

3.6 SUBSOIL EXCAVATION

- A. Excavate subsoil to accommodate slabs-on-grade, footings, and construction operations.
- B. Remove groundwater by pumping to keep excavations dry.
- C. When excavating through roots, perform work by hand and cut roots with sharp axe.
- D. Slope banks with machine to angle of repose or less until shored.
- E. Grade top perimeter to prevent surface water from draining into excavation.
- F. Hand trim excavation. Remove loose matter.
- G. Remove lumped subsoil, boulders, and rock from site.

- H. Proofroll bearing surfaces. Correct soft spots and compact uniformly to required density.
- I. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume Work.
- J. Correct over-excavated by refilling to proper grade with approved materials at no additional cost to Owner.
- K. Provide adequate protection of open excavations.

3.7 PREPARATION BEFORE BACKFILLING

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with General Fill and compact to density equal to or greater than requirements for subsequent fill material.
- C. Scarify subgrade surface to a depth of 6 inches to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.8 FILLING AND BACKFILLING

- A. Fill areas to contours and elevations.
- B. Do not backfill over porous, wet or spongy subgrade surfaces.
- C. Employ a placement method that does not disturb or damage utility or other work.
- D. Place fill materials in continuous layers and compact to required density. Do not exceed 8 inches depth per lift before compaction.
- E. Pipe Trench:
 1. Place pipe cushion material in bottom of trench to a minimum depth of 2 inches.
 2. Backfill first lift with Pipe Zone Material from the bottom of pipe to 12 inches above the barrel of the pipe by hand shoveling and tamping. Make sure backfill material is in contact with entire periphery of the pipe.
 3. Backfill remainder of trench with General Fill.
- F. Maintain optimum moisture content of fill materials to attain required compaction density.
- G. Compact to 90 percent of ASTM D1557 maximum dry density.
- H. Remove surplus fill materials from site.

3.9 ROUGH GRADING

- A. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Eliminate uneven areas and low spots.
- C. Make grade changes gradual. Blend slope into level areas.
- D. Slope grade away from buildings and other structures a minimum of 2 inches in 10 ft., unless noted otherwise.

- E. Unless otherwise indicated, the subgrade shall be evenly sloped to provide drainage away from buildings and site improvements or the centerline of medians. Swales shall be cut as shown on the plans, but shall not reduce the thickness of the topsoil specified.

3.10 FINISH GRADING

- A. Protect finish grade areas and correct any irregularities caused by hauling materials or by other operations over the finished grade.
- B. Repair soil erosion or other damage resulting from weathering action before final acceptance.
- C. Finish and fine grade the project area to establish an even and well-matched grade over the entire surface. Positive surface drainage with no depressions, or subsequent settling or irregularities in the finished grade.
- D. Excavated and filled sections and adjacent transition areas shall be smooth, properly compacted and free from irregular surface changes, all lumps of soil shall be pulverized, raked out or removed. The degree of finish grading shall equal that ordinarily obtained from either blade, grader, or scraper operations. Where finishing cannot be satisfactorily completed with power equipment, hand raked methods shall be used.
- E. Finish grading shall conform to elevations and shall be in a smooth, even condition, free from debris, rocks, and other materials that would be detrimental to the finished grade.
- F. Settling of finish grade shall not be more than 0.1 feet, and if settling is greater, the contractor shall bring the grade to specified elevations.

3.11 TOLERANCES

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

3.12 FIELD QUALITY CONTROL

- A. Section 01 40 00 – Quality Requirements.
- B. Perform a minimum of 1 field density test per 100 square feet on compacted fill in accordance with ASTM D1557.

3.13 STOCKPILE CLEANUP

- A. Remove stockpile; leave area in a clean and neat condition.
- B. Remove surplus subsoil and topsoil from site.
- C. Leave stockpile area and site clean and raked.
- D. Grade site surface to prevent freestanding surface water.

3.14 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01 73 00.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.15 SCHEDULE

A. Compaction:

1. Structural Fill: Compact to 95% of maximum Standard Proctor Density.

END OF SECTION

SECTION 31 41 00
SHORING AND BRACING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary sheeting, shoring, and bracing to prevent movement of the structure during remediation.
- B. Provide free, and unobstructed egress to the structure during construction operations to protect the life and safety of occupants and visitors during construction operations.

1.2 RELATED WORK

- A. Section 02 41 20 – Selective Demolition.
- B. Section 31 23 00 – Earthwork.

1.3 SUBMITTALS

- A. At least 15 working days before beginning excavation on a trench 5 feet or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for work protection from structure movement and caving ground hazard.
 - 1. Excavation on a trench 5 feet or more in depth shall not take place until the submitted shoring and bracing plan has been approved by the Engineer.
- B. The plan shall be prepared and signed by a registered Professional Civil or Structural Engineer.
- C. Coordinate the excavation and shoring analysis and design with the dewatering plan.
- D. Design shoring and bracing for anticipated earth, water, and surcharge pressures and loading.
- E. General:
 - 1. Obtain required permits before starting work.
 - 2. Ensure that employees entering excavations are protected from cave-ins, failure of protective systems, hazardous atmospheres, vehicular traffic, falling loads, and any other hazardous conditions.
 - 3. Provide a competent person on-site who will make daily inspections of excavations, adjacent areas, and protective systems. The competent person will be responsible for ensuring that the protective system is based upon soil classifications, and that it provides the required protection in accordance with requirements of the Structural Engineer.
 - 4. Sloping or benching of excavations will not be allowed unless otherwise indicated on the Project Plans.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

- A. Remove shoring in such a manner as to prevent caving at the walls of the excavation or damage to piping or other structures.
- B. Backfill shored excavations with controlled density fill before the shoring is removed.

3.2 PROCEDURAL PRACTICES

- A. Excavations:
 - 1. Brace and support excavations to be safe, and that the ground alongside the excavation will not slide or settle, and all existing improvements of any kind will be fully protected from damage.
 - a. If damage does result to such improvements, make the necessary repairs or reconstruction, at Contractor's expense, as directed by the Engineer.
 - 2. Construct sheet piling and other timbers driven or constructed in such manner as to prevent caving the walls of the excavation.
 - 3. Excavations and shored pits shall have barricading, fall protection handrails, and access ladders in accordance with HIOSH requirements.
- B. Shoring and Bracing Structure:
 - 1. Provide header beam, wall plate or other element where required to collect load.
 - 2. Provide posts or other load-carrying elements that has adjust ability and positive end connections.
 - 3. Provide sole plate, bearing plate or other element where required to spread the load into the ground or other structure below.
 - 4. Provide lateral bracing to prevent shoring system from racking (becoming parallelogram) or buckling.
 - 5. Transfer load by bearing, so that initial distress can be observed as crushing of wood at contact surfaces.
 - 6. Connection fasteners should be as small as practicable.
 - 7. Systems should be used that are braced in both directions.

END OF SECTION