

Montana Fish, Wildlife & Parks

SPECIFICATIONS FOR WORK

SECTION 011000-	Summary
SECTION 014121 -	Historical Site Work
SECTION 015000 -	Temporary Facilities and Controls
SECTION 070150 -	Preparation for Re-roofing
SECTION 073115 -	Cedar Shingles

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and drawing conventions.
7. Miscellaneous provisions.

B. Related Requirements:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Division 01 Section "Historical Site Work" for procedures governing work on historic facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Rosebud Battlefield State Park – Kobold House and Bunkhouse Reroofing

1. Project Location:

HC 42, Box 642
Busby, MT 59016
Latitude/Longitude: (45.22031 / -106.97590)

B. Owner: State of Montana Fish Wildlife & Parks.

1. Owner's Representative:

Phil Jagoda, Project Manager
State of Montana Fish, Wildlife and Parks
Design & Construction Bureau.
1522 Ninth Avenue
Helena, Montana
Phone: (406) 841-4009
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WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
1. The work consists of removing and replacing cedar shakes and related materials from the Kobold House and north elevation of the Bunkhouse at Rosebud Battlefield State Park. Ice & water shield shall be installed over the entire porch roofing area of the Kobold House.
 2. All work associated with the re-roofing project and included in these specifications shall be considered incidental, including but not limited to: roofing felt, ice and water shield (where req'd), fasteners, seals, flashing, ridge cap, gable and fascia trim, roof penetrations, existing roofing removal & disposal, roofing preparation, site protection, and associated work.
 3. It is the contractor's responsibility to confirm dimensions and layout for quantifying materials. Slope factor, waste, and overlap is considered incidental to the project and will not be paid as extra.
- B. Type of Contract.
1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated by requirements of this Section.
- B. Staging Area: Designated area for Contractor parking, staging equipment and materials is located in the gravel drive/parking area, or as otherwise approved by Park Management.
- C. Use of Site: Limit use of Project site to work in areas of re-roofing. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Keep driveways, walkways, and entrances serving premises clear and available to Owner, Owner's employees, the public, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - c. Do not drive vehicles or equipment on the yard areas or off established roads unless approved by the Owner's project representative. Damage to the landscape areas shall be repaired by the Contractor at no cost to the Owner.
- D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

- A. Owner Occupancy: Owner will occupy site on a part time basis during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate safe Owner and Public usage. Perform the Work so as not to interfere with Owner's day-to-day operations.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. On-Site Work Hours: Project work will be limited to the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday. Additional hours or working days are subject to Owner approval with prior notice. Contractor must give Owner a minimum of two (2) days notice for working hours outside of those indicated above.
- C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Undesirable language and other such devices such as excessively loud radios and conversation are hereby specifically prohibited on the project site, as determined by the Owner.
- D. Smoking is not permitted within 25 feet of buildings.

1.7 MISCELLANEOUS PROVISIONS

- A. See Special Conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 014121 – HISTORICAL SITE WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Historical Site Preservation.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and other items of interest or value to Owner that may be uncovered during operations remain the property of Owner.

PART 2 - SITE AREAS

2.1 SITE AREA REQUIREMENTS

- A. Refer to Division 01 – “Summary” for a description of the work and other site requirements.

PART 3 - EXECUTION

3.2 HISTORICAL SITE PRESERVATION

- A. Original Condition: The Contractor shall keep historical sites in original conditions or return to original conditions when applicable at Owners approval. This includes but is not limited to the following:
 1. Historical building(s) shall be kept in as is condition. Necessary construction in those buildings shall be done in a neat and workman like manner. Accumulated debris shall be cleaned each day to the condition the building was found in and to the satisfaction of the Park Management.
 2. It is expected that work in these buildings will be done with the utmost care. Any damage encountered shall be reported immediately to the Park Management to determine the method and means of repairs.
 3. Contractor is responsible for any damages to historical buildings, sidewalks, fences or any other items of archeological significance. All costs of Contractor caused damage shall be borne by the Contractor. Careless construction will not be tolerated and will be subject to a Stop Work order and evaluation of personnel and methods involved.
 4. Any disturbed ground shall be returned to original surface condition. Contractor is responsible for any seeding. Seeding mix will be specified by Owner.
 5. Contractor is responsible for bracing building rafters/walls to enable access and movement in buildings where building integrity is of concern. Contractor is responsible to bring any integrity issues of buildings to the Owner and Engineer.

6. Contractor is responsible for taking before and after pictures of all areas and buildings where work is done. The Contractor must provide the Owner with a digital copy of both before and after pictures when the job is completed.
- B. Uncovered Artifacts: For historical sites, there is a likely probability that artifacts will be uncovered during Work.
1. If an artifact is uncovered, the Contractor is responsible to immediately notify the Park Management or onsite archaeologist.
 2. In the case of an uncovered artifact, the Contractor is expected to move ahead to another work area after notifying the proper personnel. Onsite archaeologist will need adequate time to carefully examine the artifact.
 3. It is at the archaeologist or Owner's discretion on when work can resume in the area of where the artifact was uncovered.
- C. Temporary Protection: Provide temporary barricades, signs and other protection required to prevent injury to people and damage to adjacent buildings and facilities.
1. The Park will remain open to the public during construction. Park management must be notified and updated on a routine basis as to scheduled closing and reopening of work areas. To the extent practical, Work shall be scheduled to minimize impact to the public.
 2. Provide protection to ensure safe passage of people around selective work area and to and from occupied portions of building.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective operations.
- D. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of the building that is being worked on.
1. The design for work in the buildings is, for the most practical degree, for an installation that would be possible with the least amount of hazard to the worker and the least likelihood of damage to the building. Historic buildings are fragile and contractors care is imperative.
- E. Remove temporary barricades and protections where hazards no longer exist.
- F. Remedy property damage: The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor of any tier or level, or anyone employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible.

END OF SECTION 014121

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Division 01 Section "Summary" for work restrictions.

1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner and authorities having jurisdiction.
- B. Electric Power Service from Existing System: Electric power from Owner's existing system may be available for use without metering and without payment of use charge. Contractor must review with Owner before start of work. Provide connections and extensions of services as required for construction operations. Contractor must plan on providing portable generators for the project if use of Owner's on-site service is not practical.

1.3 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service.

1.4 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units. Contractor's option- Field office not required at project site.

- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations. Contractor's option – Storage shed not required at project site.
- C. Toilet Facility: Locate in designated staging area, or as otherwise approved by Park Management.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Connect to existing service.
- B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Toilets: Use of Owner's existing latrine may be allowed if approved by Park Staff.
- C. Electric Power Service: Connect to Owner's existing electric power service, if approved by Owner. Maintain equipment in a condition acceptable to Owner. Provide Contractor supplied portable generators if necessary.
- D. Telephone Service: Provide job superintendent with a cellular phone to use on the job site or away from the job site.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Parking: Use area(s) designated by Owner for construction personnel.
- B. Waste Disposal Facilities: Provide covered waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. The Owner's waste receptacles shall not be used by the Contractor.

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

3.4 SECURITY AND PROTECTION

- A. Contractor is solely responsible for security and protection of all temporary facilities, equipment and materials stored on site.
- B. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities caused by Contractor.
- C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- D. Tree and Plant Protection: Protect vegetation from damage from construction operations. Replace vegetation damaged from work in this Contract. Replace damaged trees and plants as directed by the landscape architect and/or Engineer at no cost to the Owner.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION

SECTION 070150 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof tear-off.

1.2 SUBMITTALS

A. Contractor shall submit to the Owner the following information at least 5 business days prior to starting work:

1. Procedures for protecting site features which may be impacted by the reroofing project.
2. Procedures to allow a safe working environment for FWP employees and continued service to the public.
3. Fastener removal management, clean-up procedures, and disposal container locations.

1.3 PERMITS

- A. Contractor will be responsible to obtain and pay for all necessary permits to complete the work.
- B. Copies of the permit(s) shall be provided to the Owner before the start of any work.

1.4 PROJECT CONDITIONS

- A. Conduct reroofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
- B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- C. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit work to proceed without water entering existing roofing system or building.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ROOF TEAR-OFF

- A. General: Notify Owner each day of extent of roof tear-off proposed for that day.
- B. Contractor to only remove existing roofing materials as specified on the Drawings.

3.2 DECK PREPARATION

- A. Inspect decking after tear-off of roofing system.
- B. If broken or loose fasteners that secure decking are observed or if deck appears or feels inadequately attached, immediately notify Owner's representative. Do not proceed with installation until directed by Owner's representative. Minor work to re-secure decking in areas where fasteners are needed is allowed without prior approval.
- C. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Owner's representative. Do not proceed with installation until directed by Owner's representative.

3.3 EXISTING BASE FLASHINGS

- A. Remove and replace existing base flashings around penetrations as specified.
- B. Remove and replace fascia and gable trim around perimeter as specified.
- C. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish. Metal counterflashings determined to be damaged or not able to be reused by the Owner's Representative, shall also be replaced.

3.4 FASTENER REMOVAL AND COLLECTION

- A. Contractor will be required to control the collection of removed fasteners and minimize the amount that may land onto sidewalks, landscaped areas, and gravel/paved parking areas. Control procedures may consist of using tarps or other means to collect the fasteners as the existing roofing materials are removed.
- B. Contractor will be required to inspect the grounds at the end of each work day and at the end of the project completion for stray fasteners. Magnets or other collection devices should be used to properly collect fasteners. Owner will inspect and approve the clean-up areas at the end of the project before final payment will be approved.

3.5 DISPOSAL

- A. All materials removed become the property of the Contractor and therefore is responsible for disposal and removal from the site. Demolition and construction waste must be removed from the site each day or placed in covered waste receptacles furnished by the Contractor. The Owner's waste receptacles shall not be used by the Contractor.
- B. The function of the buildings, continued use by employees, and service to the public will require the Contractor to clean the grounds on a daily basis, and not allow removed materials to accumulate on the landscaped grounds, sidewalks, or parking areas.
- C. Transport and legally dispose of demolished materials off Owner's property.
- D. Contractor shall remove all temporary protection and all debris attributed to the execution of the Contract subject to Owner's final acceptance.

END OF SECTION

SECTION 073115 – CEDAR SHINGLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cedar shake shingles, underlayment, flashings, fasteners, and accessories.

1.2 REFERENCES

- A. Cedar Shake & Shingle Bureau (CSSB) *New Roof Construction Manual*, 2020 edition, shall be referenced for construction methods, details, and specifications.

1.3 PERFORMANCE REQUIREMENTS

- A. Cedar roof system to consist of tapersawn #1 Blue Label red cedar shingles, Certi-Guard Class B Fire-Retardant, attached to structural substrate to form weather tight roof envelope with no measurable water penetration.
- B. Method of attachments shall be designed to adequately resist wind uplift for roof configuration and project location.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Shingles, underlayment, flashings, fasteners, and accessories indicating composition, properties, and dimensions. Provide data showing compliance with specified requirements.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturer of cedar shingles.
- B. Installer Qualifications: Company competent in installing shingle roof systems with 3 years minimum experience.

1.6 PROJECT CONDITIONS

- A. Anticipate and observe environmental conditions (temperature, humidity, and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.7 WARRANTY

- A. Warranty Requirements:
 - 1. Manufacturer's warranty for shingles against breakage and deterioration that causes leaks under normal weather and use conditions.

2. Installer's 2 years total roof system warranty including underlayment, flashings, trim, and other roof components against water penetration.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cedar Shake & Shingle Bureau ("CSSB") member manufacturer's, such as CertiGrade® Shingles.
- B. Requests for substitutions will be considered in accordance with provisions of Section 012500.

2.2 CEDAR SHINGLES

- A. Cedar shingles with the appearance, color, texture, and thickness of natural wood shakes.
 1. Product: Certi-Guard #1 Blue Label Red Cedar Shingles, or other manufacturer's that are member of the CSSB.
 2. Attributes:
 - a. Fire resistance: Certi-Guard® Class B Fire Retardant; pressure impregnated with fire-retardant polymers.
 - b. Water absorption: 0.18 percent by weight tested in accordance with ASTM D 471.
 - c. Impact resistance: Class 4 to withstand two drops of 2 inches (52 mm) diameter, 1.2 pounds (0.54 kg) steel ball dropped from 20 feet (6 m) tested in accordance with UL 2218.
 - d. Nail pull through resistance: 138 foot-pounds at 72 degree F (187 joules at 22 degrees C) and 166 foot-pounds at 32 degrees F (225 joules at 0 degrees C) tested in accordance with ASTM D 3462.
 - e. Freeze-thaw resistance: No crazing, cracking, delamination of coating, or other deleterious surface changes after one month exposure with temperature cycled from -40 to +180 degrees F (0 degrees to 82 degrees C) in 22 hours tested in accordance with International Code Council (ICC) - ES Acceptance Criteria AC07 Section 4.9.
 - f. Accelerated weathering: Little change after 2,500 hours exposure to ultraviolet (UV) radiation, elevated temperature, moisture, and thermal shock.
 - g. Fungus resistance: No algae growth when inoculated with blue green algae in warm, damp environment for 4 to 6 weeks tested in accordance with ASTM G 21.
 3. Profile: Rectangular shape with exposed to view upper surface and edges textured to resemble natural wood shake. Underside formed with reinforcing ribs for added strength and stability.
 4. Size: Shingle
 - a. Thickness: Varies from 1/4 inch (6 mm) at top to 5/8 inch (16 mm) at bottom.
 - b. Length: 16 inches.
 - c. Variable widths: 4, 6, 7, 8, and 9 inches (102, 152, 178, 203 and 229 mm) to create appearance of random sized natural wood shake.
 5. Starter Shingle: Provide 12 inches (305 mm) long by 12 inches (305 mm) wide.

6. Markings: Form shingles with markings on upper surface to indicate nailing locations and provide alignment guide lines for different exposure lengths.
7. Color: Provide impregnated fire retardant as specified.

2.3 ACCESSORIES

- A. Underlayment: ASTM D 226 No. 30 un-perforated asphalt saturated felt.
- B. Waterproof Sheet Membrane: Cold applied, self-adhering waterproof membrane composed of polyethylene film coated one side with rubberized asphalt adhesive.
 1. Thickness: 40 mils (1 mm).
 2. Low temperature flexibility: Unaffected at minus 32 degrees F (-36 degrees C).
 3. Minimum tensile strength: 250 psi (1724 kPa).
 4. Minimum elongation: 250 percent.
 5. Permeance: 0.05 perms maximum.
- C. Flashing: Fabricate from sheet to profiles and dimensions indicated on Drawings and approved shop drawings and in accordance with general requirements specified in Section 07600 - Flashing and Sheet Metal.
 1. Material: 16 ounce copper.
 2. Material: 26 gage (0.455 mm) galvanized steel.
 3. Linear components: Form in longest possible lengths with 8 feet (2.5 m) as minimum.
 4. Counter Flashings: Extend 4 inches (102 mm) minimum up vertical surfaces and 4 inches (102 mm) minimum under shingles.
 5. Valley flashings: 24 inches minimum width and extending 10 inches (254 mm) minimum from valley center line.
 6. Fabricate eave flashings with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- D. Fasteners: 3/8 inch (9.5 mm) flat head nails 1-1/2 inches (38 mm) long.
 1. Material: Copper.
 2. Material: Stainless steel.
 3. Material: Hot-dipped galvanized.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

- A. Coordinate cedar shingle installation with provision of gutters and downspouts.
- B. Inspect roof framing and plywood or OSB substrate. Verify roof is complete, rigid, braced, and deck members are securely fastened. Ensure proper ventilation has been provided for roof space. Do not proceed with roofing until deficiencies are addressed.
- C. Verify roof deck is clean, dry, and ready to receive cedar shingles.

- D. Remove dirt, loose fasteners, and other protrusions from roof surface.

3.3 UNDERLAYMENT INSTALLATION

- A. Underlayment: ASTM D 226 30# un-perforated asphalt saturated felt.
- B. Install one-ply asphalt felt over full roof area, with ends weather lapped 4 inches minimum. Nail in place with roofing nails spaced in accordance with manufacturer's recommendations.
- C. Install waterproof sheet membrane over roof area, where required. **The porch roof area on the Kobold House will required ice and water shield over the entire area.** Apply underlayment membrane in fair weather at temperatures of 40 degrees F (4 degrees C) or higher. Adhere and attach as recommended by manufacturer of underlayment.
- D. Start underlayment installation at lower edge of roof. Install perpendicular to roof slope with 2 inches minimum side laps and 12 inches minimum end laps. Extend underlayment 4 inches minimum up vertical wall intersections.
- E. Do not leave underlayment membrane exposed for lengthy period of time. Exercise care not to puncture or tear underlayment barrier with subsequent roofing operations.

3.4 FLASHING INSTALLATION

- A. Install overhanging drip edge on eaves and gable ends and metal flashings at valleys, ridges, hips, roof curbs, penetrations, and intersections with vertical surfaces in accordance with applicable specifications and as detailed on Drawings and approved shop drawings.
- B. Weather lap joints 2 inches (52 mm) minimum and seal with sealant as specified.
- C. Secure in place with clips, nails, or other fasteners.

3.5 INSTALLATION - GENERAL

- A. Install cedar in accordance with manufacturer's instructions.
- B. Accurately layout shingles. Ensure that edges are parallel and perpendicular to roof eaves.
- C. Cutting: Layout work to avoid cutting shingles.
 1. At gables and vertical intersections, vary combination of shingle widths and spacing of shingles to avoid cutting.
 2. If cutting is required, place shingle such that cut edge is not exposed.
 3. Use circular saw or straight edge and utility knife if cuts are necessary.

3.6 CEDAR SHINGLE INSTALLATION

- A. The CSSB New Roof Construction Manual, dated 2020 edition, shall be referenced for construction methods, details, and specifications.
- B. Install shingles in a rack or pyramid style from factory assembled bundles.

- C. Exposure: Install shingles in straight pattern with exposure and bottom shingle edges evenly aligned.
- D. Exposure: Install shingles in staggered pattern with exposure and bottom edges of adjacent shingles staggered.
- E. Spacing: Provide inch gap between shingles to allow for expansion and contraction.
- F. Stagger shingle joints in one course 1-1/2 inches minimum from joints in course below.
- G. Eaves: Install row of starter shingles at eaves as base layer. Project eave shingles approximately 1 inch, 1/8 inch past overhanging drip edge, or as required to allow water to drain into gutter or off eave as indicated or required.
- H. Gables: Project shingles approximately 3/4 inch beyond gable rakes or 1/8 inch past overhanging drip edge.
- I. Ridges and Hips: After field shingle installation is complete, install double row of shingles over 6 inches (152 mm) wide metal flashing.
 - 1. Ridges: Use pre-manufactured ridge shingles with exposure. Start ridge shingles at leeward end. Face shingle laps away from prevailing wind.
 - 2. Hips: Use pre-manufactured shingles with exposure. Start hip course at eave.
- J. Fastening: Attach each shingle to wood deck with 2 nails using hammer or pneumatic nail gun.
 - 1. Place nails at locations on shingles.
 - 2. Ensure good penetration but do not overdrive nail. Do not nail at angle. Ensure head is flush with shingle surface to avoid creating depressions.
 - 3. At valleys do not nail shingles within 5 inches of valley center line.

3.7 FIELD QUALITY CONTROL

- A. Inspect units as they are installed. Do not install cracked, broken, twisted, curled, or otherwise damaged units.
- B. As work progresses, exercise care not to scratch or mar installed units. Units damaged during installation shall be immediately removed and discarded.
- C. After approximately 200 units have been installed, inspect roof from ground. Verify proper layout and appearance. Repeat inspection every 200 shingles.
- D. Visually inspect complete installation to ensure that it is weather tight.

3.8 CLEANING AND PROTECTION

- A. Remove excess materials and debris from finished surfaces and adjacent roof areas.
- B. Do not allow work force on completed roof.
- C. Protect installed products until completion of project.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION