

SPECIFICATIONS

WAYNE ORSB KIOSKS(2) WAYNE NATIONAL FOREST

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 PROJECT IDENTIFICATION

- A. Project Name and Location: ORSB Kiosk construction work at Frontier Boat launch and South Point.
- B. Project Summary Description: The project includes but is not limited to the following Work:
 - 1. Install new kiosks.
 - a. Furnish and Install concrete sidewalks
 - b. Install GFM solar lighting.
 - c. Install GFM stone column facade.
 - d. Install GFM gutters and downspouts.
 - e. Furnish and Install asphalt paving.

1.2 CONTRACTOR USE OF SITE AND PREMISES

- A. No toilet facilities, on-site power, or water is available for the contractor to use.

PART 2 - GENERAL

2.1 RELATED DOCUMENTS

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

2.2 CONTRACTOR USE OF PREMISES

- A. The Government will conduct a pre-construction survey with the Contractor to review and document the existing project conditions prior to construction.
- B. During the construction period the parking area shall be kept open.
- C. Contractor shall be responsible for all personal and construction waste material and shall supply their own waste receptacle.

- D. The Contractor shall limit use of the premises to the work in areas indicated.
1. Confine operations at the site to areas indicated. Do not disturb portions of the site beyond the areas in which Work is indicated.
 2. Schedule deliveries to minimize space and time requirements for storage of material and equipment on site.
 3. Repair damage caused by construction operations. Take precautions to protect the public during the construction period.
 4. Space on the premises is available for the Contractor's storage and related activities.
 5. Existing materials and equipment that are removed as part of the construction operations, and that are not reused or salvaged as Government property, shall become the property of the Contractor and shall be removed from the site. Storage or sale of excess salvageable materials and equipment is not permitted on site.

2.3 GOVERNMENT OCCUPANCY

- A. The site will be open to the public during the construction. Cooperate with the Government's representatives during construction operations to minimize conflicts and facilitate public usage. Perform the Work in a manner that does not interfere with the public operations.

PART 3 - PRODUCTS

- A. Government Furnished Materials (GFM)
1. All lumber required for kiosks
 - a. Miscellaneous actual 2" thickness blocking not included in GFM.
 - b. T1-11 siding not included in GFM.
 2. Ledge stone fieldstone for column facade.
 - a. Limestone cap not included in GFM.
 3. Solar lighting.
 4. Metal roofing and ridge cap.
 5. Gutters and downspouts.

PART 4 - EXECUTION (Not Applicable)

END OF SECTION 01140

SECTION 01270 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. A unit price provides an amount proposed by the Contractor and stated on the Schedule of Items as a price per unit of measurement for materials or services.
- B. Unit prices include all necessary material and labor costs, taxes, shipping and other related expenses for the added or deducted work.

1.2 PROCEDURES

- A. Measurement: Method of measurement for each unit price is specified in the specification section applicable to the work.
- B. Verification: The Government reserves the right to reject the Contractor's measurement of work in place that involves use of an established unit price, and to have this work measured, at the Government's expense, by an independent surveyor acceptable to the Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01270

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes certain administrative provisions for managing and coordinating construction operations.

1.2 GENERAL PROJECT COORDINATION

- A. Coordination of Trades: Coordinate construction operations to provide an efficient and orderly installation of each part of the Work.

1.3 CONSERVATION

- A. Practice conservation of energy, water and materials during construction operations.

1.4 SPILL AND EROSION CONTROL

- A. Spill and Erosion Control Plans: Develop plans to minimize erosion. Develop plans to provide for containment of hazardous materials and unplanned spills.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. In addition to meeting the requirements of FAR 52.236-6 for an on-site Project Superintendent, the Contractor shall provide other administrative and supervisory personnel as required for performance of the Work.

1.6 CONFERENCES AND MEETINGS

- A. Pre-construction Conference: The Contracting Officer will schedule a pre-construction conference before starting construction at a time and place convenient to the Contractor and will review responsibilities and personnel assignments. FAR 52.236-26
- B. Progress Meetings: Progress meetings at the Project Site shall be conducted at regular intervals. Dates of meetings shall be coordinated with preparation of the payment request in accordance with FAR 52.232-5.
 - 1. Agenda: Include topics for discussion as appropriate to the status of the Project. Include review of the Contractor's Construction Schedule and of the present and future needs of each entity present.
 - 2. Schedule Updating: If the progress of the work falls behind the approved Contractor's Construction Schedule, the Contractor shall submit a supplementary schedule for approval by the Contracting Officer in accordance with FAR 52.236-15.

1.7 SUBMITTALS

- A. Spill and Erosion Control Plans shall be submitted within 10 calendar days after commencement of construction.
- B. Staff Names: Within 10 calendar days after commencement of construction, submit a list of principal staff assignments, including the Superintendent and other primary personnel. Identify individuals by name, duties and responsibilities, home address, and business and home telephone numbers. Post copies of this list in the temporary field office.
- C. Construction Schedules shall be submitted as directed in FAR 52.236-15, Schedules for Construction.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Prior to installations, require the installer of each major component to inspect both the substrate and conditions under which work is to be performed.
- B. Construction in Progress: Keep construction in progress, adjoining materials in place, and clean during handling and installation. Apply protective coverings for protection from damage or deterioration.
- C. Completed Construction: Clean completed construction and provide maintenance to prevent damage, soiling or other deterioration through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damage.
- D. Limiting Exposures: Supervise construction operations to prevent exposure of any part of construction, completed or in progress, to harmful, dangerous, damaging or otherwise deleterious conditions during the construction period.

END OF SECTION 01310

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. This section, FAR 52.246-1 and FAR 52.246-12 include within 10 calendar days requirements for quality control services to verify quality assurance requirements specified elsewhere in the Contract.
- B. The Government reserves the right to conduct independent tests.
- C. This section includes requirements for quality control services: soil density compaction, water line pressure tests, drain rock and sand gradation tests, and water quality tests.
- D. The quality control services include tests and related actions, including reports, performed by the Contractor, independent agencies or governing authorities.

1.2 RESPONSIBILITIES

- A. Contractor Responsibilities: The Contractor shall provide for tests, inspections and other quality control services where specified in the Contract or when required by authorities having jurisdiction. Costs for these services are included in the Contract price. The Contractor shall maintain complete inspection records and make them available to the government.
- B. The Contractor shall employ and pay for a qualified independent testing agency (Agency) to perform the quality control services.
- C. Retesting: The Contractor is responsible for retesting, including repeated inspections and other services, where results of the initial tests, inspections or other quality control services indicate noncompliance with the requirements of the Contract.
- D. Associated Services: The Contractor shall cooperate with others performing required tests, inspections and other quality control services, shall provide access to the work, and shall furnish incidental labor and facilities necessary to facilitate inspections and tests.
- E. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 - 1. Deliver samples to testing laboratories.
 - 2. Provide security and protection of samples and test equipment at the Project site.
- F. The Agency shall provide qualified personnel to perform required inspections and tests.
- G. The Agency shall notify the Government and the Contractor of irregularities or deficiencies observed in the Work during performance of their services.
- H. The Agency is not authorized to change requirements of the Contract or approve or accept any portion of the Work. The Agency shall not perform any duties of the Contractor.

1.3 SUBMITTALS

- A. Reports: The Contractor shall submit a certified written report, in duplicate, of each test, inspection or other quality control service to the Government.
- B. Written reports shall include, but not be limited to the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making the test or inspection.
 - 6. Designation of the work and test method.
 - 7. Identifications of product and specification section.
 - 8. Complete test or inspection data.
 - 9. Test results and an interpretation of test results.
 - 10. Ambient conditions at the time of sample taking and testing.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting.
- C. Permits, Licenses, and Certificates: For the Government's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01400

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide temporary utilities, support facilities, protection, and controls required for construction.
- B. Provide project work signs and secured areas to direct safe construction operations.

1.2 QUALITY ASSURANCE

- A. Standards and Regulations: Comply with industry standards, codes, and with applicable laws and regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES

- A. Temporary Electric Power Service: Provide as needed to keep normal operations from being interrupted. Use of power and water from existing Government buildings for construction activities is approved as available.

3.2 TEMPORARY SUPPORT FACILITIES

- A. Temporary Enclosures: Provide temporary enclosures for protection of construction as needed.
- B. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily.

3.3 TEMPORARY PROTECTION FACILITIES

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

3.4 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal.

- B. Termination and Removal: Each temporary facility shall be removed when the need for its service has ended.

END OF SECTION 01500

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section, FAR 52.236-5, FAR 52.236-12 and FAR 52.236.17 include certain general procedural requirements governing the Contractor's execution of the Work, including, but not limited to laying out the Work, general installation of products, correction of defective Work, and cleaning.

1.2 QUALITY ASSURANCE

- A. Workmanship Standards: Initiate and maintain procedures to ensure personnel performing the Work are skilled and knowledgeable in the methods and craftsmanship needed to produce the required levels of workmanship. Remove and replace Work that does not comply with workmanship specified and standards recognized in the construction industry for the applications indicated. Remove and replace Work damaged or deteriorated by faulty workmanship or replacement of other Work.
 - 1. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable installation instructions and recommendations to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract. The Contracting Officer's Representative shall be immediately notified of conflicts between manufacturer's instructions and the Contract.
 - 2. Minimum Quality and Quantity: The quality level or quantity shown or specified shall be the minimum required for the Work. Except as otherwise indicated, the Work shall comply exactly with that minimum or may be superior to that minimum. Specified numeric values are either minimums or maximums as indicated or as appropriate for the context of the requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 LAYING OUT THE WORK

- A. Before proceeding to lay out the Work, verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered notify the Contracting Officer's Representative promptly.
- B. Maintain a minimum of 1 permanent benchmark on the site. Existing BMs are indicated on the drawings.

- C. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.

3.2 PREPARATION

- A. Site Improvements: The Contractor is responsible for all staking, except for those items indicated on the Drawings to be Government Staked, and maintaining and replacing of staking.
- B. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.
- C. Take field measurements as required to fit the Work properly.

3.3 INSTALLATION

- A. Locate the Work and components of the Work accurately. Make vertical work plumb and horizontal work level.
- B. Install products at the time and under conditions that will produce satisfactory results.
- C. Conduct construction operations so that no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- D. Anchors and Fasteners: Provide anchors and fasteners as required to withstand stresses, vibration and physical distortion. Anchor each component securely in place, accurately located and aligned with other Work.
- E. Adjust operating components for proper operation without binding.

3.4 CORRECTION OF DEFECTIVE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
- B. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and proper adjustment of operating equipment.
- C. Remove and replace damaged surfaces that are exposed to view if the surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired to operate properly.
- E. Remove and replace chipped, scratched or broken surfaces.

3.5 CLEANING

- A. Maintain the project site and work areas free of waste material and debris.
- B. Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the work.
 - 1. Remove liquid spills promptly.
- C. Remove debris from concealed spaces prior to enclosing the space.
- D. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at the time of project completion.

3.6 PROTECTION

- A. Protect installed work from soiling and damage.
- B. Protective Coverings: Provide appropriate protective coverings for work that might be damaged by subsequent operations. Maintain protective coverings in place until project completion.

END OF SECTION 01700

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for Contract close out.
- B. Substantial Completion is defined as that state when the Contractor has complied with the Contract, except for minor deviations, and the project is sufficiently complete and capable of being occupied and used by the Government for the intended purpose.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for Substantial Completion, complete the following.
 - 1. Submit a list to the Contracting Officer, of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Submit operation and maintenance manuals, and As-Built Drawings.
 - 3. Make final change over of valve keys to the Government.
 - 4. Complete startup testing of systems and instruction of the Government operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
- B. Inspection Procedures: The Contracting Officer will notify the Contractor of Substantial Completion following an inspection or advise the Contractor of construction that must be completed or corrected before Substantial Completion.
 - 1. The Government will repeat the inspection when requested and when assured that the Work is substantially complete.
 - 2. Results of the completed inspection will form the basis of the requirements for Final Acceptance.

1.3 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting inspection for Final Acceptance, complete the following:
 - 1. Submit final payment request with releases and supporting documentation not previously submitted and accepted.
 - 2. Submit an updated final statement accounting for final additional changes to the Contract price.
 - 3. Submit a certified copy of the previous Substantial Completion inspection list of items.
 - 4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 5. Submit record documents and similar final record information.
 - 6. Deliver tools, spare parts, extra stock and similar items.

7. Complete final clean-up requirements including touch-up painting of marred surfaces.

B. Final Inspection Procedure: The Government will inspect the Work upon receipt of notice from the Contractor that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the CO.

1. Upon completion of inspection, the CO will notify the Contractor of Final Acceptance or will advise the Contractor of Work that it is incomplete or of obligations that have not been fulfilled and are required for Final Acceptance.

1.4 RECORD DOCUMENT SUBMITTALS

A. Record Drawings: Maintain a clean, undamaged set of blue or black line prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark the drawing that is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

B. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of Record Drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.

2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily determined later by direct observation.

1.5 OPERATION AND MAINTENANCE MANUALS

A. Organize operation and maintenance data in suitable sets of manageable size (2 copies). Bind properly indexed data in individual, heavy-duty, 2-inch (51 mm), 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information.

1. Emergency instructions.

2. Spare parts lists.

3. Copies of warranties.

4. Wiring diagrams.

5. Inspection procedures.

6. Shop Drawings and Product Data.

7. Fixture lamping schedule.

1.6 UTILITY LINES SITE PLAN

- A. Provide an accurately dimensioned site plan showing survey location and elevation of all utility lines, including valves, connections and changes in direction, as installed under the Contract within property lines and outside of building walls.
 - 1. Points where utility lines leave buildings shall be dimensioned from building corners.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Government's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives or installers. Include the following:
 - 1. Maintenance manuals.
 - 2. Record documents.
 - 3. Spare parts and materials.
 - 4. Tools.
 - 5. Lubricants.
 - 6. Fuels.
 - 7. Identification systems.
 - 8. Control sequences.
 - 9. Hazards.
 - 10. Cleaning.
 - 11. Warranties and bonds.
 - 12. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures to site maintenance personnel:
 - 1. Startup.
 - 2. Shutdown.
 - 3. Emergency operations.
 - 4. Noise and vibration adjustments.
 - 5. Safety procedures.
 - 6. Economy and efficiency adjustments.
 - 7. Effective energy utilization.

3.2 FINAL CLEANING

- A. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for Final Acceptance.
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - d. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean, and remove stains, spills, and other foreign deposits. Rake beach areas and other grounds that are neither paved nor planted to a smooth, even-textured surface.
- B. Removal of Protection: Remove temporary protection and facilities installed for the protection of the Work during construction.
- C. Compliance: Comply with the regulations of authorities having jurisdiction and with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Government property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of it lawfully.

END OF SECTION 01770

SECTION 024119 - DEMOLITION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Unless otherwise indicated, demolished materials become Contractor's property. Remove from Project site.
- B. Comply with EPA regulations and hauling and disposal regulations of authorities having jurisdiction.
- C. Forest Service will occupy portions of site immediately adjacent to demolition area. Conduct demolition so Forest Service's operations will not be disrupted.
- D. It is not expected that hazardous materials will be encountered in the Work. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify CO.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Maintain services/systems indicated to remain and protect them against damage during selective demolition operations. Before proceeding with demolition, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other buildings.
- B. Locate, identify, shut off, disconnect, and cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
- C. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- D. Promptly remove demolished materials from Forest Service's property and legally dispose of them. Do not burn demolished materials.

END OF SECTION 024119

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes. All concrete work shall be in accordance with the latest edition of the American Concrete Institute (ACI) Manual of Concrete Practice, including “ACI 301-Specifications for Structural concrete for Buildings” and “ACI 318-Building Code Requirements for Reinforced Concrete”.
- B. See Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.

1.2 SUBMITTALS

- A. Product Data: For each manufactured material and product indicated.
- B. Design Mixes: For each concrete mix indicated.
- C. Concrete coloring agent and color samples.
- D. Shop Drawings: Include details of steel reinforcement placement including material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports.
- E. Material test reports.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- B. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.
 - 1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
 - 2. Formwork and form accessories.
 - 3. Steel reinforcement and supports.
 - 4. Concrete mixtures.
 - 5. Handling, placing, and constructing concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Formwork: Furnish formwork and form accessories according to ACI 301.
- B. Steel Reinforcement:
 - 1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
 - 2. Plain-Steel Wire: ASTM A 82, as drawn.
 - 3. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
 - 4. Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.
 - 5. Hooked Anchor Bolts: ASTM F 1554, Grade 36.
 - 6. Headed Anchor Bolts: ASTM A 307.
- C. Concrete Materials:
 - 1. Portland Cement: ASTM C 150, Type I or II or I/II.
 - 2. Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 3/4-inch (19-mm) nominal size.
 - 3. Water: Complying with ASTM C 94.
 - 4. Synthetic Fiber: Fibrillated or monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.
- D. Admixtures:
 - 1. Air-Entraining Admixture: ASTM C 260.
 - 2. Water-Reducing Admixture: ASTM C 494, Type A.
 - 3. Calcium chloride or added chlorides are not permitted.
 - 4. Concrete coloring agent.
- E. Vapor Retarder: Multi-ply reinforced polyethylene sheet, ASTM E 1745, Class C, not less than 7.8 mils (0.18 mm) thick; or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.
 - 1. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a No. 4 (4.75-mm) sieve and 10 to 30 percent passing a No. 100 (0.15-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.
- F. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- G. Curing Materials:
 - 1. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 - 2. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf.
 - 3. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
 - 4. Water: Potable.

5. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
6. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.2 CONCRETE MIXES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:
 1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
 2. Slump: 4 inches (100 mm).
 3. Maximum water to cement ratio: 0.5
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 6.0 percent within a tolerance of plus 1.0 or minus 1.5 percent.
 1. Air content of trowel-finished interior concrete floors shall not exceed 3.0 percent.
- D. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).
- E. Admixtures must be listed in the approved mix design.

2.3 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with ASTM C 94 and ASTM C 1116.
 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Formwork: Design, construct, erect, shore, brace, and maintain formwork according to ACI 301 and ACI 347.
- B. General contractor shall check entire set of contract documents and drawings and shall coordinate with other contractors to verify location of all openings, sleeves, anchors and

hangers. Contractor shall assume full responsibility for their proper location before placing concrete.

- C. Pipes, sleeves and ducts are not to be placed in walls, beams, slabs, footings or columns unless shown on the drawings.
- D. Vapor Retarder: Install, protect, and repair vapor-retarder sheets according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
 - 2. Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).
- E. Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
 - 2. Minimum concrete cover shall be:

Cast Against Earth.....	3"
Exposed to Earth or Weather.....	2"
Not Exposed to Weather or in Contact with Earth:	
Slabs, Walls, Joists.....	3/4"
Beams, Columns.....	1-1/2"
 - 3. Chairs, spacers, sand plates and supports shall be installed as required to maintain concrete cover and to secure the reinforcement in the locations shown on the plans.
 - 4. No structural concrete shall be poured until the concrete design mixes, the concrete placement procedure, the location of construction joints and the setting of reinforcing steel is approved in writing by the COR.
 - 5. Clear distance between parallel reinforcement in a layer shall not be less than 1-1/2 times the nominal diameter of the reinforcement, nor less than 1-1/3 times the maximum aggregate size, nor less than 1-1/2".
 - 6. Tack welding, welding, heating or cutting of bars is not permitted unless specifically shown on the drawings.
 - 7. Tension and compression lap splices shall be Class B. Splices shall be 48 bar diameters or 24 inches, whichever is greater, unless otherwise shown on the drawings. Stagger splices at least 4'-0" from splices in adjacent reinforcement.
 - 8. No aluminum shall be allowed in the concrete work.
 - 9. Anchor bolts, dowels and hold down anchors shall be securely held in place prior to inspection by COR.
- F. Joints: Construct joints true to line with faces perpendicular to surface plane of concrete.

1. Construction Joints: Construction joints shall be doweled or keyed joints as shown on the plans. Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by COR.
 2. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - a. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 3. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Control joints not specifically indicated on the drawings shall be reviewed by the COR and shall have a maximum spacing not to exceed 36 x slab thickness. Control joints shall be tooled or sawcut to a depth equal to at least one-fourth of the concrete thickness, as follows:
 - a. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 - b. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
 4. Sidewalks shall have contraction joint grooved every five feet, and a construction joint every fifteen feet.
- G. Tolerances: Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.2 CONCRETE PLACEMENT

- A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- B. Dimensions shown for slabs, walls, beams and columns are actual dimensions not nominal dimensions (i.e. a 4 inch slab is 4 inches thick, not 3-1/2 inches thick.).
- C. Do not add water to concrete during delivery, at Project site, or during placement.
- D. Consolidate concrete with mechanical vibrating equipment.
- E. Attach wood sills to concrete with 5/8" anchor bolts 12 inches from each end and 48 inches maximum on center unless shown otherwise on the drawings.
- F. Provide 3/4-inch chamfer on exposed corners.

3.3 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch (6 mm) in height rubbed down or chipped off.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.
 - 1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 - 2. Do not apply rubbed finish to smooth-formed finish.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.4 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Concrete slabs shall be sloped to assure drainage toward floor drains and away from foundation walls.
- C. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on the surface.
 - 1. Do not further disturb surfaces before starting finishing operations.
- D. Scratch Finish: Apply scratch finish to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finish, unless otherwise indicated.
- E. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- F. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
- G. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

- H. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.5 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection, and follow recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions occur before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
- D. Cure formed and unformed concrete for at least seven days in accordance with ACI 308 as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist with absorptive cover, water saturated and kept continuously wet.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Tests will be performed according to ACI 301.
 - 1. Testing Frequency: At least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.

END OF SECTION 03300

SECTION 044300 - STONE MASONRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Samples for limestone caps.
- B. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- C. Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 STONE

- A. Smooth limestone for column caps and GFM ledgerstone fieldstone for the column wraps.

2.2 MORTAR

- A. Mortar for Stone Masonry: ASTM C 270, Proportion Specification, Type N for setting stone, and pointing.
 - 1. Masonry Cement: Do not use masonry cement.
 - 2. Low-Alkali Cement: Use portland cement with not more than 0.60 percent total alkali per ASTM C 114.
- B. Mortar for Scratch Coat over Metal Lath: 1 part portland cement, 1/2 part lime, and 5 parts sand.
- C. Mortar for Scratch Coat over Unit Masonry: 1 part portland cement, 1 part lime, and 7 parts sand.

2.3 STONE MASONRY-VENEER ANCHORS

- A. Adjustable Veneer Anchors: Two-piece anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to studs.
- B. Corrugated-Metal Veneer Anchors.
- C. Wire Veneer Anchors.

2.4 MISCELLANEOUS MATERIALS

- A. Dampproofing for Limestone: Cementitious dampproofing recommended by ILI.
- B. Weep Holes: [Round polyethylene tubing, 3/8-inch (9.5-mm) OD] [Absorbent rope, 1/4 to 3/8 inch (6 to 10 mm) in diameter, 24 inches (600 mm) long].
- C. Expanded Metal Lath: ASTM C 847, 3.4 lb/sq. yd. (1.8 kg/sq. m), galvanized, self-furring, diamond-mesh lath.
- D. Welded-Wire Lath: ASTM C 933, 2-by-2-inch (50-by-50-mm) mesh, 0.0625-inch- (1.6-mm-) diameter, galvanized-steel wire.
- E. Acidic Cleaner: Cleaner designed for removing mortar stains from stone masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

2.5 STONE FABRICATION

- A. Gage backs of stones more than 81 sq. in. (522 sq. cm) in area.
- B. Thickness of Stone Masonry Veneer: 4 inches (100 mm) plus or minus 1/4 inch (6 mm).
 - 1. Thickness does not include projection of pitched faces.
- C. Type of Masonry (Pattern): Match limestone on Tell City Ranger Station for stone characteristics relating to aesthetic effects
- D. Finish: Match limestone on Tell City Ranger Station for stone characteristics relating to aesthetic effects

PART 3 - EXECUTION

3.1 SETTING STONE MASONRY, GENERAL

- A. Accurately mark stud centerlines on face of weather-resistant sheathing paper before beginning stone installation.
- B. Execute stone masonry by skilled masons experienced with the kind and form of stone and installation method indicated. Arrange stones for good fit, in pattern indicated.
- C. Maintain uniform joint widths except for variations due to different stone sizes and minor variations required to maintain bond alignment. Lay walls with joints not less than 1/4 inch (6 mm) at narrowest points or more than 3/8 inch (10 mm) at widest points.
- D. Install embedded flashing[and weep holes] at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
 - 1. Extend flashing 4 inches (100 mm) into masonry at each end and turn up 2 inches (50 mm) to form a pan.

- E. Coat limestone with dampproofing on beds, joints, and back surfaces to at least 12 inches (300 mm) above finish-grade elevations, and on face surfaces up to finish-grade elevations.

3.2 INSTALLING ANCHORED STONE MASONRY

- A. Set stone in full bed of mortar with full head joints. Build veneer anchors into mortar joints as stone is set.
 - 1. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 1-1/2 inches (38 mm), through stone masonry and with at least 5/8-inch (16-mm) cover on outside face.
 - 2. Space anchors to provide not less than 1 anchor per 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (300 mm) of openings, sealant joints, and perimeter at intervals not exceeding 12 inches (300 mm).
- B. Rake out joints for pointing [1/2 inch (13 mm)] [3/4 inch (19 mm)] deep.

3.3 POINTING

- A. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch (10 mm) deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- B. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce joint profile indicated.

3.4 CLEANING

- A. In-Progress Cleaning: Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly cured, remove large mortar particles, scrub, and rinse stone masonry veneer.
 - 1. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

END OF SECTION 044300

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. All work shall comply with the National Design Specification for Wood Construction (NDS).
- B. This Section includes the following:
 - 1. Wood framing.
 - 2. Wood supports.
 - 3. Wood blocking.
 - 4. Wood cants.
 - 5. Wood nailers.
 - 6. Wood furring.
 - 7. Wood grounds.
 - 8. Wood sheathing.
 - 9. Wood subflooring.
 - 10. Wood underlayment.
 - 11. Plywood backing panels.
 - 12. Building wrap.

1.2 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product indicated.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 58 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 3. Provide dressed lumber, S4S, unless otherwise indicated.
 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.
- B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
1. Allowable Design Stresses: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Wood Structural Panels:
1. Plywood: As indicated on plans.
 2. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA C2 (lumber), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber.
- C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
- D. Application: Pressure treated lumber in accordance with AWPA-C2 or C9 shall be provided where shown on the drawings and where:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood joists or wood floor are closer than 18 inches or wood girders are closer than 12 inches to exposed ground in crawl spaces or unexcavated areas.
 3. Wood framing members, including wood sheathing, rest on exterior foundation walls and are less than 8 inches from exposed earth.
 4. Sleepers and sills are installed on a concrete or masonry slab in direct contact with earth.
 5. The ends of wood girders enter exterior masonry or concrete walls unless a ½-inch air space is provided on top, sides and end.
 6. Clearance between wood siding and earth on the exterior of a building is less than 6 inches.
 7. Posts or columns are supported by concrete or masonry slab or footing in direct contact with the earth unless supported by concrete piers or metal pedestals projecting at least 1

inch above the slab and 6 inches above exposed earth and are separated by an impervious moisture barrier.

8. Portions of structural glued laminated timbers are exposed to weather.
9. Wood in contact with the ground.

2.4 DIMENSION LUMBER

- A. General: All grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.
- B. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 2 grade and any of the following species:
 1. Mixed southern pine; SPIB.
 2. Eastern softwoods; NELMA.
 3. Northern species; NLGA.
 4. Western woods; WCLIB or WWPA.
- C. Framing Other Than Non-Load-Bearing Partitions: Construction or No. 2 grade and any of the following species:
 1. Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; NLGA, WCLIB, or WWPA.
 2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
 3. Southern pine; SPIB.
 4. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
- D. Exposed Framing: Hand select material for uniformity of appearance and freedom from characteristics that would impair finish appearance.
 1. Species and Grade: As indicated above for load-bearing construction of same type.

2.5 TIMBER AND MISCELLANEOUS LUMBER

- A. For timbers of 5-inch nominal (117-mm actual) size and thicker, provide material complying with the following requirements:
 1. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; No. 1 grade; NLGA, WCLIB, or WWPA.
 2. Species and Grade: Eastern hemlock, Eastern hemlock-tamarack, or Eastern hemlock-tamarack (north); No. 1 grade; NELMA or NLGA.
 3. Species and Grade: Southern pine, No. 1 grade; SPIB.
- B. Provide miscellaneous lumber for support or attachment of other construction, including the following:
 1. Rooftop equipment bases and support curbs.
 2. Blocking.
 3. Cants.

4. Nailers.
 5. Furring.
 6. Grounds.
- C. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content of any species.
- D. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
 2. Eastern softwoods, No. 2 Common grade; NELMA.
 3. Northern species, No. 2 Common grade; NLGA.
 4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.6 SHEATHING

- A. Plywood Wall Sheathing: A-D Interior Plywood.
- B. Plywood Roof Sheathing: Exposure 1, Structural I sheathing.

2.7 MISCELLANEOUS MATERIALS

- A. Fasteners:
1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 2. Power-Driven Fasteners: CABO NER-272.
 3. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- B. Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
1. Available Manufacturers:
 - a. Alpine Engineered Products, Inc.
 - b. Cleveland Steel Specialty Co.
 - c. Harlen Metal Products, Inc.
 - d. KC Metals Products, Inc.
 - e. Silver Metal Products, Inc.
 - f. Simpson Strong-Tie Company, Inc.
 - g. Southeastern Metals Manufacturing Co., Inc.
 - h. United Steel Products Company, Inc.

2. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
 3. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.
- D. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.
1. Available Manufacturers:
 - a. Celotex Corporation (The); Building Products Division.
 - b. DuPont (E. I. du Pont de Nemours and Company).
 - c. Parsec, Inc.
 - d. Raven Industries, Inc.
 - e. Reemay, Inc.
 - f. Simplex Products.
 - g. Sto-Cote Products, Inc.
 - h. Tenneco Building Products.
 2. Thickness: Not less than 3 mils (0.08 mm).
 3. Permeance: Not less than 10 perms (575 ng/Pa x s x sq. m).
 4. Flame-Spread Index: 25 or less per ASTM E 84.
 5. Allowable Exposure Time: Not less than three months.
- E. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Apply field treatment complying with AWWA M4 to cut surfaces of preservative-treated lumber and plywood.

- C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Provide 5/8 inch diameter anchor or machine bolts with a minimum of 7 inches embedment into concrete or masonry unless otherwise shown. Anchors shall be placed within 12 inches of each end of the bottom plate and at 48 inches on center unless otherwise shown on the drawings. Anchors shall be located a maximum of 2 inches from the face of a stud receiving wood structural panels. Anchor bolt holes shall be 1/32 to 1/16 inch larger than the anchor bolt diameter. Install 2-1/2 inch by 2-1/2 inch square steel plate washers under anchor bolt nut.
 2. CABO NER-272 for power-driven fasteners.
 3. Published requirements of metal framing anchor manufacturer.
 4. Table 2304.9.1, "Fastener Schedule," in the International Building Code.
- D. Install bolts not less than 7 bolt diameters from the end and 4 diameters from the edge of the member. Bolt holes shall be 1/32 to 1/16 inch larger than the bolt diameter. All nuts shall be tightened when installed and retightened at completion of work or before closing in. Thread shall project 1/16-inch minimum beyond the nut. Install cut steel washers under bolts and nuts unless otherwise indicated on the drawings.
- E. Lag screws shall have a lead hole the same diameter as the shank, and the same depth of penetration as the length of unthreaded shank. The lead hole for the threaded portion shall have a diameter equal to 60% to 75% of the shank diameter and a length equal to at least the length of the threaded portion of the lag screw. Install cut steel washers under lag screws unless otherwise indicated on the drawings.
- F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
- G. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- H. Framing connectors: Install all framing connectors per manufacturer's recommendations.
- I. Hold-downs: Install hold-downs 1/2 inch minimum above the plate to allow for tightening anchor bolt. The hold-down shall be installed tight to the hold down post without fillers. Do not bend hold down anchors.
- J. Top and bottom plates shall be the same size as studs unless noted otherwise. Double top plates shall be used for all load bearing and shear walls. Splices in double top plates shall be a minimum of 48" long.
- K. Provide double joists beneath all partition walls parallel to joists and at sides of all header openings greater than twice the typical joist or truss spacing.
- L. All joists, beams and trusses shall bear on or be provided with hangers, which bear on the full width of the supporting elements. Beams and trusses shall bear directly above a vertical wall stud when bearing on a load bearing stud wall.
- M. All joists, beams and trusses not bearing directly on supporting member shall be supported with galvanized metal hangers rated for the design loads by the manufacturer. Hangers shall be installed in strict conformance with the manufacturer's recommendations.

- N. Do not cut, bore, countersink or notch wood members except where shown in the details. Holes through plates, studs and double plates in walls shall not exceed 40% of the member width and shall be located in the center of the member.
- O. Provide lateral end support for all roof and floor joists over 4 inches deep. Joists shall have their ends held in position with either full depth solid blocking, nailed bridging, nailing or bolting to other framing members or approved joist hangers. Intermediate bridging for all joists shall be provided every 8 feet or less.
- P. Continuous solid blocking shall be installed between all joists at all bearing points and beneath perpendicular bearing walls above.
- Q. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- R. Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 - 1. Comply with "Code Plus" provisions in above-referenced guide.
- S. Fastening Methods:
 - 1. Combination Subfloor-Underlayment: Glue and nail to wood framing and at tongue and groove panel edges.
 - 2. Subflooring: Glue and nail to wood framing.
 - 3. Sheathing: Nail to wood framing.
 - 4. Underlayment: Nail to subflooring.
 - 5. Plywood Backing Panels: Nail or screw to supports.
- T. Sheathing in walls, floors and roofs shall be fully blocked. All unsupported panel joints shall be blocked solid with 2x blocking in walls and 3x blocking in floors and roofs.
- U. Install all sheathing with the long dimension of the panel continuous across two or more spans.
- V. Machine nailing will be permitted subject to a satisfactory job site demonstration of procedure and equipment to be used and approval by the COR. Panel nails shall be driven so that the heads are flush with the surface of the panel and the minimum panel edge distances are maintained. The use of machine nailing is subject to continued satisfactory performance.
- W. Framing shall be free of surface moisture and debris prior to gluing.
- X. Apply building paper horizontally with 2-inch (50-mm) overlap and 6-inch (150-mm) end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inch (102-mm) overlap.
- Y. Building Wrap Application: Cover wall sheathing with building wrap as indicated. Cover upstanding flashing with 4-inch (102-mm) overlap. Seal seams, edges, and penetrations with tape.

- Z. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing.
Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION 06100

SECTION 06176 - METAL-PLATE-CONNECTED WOOD TRUSSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads indicated without exceeding TPI 1 deflection limits. Design loads shall be determined in accordance with IBC 2000. In addition, loft trusses shall be designed for a 40 psf live load in the loft area.
- B. Submittals: Product Data, Shop Drawings, and structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. All wood trusses and all connections shall be designed by a Licensed Professional Engineer retained by the truss manufacturer. All shop, erection and bracing drawings shall be reviewed and signed by the above referenced engineer and shall be submitted to the COR for review. All permanent bracing, bridging and fasteners shall be clearly noted on the shop drawings. All submittals shall include at a minimum the requirements of section IBC 2303.4, Truss design drawings.
- C. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that involves inspection by SPIB, Timber Products Inspection, TPI, or other independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- D. Comply with TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction"; TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses"; and applicable requirements in AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review, any species, graded visually or mechanically.
- B. Connector Plates: TPI 1, fabricated from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation; Designation SS, Grade 33, and not less than 0.036 inch (0.9 mm) thick.
- C. Fasteners: Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- D. Metal Framing Anchors: Provide framing anchors made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

2.2 FABRICATION

- A. Assemble trusses using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
- B. All wood trusses shall be factory manufactured utilizing machine stress rated lumber.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and brace trusses according to TPI recommendations and as indicated. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- B. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor in accordance with manufacturer's recommendations.
- C. Securely connect each truss ply required for forming built-up girder trusses. Anchor trusses to girder trusses in accordance with manufacturer's recommendations..
- D. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
- E. Install wood trusses within installation tolerances of ANSI/TPI 1.
- F. Do not cut, drill holes through or remove truss members.
- G. Remove wood trusses that are damaged or do not meet requirements and replace with trusses that do meet requirements.

END OF SECTION 06176

SECTION 076100 - SHEET METAL ROOFING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and color Samples.
- B. Comply with SMACNA's "Architectural Sheet Metal Manual" unless otherwise indicated.

PART 2 - PRODUCTS

2.1 ROOFING SHEET METALS

- A. GFM metal roofing.

2.2 ACCESSORIES

- A. Underlayment: Asphalt-saturated organic felt ASTM D 226, Type II (No. 30)
- B. Slip Sheet: Rosin-sized building paper, 5 lb/100 sq. ft. (2.4 kg/sq. m).
- C. Metal Accessories: Matching sheet metal roofing in finish and material required for a complete weathertight roofing system, including clips, flashings, ridge closure strips, trim, copings, fasciae, gutters, and louvers.

2.3 FABRICATION

- A. Fabricate sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of installation indicated.
 - 1. Match metal roofing at existing kiosk located at Frontier Boat Launch.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install underlayment on roof sheathing under sheet metal roofing unless otherwise recommended by metal roofing manufacturer.
 - 1. Apply slip sheet over underlayment before installing metal roofing.
- B. Space fasteners as required to resist design uplift, but not more than 18 inches (457 mm) o.c.

- C. Anchor roofing securely in place, with provisions for thermal and structural movement. Install with concealed fasteners unless otherwise indicated.
- D. Install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form a hem on concealed side of exposed edges unless otherwise indicated.
 - 1. Install cleats to hold sheet metal panels in position. Attach each cleat with two fasteners to prevent rotation.
 - 2. Nail cleats not more than 12 inches (300 mm) o.c. Bend tabs over nails.
- E. Seal joints as required for leakproof construction. Provide low-slope transverse seams using cleats where backup of moisture may occur.

END OF SECTION 076100

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

PART 2 - PRODUCTS

2.1 MATERIALS

- A. GFM Gutters and Downspouts

2.2 ROOF SPECIALTIES

- A. General: Provide materials required by manufacturer for a complete installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate with installation of roof decks and other substrates to produce a watertight assembly capable of withstanding inward and outward loading pressures, and thermal and lateral loads.

END OF SECTION 077100

SECTION 265100 - LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:

- 1. GFM Solar lighting

1.2 SUBMITTALS

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 GFM SOLAR LIGHTING

3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Comply with NFPA 70 for minimum fixture supports.

3.2 FIELD QUALITY CONTROL

- A. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265100

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Unauthorized excavation consists of excavation below subgrade elevations or beyond indicated lines and dimensions. Unauthorized excavation, as well as remedial work, shall be without additional compensation.
- B. Do not interrupt existing utilities serving facilities occupied by Owner or others unless permitted in writing by COR and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 2 inches (50 mm) in any dimension, debris, waste, frozen materials, vegetation, or other deleterious matter.
- B. Unsatisfactory Soil: ASTM D 2487 Soil Classification Groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Backfill and Fill: Satisfactory soil materials.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Drainage Course: Narrowly graded mixture of [washed]crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing," during earthwork operations.

- B. Protect subgrades and foundation soils from softening and damage by water, freezing temperatures, or frost.
- C. Explosives: Do not use explosives.
- D. Excavate to subgrade elevations regardless of character of materials and obstructions encountered.
- E. Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents.
- F. Excavate for structures, building slabs, pavements, and walkways. Trim subgrades to required lines and grades.
- G. Utility Trenches: Excavate trenches to indicated slopes, lines, depths, and invert elevations. Maintain 12 inches (300 mm) of working clearance on each side of pipe or conduit.
 - 1. Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
 - 2. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Plow strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal to receive fill.
- I. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface, pulverize, moisture-condition or aerate soil, and recompact.
- J. Place backfill and fill in layers not more than 8 inches (200 mm) in loose depth at optimum moisture content. Compact each layer under structures, building slabs, pavements, and walkways to 95 percent of maximum dry unit weight according to ASTM D 698; elsewhere to 90 percent.
- K. Grade areas to a smooth surface to cross sections, lines, and elevations indicated. Grade lawns, walkways, and unpaved subgrades to tolerances of plus or minus 1 inch (25 mm) and pavements and areas within building lines to plus or minus 1/2 inch (13 mm).
- L. Under pavements and walkways, place subbase course material on prepared subgrades and compact at optimum moisture content to required grades, lines, cross sections, and thicknesses.
- M. Under slabs-on-grade, place drainage course on prepared subgrade and compact to required cross section and thickness.
- N. Allow testing agency to inspect and test each subgrade and each fill or backfill layer and verify compliance with requirements.

- O. Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 312000

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Hot-mix asphalt paving.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
 - 1. Job-Mix Designs: For each job mix proposed for the Work.
- B. Material Certificates: For each material, from manufacturer.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the Missouri Department of Transportation ODOT.
- B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of ODOT for asphalt paving and asphalt sealing work.
 - 1. Measurement and payment provisions and safety program submittals included in ODOT standard specifications do not apply to this Section.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Tack Coat: Minimum surface temperature of **60 deg F**.
 - 2. Asphalt Surface Course: Minimum surface temperature of **60 deg F** at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- B. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO M 320 or AASHTO MP 1a, PG 64-22, PG 58-28 or PG 70-22.
- B. Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397] cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- C. Asphalt Sealant: Emulsified asphalt types SS-1,1h, CSS-1,1h; meeting AASHTO M 140.

2.3 AUXILIARY MATERIALS

- A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form under all areas to be paved.

2.4 MIXES

- A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements:
 - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving or asphalt sealant.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

- C. Tack Coat: Apply uniformly to surfaces of existing abutting pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.2 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Spread mix at minimum temperature of 250 deg F.
 - 2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.3 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.

3.4 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
 - 2. Average Density: 92% of referenced maximum theoretical density according to ASTM D 2041, but not less than 90% nor greater than 96%. Field density measuring procedures shall be approved prior to Testing. A minimum of 15 compaction tests shall be performed at locations designated by the Contracting Officer.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

3.5 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances: Plus **1/4 inch**, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a **10-foot** straightedge applied transversely or longitudinally to paved areas: 14 inch.

END OF SECTION 321216

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product certificates.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."
- C. Planting Restrictions: Plant during one of the following periods.
 - 1. Spring Planting: Spring Planting: April 15 – May 20.
 - 2. Fall Planting: Fall Planting: August 15 – September 20.
- D. Maintain lawn until established, but for not less than 30 days.

PART 2 - PRODUCTS

2.1 GRASSES

- A. Seed Species: State-certified seed of grass species, as follows:
- B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
 - 1. Seed Mixture: Seed Mixture: Commercial, lawn mixture as approved by COR.

2.2 SOILS AND AMENDMENTS

- A. Topsoil: ASTM D 5268, free of stones 1 inch (25 mm) or larger.
- B. Straw Mulch: Clean, mildew- and seed-free salt hay or threshed straw of wheat, rye, oats, or barley.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Loosen subgrade to a minimum depth of 4 inches (100 mm) remove stones, sticks, existing grass, vegetation, and other extraneous materials.

1. At newly graded subgrades, spread planting soil mix to a depth of 4 inches (100 mm) but not less than required to meet finish grades.
 2. At unchanged grades, apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.
- B. Grade lawn areas to a smooth, even surface with loose, uniformly fine texture. Moisten before planting.

3.2 PLANTING

- A. Seeding: Evenly distribute seed by sowing with a spreader or a seeding machine. Rake seed lightly into top 1/8 inch (3 mm) of topsoil, roll lightly, and water with fine spray. Protect seeded areas by spreading straw mulch 1-1/2 inches (38 mm) in loose depth.
1. Seeding Rate: 3 to 4 lb/1000 sq. ft.
- B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.
- C. Mow lawn as soon as top growth is tall enough to cut. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

END OF SECTION 329200