DESCRIPTION/SPECIFICATIONS

FWS SPECIALIZED SPECIFICATIONS

MULTIPLE BOAT RAMP REPLACEMENT

AT

KIRWIN NATIONAL WILDLIFE REFUGE

SPECIFICATION INDEX

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Project background.
3. Work covered by Contract Documents.
4. Work under separate contracts.
5. Access to site.
6. Coordination with occupants.
7. Coordination with local utilities.
8. Work restrictions.
9. Permits and Fees.
10. Applicable codes, standards, and specifications.
11. Means and methods.
12. Safety.
13. Environmental Protection.

1.2 PROJECT INFORMATION

A. Project Location: Kirwin National Wildlife Refuge, 702 E Xavier Rd, Glade, KS 67644

B. Station Contact Information: Jillian Boyd, Station Manager, 308-238-8260

1.3 PROJECT BACKGROUND

A. The purpose of this project is to demolish and replace three (3) deteriorated concrete boat ramps at the Kirwin National Wildlife Refuge. A high percentage of refuge visitation comes from the utilization of the boat ramps for authorized recreational activities, primarily hunting and fishing. The rehab of these boat ramps will improve public safety and reduce long-term maintenance costs. They will be designed to accommodate modern vehicles and trailers, support increased loads, and comply with current design standards for boat ramp construction.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. Work covered by this contract includes but is not limited to: demolishing three (3) existing boat ramps, replacing two of the demolished boat ramps with two double-lane boat ramps, extending the wave breaks at both locations, and demolishing an existing concrete boat dock located at the South Shore.

1.5 WORK UNDER SEPARATE CONTRACTS

A. General: In the event there is work being performed under a separate contract the Contractor shall cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.6 ACCESS TO SITE

A. All operations of the Contractor (including storage of materials) upon Government premises shall be confined to areas authorized or approved by the Contracting Officer.

B. Limit use of Project site areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to the area outlines in the drawings in the Kirwin National Wildlife Refuge, Kansas.
2. Driveways, Walkways and Entrances: Keep driveways and loading areas, and entrances serving premises clear and available to Government, Government Representatives, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

C. Condition of Existing Site: Repair damage caused by construction operations

1.7 COORDINATION WITH OCCUPANTS

A. Partial Government Occupancy: Government will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Station Manager during construction operations to minimize conflicts and facilitate usage. Perform the Work so as not to interfere with Government operations. Maintain existing exits unless otherwise indicated.

1. Provide not less than 48 hours' notice to Government of activities that will affect Government's operations.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 8:00 a.m. to 4:00 p.m., Monday through Friday, unless otherwise indicated.

1. Work on weekends will be restricted to Contracting Officers approval and at the Station Managers discretion.
2. No work will take place over Federally observed holidays.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Station Manager not less than 48 hours in advance of proposed utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruptions to the Government.

1. Notify Station Manager not less than 48 hours in advance of proposed disruptive operations.

E. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

1.9 PERMITS AND FEES

A. The Contractor shall be responsible for obtaining all necessary local, State, and Federal permits and licenses, and payment of related fees, per the Contract Clauses.

1.10 APPLICABLE CODES, STANDARDS AND SPECIFICATIONS

A. All work shall comply with the codes and standards applicable to each type of work as listed in individual Sections of these Specifications.

B. Where a conflict occurs between a referenced document and the Project Specifications, the Project Specifications govern.

C. Where a conflict occurs between referenced documents, the document containing the most stringent requirements governs.

D. Where referenced documents are not specified by date, the document current at the bid opening applies.

E. Materials, applications, and tests specified by reference to published standards of society, association, code, or other published standards are included in the specifications as if written in their entirety.

F. Conform to all regulations and statutes of the State of Kansas and to all Federal Regulations which apply.

1.11 MEANS AND METHODS

A. Means and methods of construction shall be such as the Contractor or subcontractors may choose; subject, however, to the Contracting Officer's right to reject means and methods proposed which:

1. Constitute a hazard to the work, persons, or property.
2. Will not produce finished work in accordance with terms of the contract.
3. Are contrary to specified means or methods included in the contract.

B. The right to reject means and methods of the Contractor or subcontractor shall not be construed or interpreted as acceptance of control of means and methods by the Contracting Officer.

C. The Contracting Officer's approval of means and methods or failure to exercise right to reject means and methods shall not relieve the Contractor of the obligation to complete the work required by the contract.

D. Total responsibility for control of all means and methods lies with the Contractor for all work.

1.12 SAFETY

A. The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient flasher lights, flagmen, danger signals and signs, and shall take all necessary precautions for the protection of the work and the safety of the public. All ponds and water control structures shall remain accessible by vehicle. Roads closed to traffic shall be protected by effective barricades and shall be placed with acceptable warning signs. All barricades and obstructions shall be illuminated at night and all lights shall be kept burning from sunset until sunrise. Install appropriate traffic signs at crossroads and approaches to site as needed to direct affected public traffic. Specific signs and barricade requirements are detailed in the U.S. Department of Transportation, "Manual on Uniform Traffic Control Devices".

B. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local regulations pertaining to the protection of workers, visitors to the site, and persons occupying areas adjacent to the site, including the provisions of 29CFR1910 and 29CFR1926 of the Code of Federal Regulations. The Contractor shall hold harmless the Government for failure to comply with any applicable safety or health regulation on the part of himself, his employees, or his subcontractors.

C. Provide personal safety equipment and training commensurate with the hazards which may exist at the work site. The personal safety equipment and training shall be determined by a thorough hazard analysis of all work site areas. The safety program available at all work sites shall include a minimum of:

1. One nonfreezing-type fire extinguisher in each workshop and shed used for storage of materials at the work site. Place in location readily accessible to construction personnel.
2. A first aid kit for use of construction personnel commensurate with size of project with items necessary for first aid treatment of all injuries.
3. The Contractor shall conduct regular onsite safety inspections and all construction personnel shall receive a safety orientation.
4. Post telephone numbers of nearest hospital, ambulance service or flight for life, and fire station in conspicuous location. Advise all workers of location of telephone numbers.

1.13 ENVIRONMENTAL PROTECTION

A. The Contractor shall abate and control all environmental pollution arising from construction activities by complying with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement, as well as the specified requirements in this contract. Compliance with this requirement by subcontractors will be the responsibility of the Contractor.

B. Fossils and Artifacts

1. Should the Contractor discover any human remains, fossils or artifacts during construction operations, such objects shall become the property of the Government. The Contractor shall cease construction operations in the area of the "find," and immediately notify the Construction Representative, COR, or Contracting Officer. The Contracting Officer will notify the Regional Archaeologist. Construction operations may proceed in other areas not affected by this clause. Care shall be exercised by the Contractor not to damage any human remains, fossils or artifacts uncovered during excavation operations.
2. Failure to comply with this requirement may be considered a violation of the Archeological Resources Protection Act of 1979 as amended, or the Native American Graves Protection and Repatriation Act of 1990. Destruction of historic and prehistoric sites and/or unauthorized collection of cultural materials can result in criminal and/or civil penalties. Penalties can include fines, prison sentences, and/or confiscation of equipment.
3. If the Contractor uses fill from a nongovernmental source to perform work that is required under this project, and a new borrow site is opened or an existing borrow area is expanded as part of this project, then the Contractor needs to inform the Construction Representative, COR, or CO. The Regional Archaeologist will be informed and a Section 106 consultation will be required and conducted by USFWS prior to use of the new or expanded borrow site.

C. Abatement of Air Pollution

1. The Contractor shall comply with applicable Federal, State, and local laws and regulations concerning the prevention and control of air pollution.
2. Construction activities shall be performed in such a manner that air pollution will be held to a minimum.
3. Burning of materials, trees and brush, combustible construction materials, and rubbish will not be permitted. Construction debris shall be disposed of at a location designated by the Contracting Officer or hauled off the Station to an approved disposal site.

D. Prevention of Water Pollution

1. The Contractor is responsible for implementing the terms and requirements of the (insert state) storm water discharge permit, as issued to the State under the National Pollution Discharge Elimination System (NPDES) by the Environmental Protection Agency (EPA). The Contractor shall apply for and execute all permits as required by the State of (insert state) regarding storm water discharge from the construction site. The Contractor shall submit to the Contracting Officer a copy of all permit applications and a copy of all approvals from the State. Allow the Government 10 days for review of the application package prior to submission.

2. During construction, the Contractor shall comply with all applicable Federal, State, and local laws and regulations concerning the control and abatement of water pollution.
3. The Contractor's construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into streams, flowing or dry water-courses, lakes, ponds, and underground water sources. The Contractor shall dispose of all pollutants such as petroleum products, rubbish, cement, concrete, etc., and objectionable material at a jurisdictionally accepted waste management facility.

4. Sanitary facilities, such as chemical toilets shall be located far enough from wells, live streams, or ponds to prevent pollution of the water.
5. Dewatering work for structure foundations or earthwork operations adjacent to or encroaching on streams or watercourses shall be conducted in a manner that prevents muddy water and eroded materials from entering streams or watercourses. This shall be accomplished by construction of intercepting ditches, bypass channels, barriers, settling ponds, or other approved means. Excavated material shall not be placed in or adjacent to watercourses where it can be washed away by high water or storm runoff.

E. Prevention of site contamination

1. The purpose of this section is to prevent invasive species from being introduced to the project work sites. This includes both plant and animal species. Invasive species can have long last detrimental effects at project sites at US Fish and Wildlife Service lands.

2. Prior to entrance to the work site, all equipment brought on site will be thoroughly washed to remove dirt, seeds, and plant parts. Any equipment that has been any body of water within the past 30 days will be thoroughly cleaned with hot water greater than 140 degree F (typically the temperature found at commercial truck washes) and dried for a minimum of five days before being used at this project site. In addition, before transporting equipment from the project site all visible mud, plants and fish/animals will be removed, all water will be eliminated, and the equipment will be thoroughly cleaned. Anything that came in contact with water will be cleaned and dried following the above procedure.

F. Environmental Litigation: Time lost due to work stoppage because of failure of the Contractor to comply with these requirements may not be the subject of a claim for extension of time, for additional costs, or damages.

END OF SECTION 011000

SECTION 012900 – PAYMENT PROCEDURES

PART 2 - GENERAL

2.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

2.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Submit the schedule of values to Contracting Officer at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

2.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Contracting Officer.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Government and Contractor.

C. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. Schedule of values.
2. Contractor's construction schedule (preliminary if not final).
3. Submittal schedule (preliminary if not final).

D. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Written guarantees, warranties, and certificates.
3. Record (As-Built) Drawings
4. All test reports.

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 3 - GENERAL

3.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination drawings.
2. Requests for Information (RFIs).
3. Project meetings.

3.2 DEFINITIONS

A. RFI: Request from Government, Owner, Construction Manager, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

3.3 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

3.4 GENERAL COORDINATION PROCEDURES

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

1. Provide a construction schedule noting demolition activities, construction activities, deliveries, payments, etc., as needed to convey coordination information to the Contacting Officer, Contacting Officer's Technical Representative (COTR), Government Inspector as well as local staff.

2. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

3. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.

4. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities as well as any activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the Schedule of Values (SOV).
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

3.5 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

3.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. The Government will return RFIs as submitted to the Government by other entities controlled by Contractor with no response. RFI’s must come directly from the Contractor.

2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. RFI number, numbered sequentially.
6. RFI subject.
7. Specification Section number and title and related paragraphs, as appropriate.
8. Drawing number and detail references, as appropriate.
9. Field dimensions and conditions, as appropriate.
10. Contractor's suggested resolution. If Contractor's solution(s) have an impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
11. Contractor's signature.
12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. RFI Forms: AIA Document G716, or Software-generated form with substantially the same content as indicated above, acceptable to the Government.

D. The Governments Action: The Government will review each RFI, determine action required, and respond. Allow seven working days for the Government's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for coordination information already indicated in the Contract Documents.
   d. Requests for adjustments in the Contract Time or the Contract Sum.
   e. Requests for interpretation of Architect's actions on submittals.
   f. Incomplete RFIs or inaccurately prepared RFIs.
   g. Request For Information submitted by a sub-contractor to the Contractor.

2. The Government's action may include a request for additional information, in which case the time for response will date from time of receipt of additional information.

3. The Government's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal.

   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Contacting Officer and COR in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly with not less than the following information:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Contacting Officer and COR.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date the Contacting Officer's response was received.

F. On receipt of the Government's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify the Government within seven days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

3.7 PROJECT MEETINGS

A. General: The construction contractor shall coordinate and schedule and conduct weekly construction progress meetings at the Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify the Facility Director, the Contracting officer and the COR of scheduled meeting dates and times.

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

3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including the Contracting Officer and the COTR, Construction Manager, and other FWS personnel, within three days of the meeting.

B. Preconstruction Conference: The Contracting Officer will schedule a preconstruction conference before starting construction, at a time convenient to the Contracting Officer, COTR, Facility Director, On-Site Government Inspector and Contractor.

1. Attendees: Authorized representatives of the Contracting Officer, Government Project Manager, Owner's Commissioning Authority, Construction Manager, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

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

a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing and long-lead items.
d. Designation of key personnel and their duties.
e. Procedures for processing field decisions and Change Orders.
f. Procedures for RFIs.

g. Procedures for testing and inspecting.
h. Procedures for processing Applications for Payment.
i. Distribution of the Contract Documents.
j. Submittal procedures.
k. Preparation of record documents.
l. Use of the premises and existing building.
m. Work restrictions.
n. Working hours.
o. Owner's occupancy requirements.
p. Responsibility for temporary facilities and controls.
q. Procedures for moisture and mold control.
r. Procedures for disruptions and shutdowns.
s. Construction waste management and recycling.
t. Parking availability.
u. Office, work, and storage areas.
v. Equipment deliveries and priorities.
w. First aid.
x. Security.
y. Progress cleaning.

3. Minutes: The construction contractor shall be responsible for conducting meeting, recording minutes and distributing the meeting minutes.

C. Progress Meetings: Conduct weekly construction progress meetings as directed by the Contracting officer and/or the COTR.

1. Attendees: In addition to representatives of the Government, Construction Manager, and COTR (as applicable), each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.

5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

3. Minutes: The construction contractor shall be responsible for conducting meeting, recording minutes and distributing the meeting minutes.

   a. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

END OF SECTION 013100

SECTION 013200 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 4 - GENERAL

4.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.

4.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

4.3 INFORMATIONAL SUBMITTALS

A. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

B. Construction Schedule Updating Reports: Submit with Applications for Payment.

4.4 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 5 - PRODUCTS

5.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established from the Notice to Proceed to the date of completion.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration
2. Procurement Activities
3. Submittal Review Time
4. Punch List and Final Completion: Include not more than 15 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Work Restrictions: Show the effect of the following items on the schedule:

a. Coordination with existing construction.
b. Limitations of continued occupancies.
c. Uninterruptible services.
d. Partial occupancy before Substantial Completion.
e. Use of premises restrictions.
f. Provisions for future construction.
g. Seasonal variations.
h. Environmental control.

5. Work Stages: Indicate important stages of construction for each major portion of the Work.
6. Other Constraints

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion and the following interim milestones.

1. Insert milestones not indicated elsewhere.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 6 - GENERAL

6.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.

B. Related Requirements:

1. Section 017700-Closeout Procedures for submitting photographic documentation as Project Record Documents at Project closeout.

6.2 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit unaltered, original, full-size image files within 5 days of taking photographs.

1. Digital Camera: Minimum sensor resolution of 8 megapixels.
2. Digital photographs to be submitted in the order in which they were taken with the photograph "name" as given by the device used to take to photo.
3. Identification: Provide the following information with each image description in file metadata tag:

a. Date and time photograph was taken
b. Unique photograph number

6.3 QUALITY ASSURANCE

A. Photographs to be clear, focused, level, have proper exposure settings (not over exposed or under exposed), and clearly show and document the subject matter. Detail photographs (close-ups) to be preceded by a larger overall view of the area being documented.

6.4 USAGE RIGHTS

A. If a professional photographer is used for this requirement, obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 7 - PRODUCTS

7.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, with minimum size of 8 megapixels.

PART 8 - EXECUTION

8.1 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs. Photographer need not be a professional photographer, but an individual familiar with and able to produce clear, focused photographs of the subject area with good reference points.

B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to the Government.

D. Preconstruction Photographs: Before commencement of excavation, commencement of demolition and starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Government.

1. Flag excavation areas before taking construction photographs.
2. Take minimum of 10 photographs, or as needed, to show existing conditions adjacent to property before starting the Work.
3. Take minimum of 10 photographs, or as needed, of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

E. Periodic Construction Photographs: Take photographs as needed to fully document the construction progress. Select vantage points to show status of construction and progress since last photographs were taken. Try to retake progress photos from the same vantage points when possible so as to show relative construction progress.

F. Final Completion Construction Photographs: Take color photographs after date of Substantial Completion for submission as Project Record Documents. The Government will inform photographer of desired vantage points.

G. Additional Photographs: The Government may request photographs in addition to periodic photographs specified as needed to verify progress or to verify work completion accuracy.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

    a. Special events planned at Project site.
    b. Immediate follow-up when on-site events result in construction damage or losses.
    c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    d. Substantial Completion of a major phase or component of the Work.
    e. Extra record photographs at time of final acceptance.
    f. Owner's request for special publicity photographs.

END OF SECTION 013233

SECTION 013300 – SUBMITTAL PROCEDURES

PART 9 - GENERAL

9.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

9.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's Contracting Officer responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's Contracting Officer responsive action. Submittals may be rejected for not complying with requirements.

9.3 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by the Government and additional time for handling and reviewing submittals required by those corrections.

9.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Contracting Officer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Contracting Officer receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals. Submittals received after 1:00 PM will be considered to having arrived the following day.

1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Contracting Officer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 working days for review of each resubmittal.

C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use a sequential submittal number followed by station initials and Specification Section number (Submittal 001-(Item Name)-(CSI Number)). Resubmittals shall include a numeric suffix after the submittal number (e.g., Submittal 001-R1-(Item Name)-(CSI Number)).

2. Transmittal Form for Electronic Submittals: Use FWS transmittal form. This form will be made available in either PDF or as a Word document.

D. Options: Identify options requiring selection by the Government.

E. Deviations: Identify deviations from the Contract Documents on submittals.

F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Contracting Officer's action stamp.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

H. Use for Construction: Retain complete copies of submittals on project site. Use only final action submittals that are marked with approval notation from Contracting Officer's action stamp.

PART 10 - PRODUCTS

10.1 SUBMITTAL PROCEDURES

A. General Electronic Submittal Procedure Requirements:

1. Submit electronic submittals via email as PDF electronic files.
2. Contracting Officer's Representative, through the Contracting Officer, will return annotated file by e-mail and/or standard mail. Annotate and retain one copy of file as an electronic Project record document file.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment. Do not submit items of different CSI divisions together within a single submittal, they shall be submitted separately.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.

3. Submit Shop Drawings in the following format:

a. PDF electronic file

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

E. Contractor's Construction Schedule: Comply with requirements specified in Section 013200-Construction Progress Documentation.

F. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900-Payment Procedures.

G. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000-Quality Requirements and complying with requirements in the Construction Documents.

H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700-Closeout Procedures.

I. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

J. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

K. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

L. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

M. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

N. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

O. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

P. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

Q. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000-Quality Requirements and complying with requirements in the Construction Documents.

R. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

S. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

T. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

U. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

PART 11 - EXECUTION

11.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Contracting Officer.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700-Closeout Procedures.

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

11.2 CONTRACTING OFFICER AND CONTRACTING OFFICER'S REPRESENTATIVE ACTION

A. General: Contracting Officer's Representative will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Contracting Officer's Representative will review each submittal, make marks to indicate corrections or revisions required, and return it. Contracting Officer's Representative will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action as follows:

1. A: Approved as submitted.
2. B: Approved, except as noted. Resubmission not required.
3. C: Approved, except as noted. Resubmission required.
4. D: No action taken. See comments on reverse. Resubmission required.
5. E: Disapproved.
6. Other: (comments as noted)

C. Informational Submittals: Contracting Officer's Representative will review each submittal and will not return it, or will return it if it does not comply with requirements. Contracting Officer will forward each submittal to appropriate party.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 12 - GENERAL

12.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Contracting Officer or authorities having jurisdiction are not limited by provisions of this Section.
3. Specific test and inspection requirements are not specified in this Section.

12.2 DEFINITIONS

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

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Contracting Officer.

C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

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

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

12.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Contracting Officer for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Contracting Officer for a decision before proceeding.

12.4 INFORMATIONAL SUBMITTALS

A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

12.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.

13. Recommendations on retesting and reinspecting.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner'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.

12.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

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

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

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated and with additional

qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

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

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Contracting Officer with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

12.7 QUALITY CONTROL

A. Government Responsibilities: Where quality-control services are indicated as Government's responsibility, Government will engage a qualified testing agency to perform these services.

1. Government will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Government are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Contracting Officer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Contracting Officer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

12.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.

2. Notifying Contracting Officer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Contracting Officer with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion including a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.
7. Any other tests that were performed for the project.

PART 13 - EXECUTION

13.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Contracting Officer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

13.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching as per the specifications.

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

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

END OF SECTION 014000

SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS

PART 14 - GENERAL

14.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000-Summary for work restrictions and limitations on utility interruptions.

14.2 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 testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System:

1. Potable and Non-potable water from Governments existing water system is available for non-construction uses

2. Sanitary Facilities: Use of Government existing toilet facilities are available.

C. Electric Power Service from Existing System:

1. Electric power from Stations existing system is available, but the location of the electrical source may be too far for feasible use. The contractor shall verify feasibility.

14.3 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

14.4 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 as a construction facility before Governments acceptance, regardless of previously assigned responsibilities.

PART 15 - PRODUCTS

15.1 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

15.2 EQUIPMENT

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

PART 16 - EXECUTION

16.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000-Summary.

16.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sanitary Facilities: If needed, 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.

C. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

D. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

16.3 SUPPORT FACILITIES INSTALLATION

A. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: use areas designated by Contracting Officer or Station Manager as parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

   a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

F. Waste Disposal: Fuels, lubricants, petroleum products, chemicals or other waste materials shall be disposed of in properly designated areas off Government premises.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

16.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. 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.

B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

END OF SECTION 015000

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 17 - GENERAL

17.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

17.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse at the facility or by another Government facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

17.3 PERFORMANCE REQUIREMENTS

A. General: Archive end-of-Project rates for salvage/recycling as much as possible. Track all items salvaged, recycled and given over to the Facility and present that list at the end of the project.

ACTION SUBMITTALS

B. Waste Management Plan: Submit plan within 14 days of the Notice to Proceed and/or prior to beginning work that would require the use of material disposal.

17.4 INFORMATIONAL SUBMITTALS

A. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

B. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

E. Qualification Data: For waste management coordinator.

17.5 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan and present to the Contracting Officer's Representative and/or Contracting officer at the beginning of the project. Plan shall consist of waste identification, any salvageable items, and items that are to be handed over to the Facility for reuse elsewhere.

B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 18 - EXECUTION

18.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

18.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Owner's Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area as directed by the Facility Manager.
4. Transport items to Owner's storage area as coordinated by the Facility Manager.
5. Protect items from damage during transport and storage.

18.3 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Retain "Disposal" Paragraph below if disposal is permitted on Owner's property; revise, if applicable, to indicate limits on type of materials that may be disposed of on-site.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 – CLOSEOUT PROCEDURES

PART 19 - GENERAL

19.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Final completion procedures.
2. Closeout Submittals.
3. Final cleaning.
4. Repair of the Work.

B. Related requirement:

1. Section 013233 “Photographic Documentation” for photographic documentation standards and submitting photographic documentation

19.2 FINAL COMPLETION PROCEDURES

A. Submit a written request for inspection to Contracting Officer to determine Final Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. Contracting Officer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Government, that must be completed or corrected.

19.3 CLOSEOUT SUBMITTALS

A. Submit all items listed per the requirements under Section 013300 to the Contracting Officer prior to final payment.

1. Certificates of Release: From Contracting Officer.
2. Guarantees, warranties, and certificates.
3. Record (As-Built) Drawings.
4. Final reports of all tests completed during construction.
5. O&M Manuals both PDF electronic form and hard copy binders.
6. Submit JPG format of all key photographs taken by the Contractor and electronics PDF plans indicating photograph location.

PART 20 - EXECUTION

20.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Fuels, lubricants, petroleum products, chemicals or other waste materials shall be disposed of in properly designated areas off Government premises.

C. No burning of rubbish on Government premises will be allowed.

20.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 017700

SECTION 024113 - SELECTIVE SITE DEMOLITION

PART 21 - GENERAL

21.1 SUMMARY

A. Section Includes:

1. Demolition and removal of existing concrete ramps and concrete boat docks
2. Salvage of concrete to be reused as riprap.

21.2 QUALITY ASSURANCE

A. Compliance Requirements:

1. Comply with requirements of codes.
2. Comply with requirements of local Public Health Authority.
3. Comply with local utility companies and/or utility standards.

21.3 FIELD CONDITIONS

A. Government will occupy the premises immediately adjacent to selective demolition areas. Conduct selective demolition so Government's operations will not be disrupted.

B. Notify Contracting Officer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Contracting Officer and Station Manager.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

21.4 PROTECTION

A. Erect barriers, fences, guard rails, enclosures, chutes, and shoring to protect structures and utilities remaining intact.

B. Protect designated trees and plants from damage.

PART 22 - PRODUCTS

22.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 23 - EXECUTION

23.1 PREPARATION

A. Prepare adjacent areas to prevent injury, movement or settlement of structures which are to remain.

B. The site is not expected to have utilities. The contractor shall verify any utilities in the project area prior to construction and protect these utilities.

23.2 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations.

23.3 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be **recycled,** reused, salvaged, reinstalled, or otherwise indicated to remain Government's property, remove demolished materials from Project site **and legally dispose of them in an EPA-approved landfill**.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Governments's property and legally dispose of them.

23.4 EXECUTION

A. All existing pavements, structures, and other surfaces shall be saw-cut at removal limits. The contractor shall take special precautions to ensure that saw dust or water used during sawing does not pollute adjacent properties, reservoirs, backwaters, or rivers.

B. Before starting demolition, the Contractor shall erect turbidity curtains to control silt in the water.

C. The Contractor shall erect temporary supports as needed in order to do any demolition required.

D. The Contractor shall erect temporary water dams, barriers or diversions in order to dewater the area to construct additional improvements.

E. The Contractor shall take precautions to ensure that the remaining structures are not damaged. Any damage to the structure shall be repaired at the Contractor's expense.

F. Areas disturbed by the demolition which are not incorporated into the new work shall be restored to their original condition or better, even if the original condition was poor.

23.5 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

23.6 CONCRETE RAMPS

A. Remove three (3) existing concrete boat ramps (NOT the parking lot area)

B. Concrete may be reused by the station as riprap or as material needed for this project. Ensure that it is placed in location specified by the station.

C. Any removed to reused base material must be compacted to 95%.

23.7 CONCRETE DOCK

A. Remove concrete boat dock including the path and steps from the parking area. Concrete may be used by station as riprap.

END OF SECTION 024113

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 24 - GENERAL

24.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Two (2) double-lane boat ramps

24.2 ACTION SUBMITTALS

A. Product Data: For each type of the following:
   1. Cementous materials.
   2. Admixtures.
   3. Steel reinforcement and accessories.

B. Design Mixtures: For each concrete mixture.
   1. The proportions of the concrete mix shall be by weight and shall be submitted for approval prior to placement of any concrete. The approved mix design and supplier shall not be changed throughout concrete placement unless a new mix design and supplier are approved.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Test reports required per Testing Schedule.

24.3 INFORMATIONAL SUBMITTALS

A. Material certificates: For each of the following:
   1. Cementous materials.
   2. Admixtures.
   3. Steel reinforcement and accessories.

B. Material test reports.

24.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete,"
2. ACI 318, “Building Code Requirements for Reinforced Concrete”
3. ACI 350 “Environmental Engineering Concrete”
4. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 25 - PRODUCTS

25.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

25.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, latest revision.

B. Plain-Steel Welded Wire Reinforcement (WWR): ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

C. Deformed-Steel Welded Wire Reinforcement (WWR): ASTM A 497/A 497M, flat sheet.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

25.3 CONCRETE MATERIALS

A. General

1. Materials shall be classified as acceptable for potable water use according to NSF Standard 61.
2. Cement for Concrete that will contact potable water shall not be obtained from kilns that burn metal rich hazardous waste fuel.
3. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Cement reclaimed from cleaning bags or leaking containers shall not be used. Cement shall be used in the sequence of receipt of shipments.

B. Materials and storage of materials shall comply with ACI 301, as applicable.

C. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II or Type II. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F or C.

D. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: Crushed stone or gravel, ASTM C331 inch nominal.
2. Fine Aggregate: Natural sand ASTM 33, free of materials with deleterious reactivity to alkali in cement. Fineness modulus shall not be less than 2.5 nor more than 3.0

E. Water: ASTM C 94/C 94M.

25.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

25.5 VAPOR RETARDERS

A. Sheet Vapor Retarder: Sheet vapor retarder for use under slabs on grade are specified in Section 072600 “Vapor Retarders”

25.6 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572 for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

25.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

25.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips:

1. Exterior: ASTM D 994, bituminous strip, minimum 1/2-inch thick, height equal to joint depth.
2. Interior: ASTM D 1752, sponge rubber, concrete gray in color, minimum 1/2-inch thick, height equal to joint depth.

B. Sleeves: PVC-Pipe Sleeves: ASTM D 1785, Schedule 40 with water stop collar at midpoint of sleeve. Size as needed.

25.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 20 percent by weight.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in

   a. Pumped concrete.
   b. Concrete for heavy-use industrial slabs and parking structure slabs.
   c. Concrete required to be watertight.
   d. Concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixture used for Exterior Concrete slabs, pads, and walkways as follows:

1. Minimum Compressive Strength: 4500 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 2-4 inches.
4. Air Entrainment Admixture-ASTM C-260.
5. Air Content %: 5-8%

25.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

25.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

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.

PART 26 - EXECUTION

26.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

1. Chamfer Size: 3/4 inch.

26.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

26.3 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

26.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Place at 12 inches O.C.E.W.

C. Install suspended in the concrete that is 1.5” to 2.5” from enter of rebar to bottom of concrete. Rebar shall be suspended by chairs. Spacing and chairs shall be installed per the manufacturer’s recommendations.

26.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Control Joints: Install control joints true to line with faces perpendicular to surface plane of concrete as specified on the drawings.

D. Expansion Joints: Install expansion joints at locations specified on the drawings.

26.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. The contractor shall broom finish all concrete.

D. Cold-Weather Placement: Comply with ACI 306.1.

E. Hot-Weather Placement: Comply with ACI 301.

26.7 FINISHING

A. Formed Surfaces: Immediately after the removal of forms, all bulges and projections on portions of concrete which will be exposed shall be removed by chipping or tooling and the surface rubbed or ground. All honeycombed and defective areas shall be chipped out to solid concrete with edges cut at right angles to the surface. All cavities shall be filled with a grout of cement and fine aggregate in the same proportion as the adjacent concrete. Immediately before filling, the cavity shall be brushed with a slurry of neat cement.

B. B. Horizontal Surfaces and Slabs: For slabs in wet locations, the Contractor shall be particularly careful to provide an adequate slope to the drains or to suitable points of disposal.

C. Boat Landing Finish: Concrete landings shall be grooved as per the details shown on the drawings.

26.8 CONCRETE PROTECTING 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 ACI 301 for hot-weather protection during curing.

B. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Curing shall be by covering the concrete surfaces with impermeable sheets of polyethylene material with joints lapped and sealed to make watertight. No chemical curing compounds shall be used.

26.9 TREATMENT OF SURFACE DEFECTS

A. As soon as forms are removed, exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall be repaired.

B. Holes left by tie-rod cones shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. Holes then shall be repaired in an approved manner with dry-packed cement grout.

C. Prior to filling any structure with water, cracks shall be "vee'd" as indicated and filled with sealant. This repair method shall be done on the water bearing face of members. Prior to backfilling, faces of members in contact with fill which are not covered with a waterproofing membrane shall also have cracks repaired as indicated herein.

26.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Contracting Officer's approval.

26.11 CARE AND REPAIR OF CONCRETE

A. The Contractor shall protect concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface.

26.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Frequency: Contractor shall take concrete cylinders once daily during concrete constructions. Air and slump tests shall be taken every 20 cubic yards of concrete placed. All costs for concrete testing shall be included in the contractor’s bid/proposal.

END OF SECTION 033000

SECTION 310523 – AGGREGATE BASE MATERIALS

PART 1 - GENERAL

1.1 Summary

A. Work covered under this Section includes providing all materials, equipment, and labor necessary to construct base materials for roads and structures.

1.3 SUBMITTALS

A. Aggregate for Base and Surfaces: Submit Gradation, Material Certification, and Stockpile location.

B. Test Reports: Provide successful Aggregate compaction test reports prior to submitting progress payment. Tests not required for areas in water.

PART 2: PRODUCTS

2.1 AGGREGATE BASE

A. Aggregate base materials shall conform to the requirements of WiDOT Specification, ¾" Dense graded base. No recycled concrete, slag, or other materials may be used.

PART 3: EXECUTION

3.1 REMOVAL

A. Removal areas shall be prepared to the lines and grades as shown in the drawings.

3.2 AGGREGATE BASE

A. Install new aggregate base material, as specified, to obtain a nice smooth, even base for the ramp and the removable dock. Compact base to 95% of Modified Proctor Density, ASTM D 1557.

3.3 FIELD QUALITY CONTROL

A. The CONTRACTOR shall establish and maintain quality control for Work covered under this Section to assure compliance with the contract requirements, including compaction test results as requested by GOVERNMENT. The CONTRACTOR shall employ a qualified testing agency to perform compaction testing. Testing shall be accomplished as shown above.

END OF SECTION 310523

SECTION 312500 EROSION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General requirements for prevention of erosion due to construction activities. This section includes erosion control methods which may not be suitable or required for all types of projects. The construction methods of the contractor shall determine the types and amounts of erosion control required. Work in the river shall require a turbidy curtain at a minimum.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

1.03 REFERENCE STANDARDS

A. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

D. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.

F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.

H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; Federal Highway Administration.

1.04 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I and II, under requirements for the 2003 Construction General Permit (CGP), whether the project is required by law to comply or not.

B. Best Management Practices Standard: Federal Highway Administration Best Management Practices for Erosion and Sediment Control.

C. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.

1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.

2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 20 years.

G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.

1. Control movement of sediment and soil from temporary stockpiles of soil.

2. Prevent development of ruts due to equipment and vehicular traffic.

3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to US Fish And Wildlife Service.

H. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.

1. Prevent windblown soil from leaving the project site.

2. Prevent tracking of mud onto public roads outside site.

3. Prevent mud and sediment from flowing onto sidewalks and pavements.

4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to US Fish and Wildlife Service.

I. Sedimentation of Waterways on Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to US Fish and Wildlife Service; remove deposited sediments; comply with requirements of authorities having jurisdiction.

2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

J. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to US Fish and Wildlife Service; remove deposited sediments; comply with requirements of authorities having jurisdiction.

K. Open Water: Prevent standing water that could become stagnant.

L. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Erosion and Sedimentation Control Plan:

1. Include:

a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.

b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.

c. Schedule of temporary preventive measures, in relation to ground disturbing activities.

2. Obtain the approval of the plan by authorities having jurisdiction.

3. Obtain the approval of the plan by US Fish and Wildlife Service.

C. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 PRODUCTS

2.01 MATERIALS

A. Grass Seed for Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose which is free of invasive species. Coordinate and get approval from Refuge staff on species to be used. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons. Ensure seed is at least 98% weed free.

B. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:

1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.

2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491.

3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355 after 500 hours exposure.

4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632.

5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632.

6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D4533.

7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

C. Silt Fence Posts: One of the following, minimum 5 feet long:

1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.

D. Gravel: See Section 32 1123 for aggregate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Linear Sediment Barriers: Made of silt fences.

1. Provide linear sediment barriers:

a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.

2. Space sediment barriers with the following maximum slope length upslope from barrier:

a. Slope of Less Than 2 Percent: 100 feet..

b. Slope Between 2 and 5 Percent: 75 feet.

c. Slope Between 5 and 10 Percent: 50 feet.

d. Slope Between 10 and 20 Percent: 25 feet.

e. Slope Over 20 Percent: 15 feet.

D. Soil Stockpiles: Protect using one of the following measures:

1. Cover with polyethylene film, secured by placing soil on outer edges.

2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

H. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.

I. Temporary Seeding: Use where temporary vegetated cover is required.

3.04 INSTALLATION

A. Silt Fences:

1. Store and handle fabric in accordance with ASTM D4873.

2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.

3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.

4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.

5. Install with top of fabric at nominal height and embedment as specified.

6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.

7. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.

8. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

B. Turbidity Curtains

1. Provide type 1 or 2 turbidity curtain around work areas within the water. Anchor turbidity curtain as necessary to keep wave action from moving or overtopping.

2. Remove turbidity curtain once all work within the water is completed and any silt has settled

C. Temporary Seeding:

1. When hydraulic seeder is used, seedbed preparation is not required.

2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.

3.05 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall. Also inspect after significant change in river levels or river flooding.

B. Repair deficiencies immediately.

C. Silt Fences:

1. Promptly replace fabric that deteriorates unless need for fence has passed.

2. Remove silt deposits that exceed one-third of the height of the fence.

3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Clean out temporary sediment control structures weekly and relocate soil on site.

E. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by COR.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION 312500

SECTION 313215 – EXCAVATION, FILL, AND COMPACTION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work Included.

1. The work includes site stripping, stockpiling and spreading topsoil, structural excavation, fill, backfill, compaction, and grading within the contract limits.

1.02 JOB CONDITIONS

A. Bidders are expected to examine the site to determine the character of material to be encountered.

B. Locate existing underground utilities in areas of excavation work. Repair damaged utilities in a permanent manner to restore full operation.

C. Locate all stockpiles according to the directions of the Contracting Officer.

1.03 SAFETY AND PROTECTION

A. Protect structures, utilities, pavements, and other site facilities from settlement, lateral movement, undermining, washout, and other hazards resulting from earthwork operations.

1.04 SUBMITTALS

A. Submit the following information in accordance with Section 01300 - Submittals:

1. Granular, Aggregate, and Fill Material: Submit Gradation, Material Certification, and Stockpile location.

2. Dewatering Plan: Submit plan for temporary cofferdams, dewatering system.

1.05 QUALITY CONTROL

A. Test Required

1. Perform soil compaction test.

2. Perform soil compaction testing in any area where over excavation (over-ex) and refilling has occurred.

PART 2 PRODUCTS

2.01 MATERIALS

A. Structural fill material (embankment) may be imported or may be obtained from a

designated borrow source within the Refuge boundary, having a USCS classification GW or GP, with 4 inch maximum particle size, less than 30% oversize (greater than ¾"), and no more than 5% fines passing the #200 sieve,. Prior to use, proposed fill material shall be tested to determine maximum density, optimum moisture content, and swell potential.

B. Backfill at foundation walls shall be obtained from material removed during excavation. Materials removed during site stripping shall not be used for backfill. Backfill shall not contain roots, trash, rocks over 4 inches in maximum dimension, ice or frozen earth, or muck.

C. Granular Fill. ¾ inch minus free-draining material. Gradation shall conform to WYDOT Grade W, or equivalent.

D. Sand Fill. Conform to ASTM C33, Fine Aggregate.

E. Gravel Surfacing. Clean, hard, durable crushed gravel conforming to Wyoming Department of Transportation, Standard Specification for Road and Bridge Construction, Aggregate for Subbase and Base, Gradation J, except the percentage passing the 4.75mm sieve shall be limited to 35%.

PART 3 EXECUTION

3.01 EROSION CONTROL

B. Erect and maintain temporary erosion control measures in working condition until the project is complete or the measures are no longer needed. Clean erosion control measures when half full of sediment. Use the sediment in the work, if acceptable, or dispose of it as directed by the Contracting Officer's Representative.

C. Remove and dispose of temporary erosion control measures when the project is complete, and grades and banks are stabilized.

3.02 CLEARING AND GRUBBING

A. Proposed surfacing footprint and in areas to receive fill, remove boulders, rubbish, vegetation, roots and other organic material, and top 6 inches of existing soil, unless otherwise specified.

3.03 EXCAVATION

A. Remove earth materials of whatever nature encountered to the subgrade elevations indicated.

B. If unsuitable material is encountered at the indicated subgrade elevation for the foundation, the Contractor shall immediately notify the Contracting Officer. The Contracting Officer may direct additional excavation to remove the unsuitable material, and replacement with acceptable fill.

C. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of

excavations in safe condition until completion of backfilling.

D. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

E. Create cofferdams only if needed to excavate the area around the landing. Design and install dewatering systems as required to install improvements. Regrade material within 10' of the end of the proposed landing to an elevation just below the of the bottom of the proposed landing. Relocate materials to a location that will not affect operation of the ramp but do not remove material from the site.

3.04 OVEREXCAVATION

A. Do not excavate below the indicated elevations without specific approval of the Contracting Officer. If at any point during excavation the foundation material below the indicated subgrade elevation is disturbed or loosened it shall be removed and replaced with selected materials satisfactory to the Contracting Officer. Overexcavation performed by the Contractor for any reason without approval of the Contracting Officer, and all work required to correct such overexcavation shall be the responsibility of the Contractor.

B. Overexcavated areas shall be filled with selected materials satisfactory to the Engineer.

3.06 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials suitable for re-use as backfill and topsoil where directed. Place, grade, and shape stockpiles for proper drainage.

B. Dispose of excess excavated soil material and materials not acceptable for use as fill or backfill at a location on the Refuge, as directed by the Contracting Officer.

3.07 FILL AND BACKFILL PLACEMENT

A. Fill shall not be placed until all clearing and excavation is completed, inspected and approved by the Contracting Officer.

B. Prior to placing fill, scarify the surface to a depth of 8 inches and recompact to maximum field density. Place fill and backfill materials in layers a maximum of 8 inches thick for material compacted by heavy compaction equipment, and a maximum of 6 inches for material compacted by hand-operated tampers. At concrete foundation walls to be backfilled on two sides, do not exceed 6 inches difference in backfill elevation on opposite sides of wall during backfill operations to maintain equal loading of wall.

C. Moisture Control. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Moisture content shall be plus or minus 2% of optimum at time of fill placement and compaction.

3.08 COMPACTION

A. Subgrade bearing surfaces for footings and slabs-on-grade, and backfill, composed of native soils containing 30% or more oversize material (greater than 3/4 inch):

1. Small areas: Compact to a depth of 8 inches using a vibratory smooth drum roller.

2. Large areas: Compact using fully-loaded rubber-tired equipment, or using a vibratory smooth drum roller.

B. Structural fill (embankment), and native soils containing less than 30% oversize material, and granular fill:

1. Compact cohesive soils to 95% of maximum dry density, Standard Proctor, per ASTM D 698, by any method which will achieve specified compaction.

C. Compaction testing of native soils containing 30% or more oversize material shall be done by qualitative analysis to determine field maximum density.

1. Compact the material at or near optimum moisture content as determined by experienced testing personnel, and perform a nuclear density test in accordance with ASTM D 2922 after each pass of the compaction equipment. Repeat the sequence of compaction and retesting until maximum field density is achieved. The field density achieved shall be used as the standard for subsequent compaction and testing.

2. Proof roll compacted areas using a fully loaded ten wheel dump truck or other approved equipment such that no visible rutting occurs.

D. Specified in-place densities are minimum values and may be exceeded.

3.10 PLACEMENT OF GRAVEL SURFACING

A. Place material on prepared subgrade to depths shown on drawings. Add moisture uniformly as necessary to achieve optimum moisture content for compaction.

B. Compact material with six uniform passes throughout with a smooth steel roller, or smooth steel plate compactor which will give a minimum rolling pressure of 250 pounds per inch of width, with weight applied uniformly over entire width.

3.11 GRADING

A. General: Uniformly grade ground surface disturbed by construction operations, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

3.12 SETTLING

A. If settling is observable at excavated and filled areas during general project warranty period, remove the surfacing, add backfill material, compact, and restore surface treatment to original condition and appearance.

END OF SECTION 313215