SPECIFICATION

FOR CONSTRUCTION CONTRACT

CBE PROJECT NO: 10-110

DEPARTMENT OF AGRICULTURE

FOREST SERVICE

REGION NINE

Aquatic Invasive Species Prevention – Boat Washing Facilities Design

Ottawa National Forest

Bessemer and Iron River Ranger Districts

April 29, 2011

BID DOCUMENTS

CHEQUAMEGON BAY ENGINEERING, INC.

SECTION 00 01 10

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SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Boat Washing Facilities Design, Hagerman Lake Recreational Site.

B. Owner's Name: USDA Forest Service - Ottawa National Forest.

C. Engineer's Name: Contracting Officer (CO) and/or Contracting Officer's Technical Representative (COTR)

D. The Project consists of the construction of boat power washing facilities and related sitework. Design and construction (Design/Build) of electrical service, feeds, conductors, panel boards, and related electrical elements related to the work of this contract is also included.

1.02 CONTRACT DESCRIPTION

A. Contract type: As defined in USDA Forest Service bid procurement documents.

1.03 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is shown on drawings.

B. Plumbing: Alter existing system and add new construction, keeping existing in operation.

C. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.

1.04 OWNER OCCUPANCY

A. USDA Forest Service - Ottawa National Forest intends to occupy the Project upon Substantial Completion.

B. USDA Forest Service - Ottawa National Forest intends to occupy areas surrounding the work area prior to the completion date for the conduct of normal operations.

C. Cooperate with USDA Forest Service - Ottawa National Forest to minimize conflict and to facilitate USDA Forest Service - Ottawa National Forest's operations.

D. Schedule the Work to accommodate USDA Forest Service - Ottawa National Forest occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Coordinate with COTR.

B. Arrange use of site and premises to allow:

1. USDA Forest Service - Ottawa National Forest occupancy.

2. Use of site and premises by the public.

C. Provide access to and from site as required by law and by USDA Forest Service - Ottawa National Forest:

1. Do not obstruct roadways, sidewalks, or other public ways without written COTR consent.

D. Existing building spaces may not be used for storage.

E. On-Site Storage:

1. On-site storage arrangements must be made with the COTR to minimize impact.

2. Driving and exiting lanes and boat launching facilities must be kept clear at all times.

F. Utility Outages and Shutdown:

1. Limit shutdown of utility services to 4 hours at a time, arranged at least 24 hours in advance with USDA Forest Service - Ottawa National Forest.

2. Contractor shall coordinate required shutdowns with appropriate utilities.

3. Prevent accidental disruption of utility services to other facilities.

1.06 WORK SEQUENCE

A. See FAR clause 52.236-15 schedules for Construction Contracts.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

C. Construction progress schedule.

D. Submittals for review, information, and project closeout.

E. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.

B. Section 01 78 00 - Closeout Submittals: Project record documents.

1.03 PROJECT COORDINATION

A. Project Coordinator: General Contractor.

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for owner access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Project Coordinator.

D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.

F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

G. Make the following types of submittals to COTR through the Project Coordinator:

1. Requests for interpretation.

2. Requests for substitution.

3. Shop drawings, product data, and samples.

4. Test and inspection reports.

5. Design data.

6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. COTR will schedule a meeting after Notice of Award.

B. Attendance Required:

1. USDA Forest Service - Ottawa National Forest.
2. COTR.
3. Contractor.

C. Agenda:

1. Execution of USDA Forest Service - Ottawa National Forest-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of schedule of values, and progress schedule.
5. Designation of personnel representing the parties to Contract, and COTR.
6. Procedures and processing of field decisions, submittals, and substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with copies to COTR, USDA Forest Service - Ottawa National Forest, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

B. Attendance Required: Job superintendent, major Subcontractors and suppliers, USDA Forest Service - Ottawa National Forest, COTR, as appropriate to agenda topics for each meeting.

C. Agenda:

1. Review minutes of previous meetings.

2. Review of Work progress.

3. Field observations, problems, and decisions.

4. Identification of problems that impede, or will impede, planned progress.

5. Review of submittals schedule and status of submittals.

6. Maintenance of progress schedule.

7. Corrective measures to regain projected schedules.

8. Planned progress during succeeding work period.

9. Maintenance of quality and work standards.

10. Effect of proposed changes on progress schedule and coordination.

11. Other business relating to Work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to COTR, USDA Forest Service - Ottawa National Forest, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.

D. Submit updated schedule with each Application for Payment.

3.04 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:

1. Product data.

2. Shop drawings.

3. Samples for selection.

4. Samples for verification.

B. Submit to COTR for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - CLOSEOUT SUBMITTALS.

3.05 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:

1. Design data.

2. Certificates.

3. Test reports.

4. Inspection reports.

5. Manufacturer's instructions.

6. Manufacturer's field reports.

7. Other types indicated.

B. Submit for COTR's knowledge as contract administrator or for USDA Forest Service - Ottawa National Forest.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:

1. Project record documents.

2. Operation and maintenance data.

3. Warranties.

4. Bonds.

5. Other types as indicated.

B. Submit for USDA Forest Service - Ottawa National Forest's benefit during and after project completion.

3.07 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:

1. Small Size Sheets, Not Larger than 8-1/2 x 11 inches: Submit the number of copies which the Contractor requires, plus one copy which will be retained by COTR.

2. Larger Sheets, Not Larger than 36 x 48 inches: Submit the number of opaque reproductions that Contractor requires, plus one copy that will be retained by COTR.

3. Submit 5 copies of shop drawings for review.

B. Electronic submittals may be made in PDF format, only as allowed and accepted by the COTR.

C. Documents for Information: Submit two copies.

D. Extra Copies at Project Closeout: See Section 01 78 00.

1. Samples: Submit the number specified in individual specification sections; one of which will be retained by COTR.

a. After review, produce duplicates.

b. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

A. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

B. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

D. Submittals that are received without Contractor review and stamp will NOT be reviewed by COTR.

E. Deliver submittals to COTR at business address.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and COTR review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Control of installation.

C. Tolerances.

D. Inspection services.

E. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

A. Section 01 30 00 - Administrative Requirements: Submittal procedures.

B. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

A. Design Data: Submit for COTR's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for USDA Forest Service - Ottawa National Forest's information.

B. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to COTR, in quantities specified for Product Data.

1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the USDA Forest Service - Ottawa National Forest's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.04 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from COTR before proceeding.

F. Neither the contractual relationships, duties, nor responsibilities of the parties in Contract nor those of COTR shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND INSPECTION AGENCIES

A. As indicated in individual specification sections, USDA Forest Service - Ottawa National Forest or Contractor shall employ and pay for services of an independent testing agency to perform specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:

1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 543, ASTM C 1021, ASTM C 1077, and ASTM C 1093.

2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.

3. Laboratory: Authorized to operate in Ottawa National Forest.

4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.

5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from COTR before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from COTR before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:

1. Provide qualified personnel at site. Cooperate with COTR and Contractor in performance of services.

2. Perform specified sampling and testing of products in accordance with specified standards.

3. Promptly notify COTR and Contractor of observed irregularities or non-conformance of Work or products.

4. Perform additional tests and inspections required by COTR.

5. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency may not approve or accept any portion of the Work.

3. Agency may not assume any duties of Contractor.

4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:

1. Provide incidental labor and facilities:

a. To provide access to Work to be tested/inspected.

b. To obtain and handle samples at the site or at source of Products to be tested/inspected.

c. To facilitate tests/inspections.

2. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

3. Arrange with USDA Forest Service - Ottawa National Forest's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by COTR.

F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.04 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to COTR 30 days in advance of required observations.

1. Observer subject to approval of COTR.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of COTR, it is not practical to remove and replace the Work, COTR will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary sanitary facilities.

C. Temporary Controls: Barriers and enclosures.

D. Security requirements.

E. Vehicular access and parking.

F. Waste removal facilities and services.

1.02 TEMPORARY UTILITIES

A. USDA Forest Service - Ottawa National Forest will provide the following:

1. Electrical power, consisting of providing access to existing power systems that are available and in service.

2. Contractor shall provide, pay for and install all temporary electrical service components required for construction use.

3. Access to existing water supplies that are available and in service.

B. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.04 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades required by governing authorities for public rights-of-way.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 SECURITY

A. Provide security and facilities to protect Work, and USDA Forest Service - Ottawa National Forest's operations from unauthorized entry, vandalism, or theft.

1.06 VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with governing authorities and USDA Forest Service - Ottawa National Forest.

B. Provide means of removing mud from vehicle wheels before entering streets.

C. Existing on-site roads may be used for construction traffic.

D. Existing parking areas may be used for construction parking.

E. Contractor parking area to be dictated by USDA Forest Service

1.07 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site weekly.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

1.08 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, and prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

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.

D. Compensation of USDA Forest Service - Ottawa National Forest for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Temporary and permanent grade changes for erosion control.

1.03 REFERENCE STANDARDS

A. ASTM D 4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus; 2007.

B. ASTM D 4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2009).

C. ASTM D 4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2004 (Reapproved 2009).

D. ASTM D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2008.

E. ASTM D 4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2004.

F. ASTM D 4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2002 (Reapproved 2009).

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

H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; Federal Highway Administration; 1995.

1.04PERFORMANCE REQUIREMENTS

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

B. 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.

1. Obtain and pay for permits and provide security required by authority having jurisdiction.

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

D. 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 25 years.

E. 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 USDA Forest Service - Ottawa National Forest.

F. 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 USDA Forest Service - Ottawa National Forest.

G. 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 USDA Forest Service - Ottawa National Forest; 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.

H. 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 USDA Forest Service - Ottawa National Forest; remove deposited sediments; comply with requirements of authorities having jurisdiction.

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

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

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Erosion and Sedimentation Control Plan:

1. Submit within 2 weeks after Notice to Proceed.

2. 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. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.

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

e. Other information required by law.

f. Format required by law is acceptable, provided any additional information specified is also included.

3. Obtain the approval of the Plan by USDA Forest Service - Ottawa National Forest.

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.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mulch: Use one of the following:

1. Erosion control matting or netting.

B. Bales: Air dry, rectangular straw bales.

1. Cross Section: 14 by 18 inches, minimum.

2. Bindings: Wire or string, around long dimension.

C. Bale Stakes: One of the following, minimum 3 feet long:

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

2. Wood, 2 by 2 inches in cross section.

D. 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 D 4751.

2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D 4491.

3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D 4355 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 D 4632.

5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D 4632.

6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D 4533.

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

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

1. Hardwood, 2 by 2 inches in cross section.

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 INSTALLATION

A. Silt Fences:

1. Store and handle fabric in accordance with ASTM D 4873.

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 wood posts using one of the following:
   a. Four 3/4 inch diameter, 1 inch long, 14 gage nails.
   b. Five 17-gage staples with 3/4 inch wide crown and 1/2 inch legs.

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. Straw Bale Rows:

1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.

2. Install bales so that bindings are not in contact with the ground.

3. Embed bales at least 4 inches in the ground.

4. Anchor bales with at least two stakes per bale, driven at least 18 inches into the ground; drive first stake in each bale toward the previously placed bale to force bales together.

5. Fill gaps between ends of bales with loose straw wedged tightly.

6. Place soil excavated for trench against bales on the upslope side of the row, compacted.

3.04 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.

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. Straw Bale Rows:

1. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.

2. Remove silt deposits that exceed one-half of the height of the bales.

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

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

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

3.05 CLEAN UP

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

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

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

1. Submit within 15 days after date of Notice to Proceed.

2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate equipment layout and dimensions, utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Where all other criteria are met, Contractor shall give preference to products that:

1. Are extracted, harvested, and/or manufactured closer to the location of the project.
2. Have longer documented life span under normal use.

3. Result in less construction waste.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.03 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. A request for substitution constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Will provide the same warranty for the substitution as for the specified product.

3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to USDA Forest Service - Ottawa National Forest.

4. Waives claims for additional costs or time extension that may subsequently become apparent.

5. Will reimburse USDA Forest Service - Ottawa National Forest and COTR for review or redesign services associated with re-approval by authorities.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

E. Substitution Submittal Procedure:

1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.

3. The COTR will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of USDA Forest Service - Ottawa National Forest personnel.

H. Closeout procedures, except payment procedures.

I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

1.03 SUBMITTALS

A. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.

1. On request, submit documentation verifying accuracy of survey work.

2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.

3. Submit surveys and survey logs for the project record.

B. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.04 QUALIFICATIONS

A. For survey work, employ a land surveyor acceptable to USDA Forest Service.

1.05 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1. Minimize amount of bare soil exposed at one time.

2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

E. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.

F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

A. See Section 01 10 00 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Specifications to ensure efficient and orderly sequence of installation of interdependent construction elements.

C. Notify affected utility companies and comply with their requirements.

D. Verify that utility requirements and characteristics of new operating equipment are compatible with site utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate completion and clean-up of work of separate sections.

F. After USDA Forest Service - Ottawa National Forest occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of USDA Forest Service - Ottawa National Forest's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify COTR of any discrepancies discovered.

C. Contractor shall locate and protect survey control and reference points.

D. Control datum for survey is that indicated on Drawings.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to COTR the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to COTR.

H. Utilize recognized engineering survey practices.

I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.

2. Buildings, structures, piping, and other items shown on the drawings.

3. Periodically verify layouts by same means.

J. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation, as-built drawings, and survey performed for this work as indicated on site plans.

1. Verify that construction and utility arrangements are as shown.

2. Report discrepancies to USDA Forest Service before disturbing existing installation.

3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.

C. Remove existing work as indicated and as required to accomplish new work.

1. Remove items indicated on drawings.

2. Relocate items indicated on drawings.

3. Where new surface finishes are to be applied to existing work, perform removals,

patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.

4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

D. Services (Including but not limited to Plumbing and Electrical): Remove, relocate, and extend existing systems to accommodate new construction.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.

2. Verify that abandoned services serve only abandoned facilities.

3. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

E. Protect existing work to remain.

1. Perform cutting to accomplish removals neatly and as specified for cutting new work.

2. Repair adjacent construction and finishes damaged during removal work.

3. Patch as specified for patching new work.

F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

H. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

I. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:

1. Complete the work.

2. Fit products together to integrate with other work.

3. Provide openings for penetration of mechanical, electrical, and other services.

4. Match work that has been cut to adjacent work.

5. Repair areas adjacent to cuts to required condition.

6. Repair new work damaged by subsequent work.

7. Remove samples of installed work for testing when requested.

8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Restore work with new products in accordance with requirements of Contract Documents.

F. Patching:

1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

2. Match color, texture, and appearance.

3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

H. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

C. Collect and remove waste materials, debris, and trash/rubbish from site daily and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

D. Verify that wiring and support components for equipment are complete and tested.

E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, shutdown and seasonal lay-up of each item of equipment at agreed time, at equipment location.

B. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with USDA Forest Service - Ottawa National Forest's personnel in detail to explain all aspects of operation and maintenance.

3.11 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 FINAL CLEANING

A. Execute final cleaning after Substantial Completion but before making final application for payment.
   1. Clean areas to be occupied by USDA Forest Service - Ottawa National Forest prior to final completion before USDA Forest Service - Ottawa National Forest occupancy.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces,

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean site; sweep paved areas, rake clean landscaped surfaces.

F. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

   1. Provide copies to USDA Forest Service - Ottawa National Forest.

B. Notify COTR when work is considered ready for Substantial Completion.

C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for COTR's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to USDA Forest Service - Ottawa National Forest-occupied areas.

E. Notify COTR when work is considered finally complete.

F. Complete items of work determined by COTR's final inspection.

3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the USDA Forest Service - Ottawa National Forest.

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to COTR with claim for final Application for Payment.

B. Operation and Maintenance Data:

1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work.

2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with USDA Forest Service comments. Revise content of all document sets as required prior to final submission.

3. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with USDA Forest Service - Ottawa National Forest's permission, submit documents within 10 days after acceptance.

2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by USDA Forest Service - Ottawa National Forest.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
3. Field changes of dimension and detail.
4. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component

parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional information as specified in individual product specification sections.

D. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:

1. Description of unit or system, and component parts.

2. Identify function, normal operating characteristics, and limiting conditions.

3. Include performance curves, with engineering data and tests.

4. Complete nomenclature and model number of replaceable parts.

B. Panel board Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. Provide control diagrams by controls manufacturer as installed.

J. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

K. Include test and balancing reports.

L. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of USDA Forest Service, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

   a. Significant design criteria.

   b. List of equipment.

   c. Parts list for each component.

   d. Operating instructions.

   e. Maintenance instructions for equipment and systems.

   f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and product data.

    b. Air and water balance reports.

    c. Certificates.

    d. Photocopies of warranties and bonds.

J. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of USDA Forest Service, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with USDA Forest Service - Ottawa National Forest's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include photocopies of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Selective demolition of building elements for alteration purposes.

C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 57 13 - Temporary Erosion and Sediment Control.

D. Section 01 70 00 - Execution Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

E. Section 31 22 00 - Grading: Topsoil removal.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 22 00 - Grading

PART 3 EXECUTION

3.01 SCOPE

A. Remove paving and curbs as required to accomplish new work.

B. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 31 22 00.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.

   1. Obtain required permits.

   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.

   3. Provide, erect, and maintain temporary barriers and security devices.

   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.

   5. Do not close or obstruct roadways or sidewalks without permit.

   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from USDA Forest Service - Ottawa National Forest.

C. Protect existing structures and other elements that are not to be removed.

   1. Provide bracing and shoring.

   2. Prevent movement or settlement of adjacent structures.

   3. Stop work immediately if adjacent structures appear to be in danger.

D. If hazardous materials are discovered during removal operations, stop work and notify COTR and USDA Forest Service - Ottawa National Forest; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

E. Perform demolition in a manner that maximizes salvage and recycling of materials.

   1. Dismantle existing construction and separate materials.

   2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

F. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to USDA Forest Service - Ottawa National Forest.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to USDA Forest Service - Ottawa National Forest.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as shown.

2. Report discrepancies to Contracting Officer before disturbing existing installation.

3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing work as indicated and as required to accomplish new work.

1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.

2. Remove items indicated on drawings.

C. Services (Including but not limited to Plumbing and Electrical): Remove existing systems and equipment as indicated.

1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

3. Verify that abandoned services serve only abandoned facilities before removal.

4. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification.

D. Protect existing work to remain.

1. Prevent movement of structure; provide shoring and bracing if necessary.

2. Perform cutting to accomplish removals neatly and as specified for cutting new work.

3. Repair adjacent construction and finishes damaged during removal work.

4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Floors and slabs on grade.

C. Concrete reinforcement.

D. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 32 13 13 - Concrete Paving: Wash pads.

1.03 PRICE AND PAYMENT PROCEDURES

A. Cast-in-place concrete work will be paid lump sum as part of the contract price.

1.04 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International; 2006.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988 (Reapproved 2002).

H. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2008.

J. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.

K. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

L. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2009b.

M. ASTM A 775/A 775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2007b.

N. ASTM C 33 - Standard Specification for Concrete Aggregates; 2008.

O. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2009a.

P. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2009a.

Q. ASTM C 150 - Standard Specification for Portland Cement; 2007.

R. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.

S. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2009.

T. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.

U. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.

V. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2008a.

W. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2008a.

X. ASTM C 685/C 685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2007.

Y. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).

Z. ASTM D 3963/D 3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy Coated Reinforcing Steel Bars; 2001 (Reapproved 2007).

AA. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2009.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.

C. Samples: Submit samples of under slab vapor retarder to be used.

D. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.06 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347 to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

1. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.

2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).

1. Type: Deformed billet-steel bars.

2. Finish: Unfinished.

3. Finish: Epoxy coated in accordance with ASTM A 775/A 775M at exterior boat wash pads.

B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.

1. Form: Flat Sheets.

2. Mesh Size: 6 x 6.

3. Wire Gage: W 10 x W 10.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage.

2. Chairs, Bolsters, Bar Supports, and Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C 150, Type I - Normal Portland type.

1. Acquire all cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C 33.

1. Acquire all aggregates for entire project from same source.

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

D. Water: Clean and not detrimental to concrete.

2.04 CHEMICAL ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C 260.

C. High Range Water Reducing and Retarding Admixture: ASTM C 494/C 494M Type G.

2.05 ACCESSORY MATERIALS

A. Under slab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E 1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.

1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.

B. Moisture-Retaining Cover: ASTM C 171; regular curing paper, white curing paper, clear polyethylene, white polyethylene, or white burlap-polyethylene sheet.

C. Liquid Curing and Sealing Compound: ASTM C 309, Type 1, clear or translucent.

1. Acceptable Products:

a. Conspec Super Seal.

b. Substitutions: Approved equal.

2.06 BONDING AND JOINTING PRODUCTS

A. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/4 inch thick and full depth of slab less 1/2 inch; tongue and groove profile.

2.07 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for concrete on the basis of field experience, as specified in ACI 301.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,000 psi.

2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.

3. Cement Content: Minimum 565 lb per cubic yard.

4. Water-Cement Ratio: Maximum 40 percent by weight.

5. Total Air Content: 6 +/- 1.5 percent, determined in accordance with ASTM C 173/C 173M.

6. Maximum Slump: 4 inches.

2.08 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C 94/C 94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

1. Vapor Retarder over Granular Fill: Install compactable granular fill before placing vapor retarder as shown on the drawings.

3.03 INSTALLING REINFORCEMENT

A. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D 3963/D 3963M.

B. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

C. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

D. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Contract Officer not less than 24 hours prior to commencement of placement operations.

D. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

3.05 CONCRETE FINISHING

A. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

B. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:

1. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.06 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than 7 days.

C. Surfaces Not in Contact with Forms:

1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-fog spray, or saturated burlap.

2. Final Curing: Begin after initial curing but before surface is dry.

a. Moisture-Retaining Cover: Seal in place with waterproof tape or adhesive.

b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.07 FIELD QUALITY CONTROL

A. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

3.08 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Contract Officer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

3.09 SCHEDULE - CONCRETE TYPES AND FINISHES

A. Slab-on-grade Foundation: 4,000 psi 28 day concrete, smooth trowel finish.

B. Concrete Aprons & Sidewalks: 4,000 psi 28 day concrete, air entrainment, trowel and non-skid broom finish perpendicular to pedestrian travel direction.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items, including: Concrete-filled pipe bollards, Hose-mast stand, and misc. mounting angles.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Items cast into, or filled with concrete.

1.03 REFERENCE STANDARDS

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2008.

B. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.

C. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2009.

D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

E. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2007b.

F. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010.

G. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2007.

H. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.

I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36, Galvanized to ASTM A 153.

B. Steel Tubing: ASTM A123 galvanized structural tubing.

C. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

D. Bolts, Nuts, and Washers: ASTM A307, galvanized to ASTM A 153/A 153M where connecting galvanized components.

E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.

B. Support Angles: Steel angle, galvanized, as detailed.

C. Hose mast stand: Square HSS, galvanized, as detailed, welded sealed cap, imbedded in concrete pad.

2.04 FINISHES - STEEL

A. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A 123/A 123M requirements.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.03 TOLERANCES

A. Maximum variation from plumb: 1/4 inch in 8 feet.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 07 31 13

ASPHALT SHINGLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Asphalt shingle roofing.

B. Flexible sheet membranes for eave protection, underlayment, and valley protection.

C. Associated metal flashings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Roof sheathing.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Edge and cap flashings.

1.03 REFERENCE STANDARDS

A. ASTM D 225 - Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules; 2007.

B. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2006.

C. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2009.

D. ASTM D 3462 - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules; 2009a.

E. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.

F. Miami (APD) - Approved Products Directory; Miami-Dade County; database at www.miamidade.gov/buildingcode.

1.04 SUBMITTALS

A. See Division 1 for administrative requirements and submittal procedures.

B. Product Data: Provide data indicating material characteristics.

C. Shop Drawings: For metal flashings, indicate specially configured metal flashings, fastening methods and locations, and installation details.

D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern.

1.05 MOCK-UP

A. Provide mock-up of 100 sq ft, including underlayment.

B. Locate where directed.

C. Mockup may remain as part of the Work.

1.06 FIELD CONDITIONS

A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

PART 2 PRODUCTS

2.01 SHINGLES

A. Manufacturers:

1. Atlas Roofing Corporation: www.atlasroofing.com.
2. GAF Materials Corporation: www.gaf.com.
3. Owens Corning Corp: www.owenscorning.com.
4. Certainteed: www.certainteed.com.
5. Other manufacturers subject to Owner's approval.

B. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D 3462; Class A fire resistance.

1. Warranted Wind Speed: Not less than tested wind resistance.
2. Miami-Dade County approved.
3. Weight: 245 lb/100 sq ft.
4. Warranty: 30 years.
5. Self-sealing type.
6. Style: Laminated overlay.
7. Basis of Design: Match shingle color and style of Recreation Hall.
8. Color: chosen by COTR.

2.02 SHEET MATERIALS

A. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D 1970; 40 mil total thickness; with strippable treated release paper and polyethylene sheet top surface.

B. Underlayment: Asphalt-saturated organic roofing felt, unperforated, complying with ASTM D 226, Type II ("No.30").

2.03 ACCESSORIES

A. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, 12 gage, 0.105 inch shank diameter, 3/8 inch head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.

B. Plastic Cement: ASTM D 4586, asphalt roof cement.

C. Zinc Strip: Provide continuous zinc strip on each side of ridge.

2.04 METAL FLASHINGS

A. Metal Flashings: Provide sheet metal eave edge and gable edge.

1. Provide shapes, styles and materials to match existing construction in-kind.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that deck is of sufficient thickness to accept fasteners.

C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

D. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.02 PREPARATION

A. Broom clean deck surfaces before installing underlayment or eave protection.

B. Install eave edge flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 24 inches on center.

3.03 INSTALLATION - EAVE PROTECTION MEMBRANE

A. Install eave protection membrane from eave edge to minimum 2 ft up-slope beyond interior face of exterior wall.

B. Install eave protection membrane in accordance with manufacturer's instructions.

3.04 INSTALLATION - UNDERLAYMENT

A. At Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches over eave protection.

B. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

3.05 INSTALLATION - SHINGLES

A. Install shingles in accordance with manufacturer's instructions.

1. Fasten strip shingles using 4 nails per strip, or as required by code, whichever is greater.

B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area. Provide double course of shingles at eaves.

C. Project first course of shingles 3/4 inch beyond fascia boards or drip edge.

D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.

E. Complete installation to provide weather tight service.

END OF SECTION

SECTION 07 31 29

WOOD SHINGLES AND SHAKES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood shakes.

B. Installation on roofs.

C. Flexible sheet membranes for eave protection, underlayment, and valley protection.

D. Associated metal flashings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Roof sheathing.

1.03 REFERENCE STANDARDS

A. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2009.

B. ASTM D 6380 - Standard Specification for Asphalt Roll Roofing (Organic Felt); 2003 (Reapproved 2009).

C. CSSB (RMAN) - New Roof Construction Manual; 2005.

D. CSSB (WEB) - [Grade Standards as posted at www.cedarbureau.org]; Cedar Shake and Shingle Bureau; current edition.

E. Miami (APD) - Approved Products Directory; Miami-Dade County; database at www.miamidade.gov/buildingcode.

F. UL 1897 - Uplift Tests for Roof-Covering Systems; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating material characteristics, performance criteria, and limitations.

1.05 MOCK-UP

A. Provide mock-up of 10 sq ft, including underlayment.

B. Locate where directed.

C. Mockup may remain as part of the Work.

1.06 FIELD CONDITIONS

A. Do not install bituminous materials or eave protection membrane when surface temperatures are below 45 degrees F.

PART 2 PRODUCTS

2.01 SHINGLES AND SHAKES

A. Manufacturers:

1. Any producer member of Cedar Shake and Shingle Bureau (CSSB); www.cedarbureau.org.

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Roof Shakes: Western red cedar (Thuja plicata), handsplit and sawn, CSSB No. 1 Grade, 18 inches long, standard straight butt.

1. Thickness at Butt: 1/2 inch, nominal.

2. Wind Resistance: Pass UL 1897.

3. Warranted Wind Speed: 90 mph

4. Miami-Dade County approved.

5. Provide CSSB labels in packaging.

C. Ridge and Hip Caps: Prefabricated lapped single ply units of matching quality and thickness.

2.02 SHEET MATERIALS

A. Smooth Surfaced Roll Roofing: Asphalt-coated organic felt, with smooth asphalt coating both sides, complying with ASTM D 6380, Class S, Type IV, 39.8 lb/100 sq ft.

B. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D 1970; 40 mil total thickness; with strippable treated release paper and polyethylene sheet top surface.

2.03 ACCESSORIES

A. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.

2.04 METAL FLASHINGS

A. Metal Flashings: Provide sheet metal eave edge and gable edge.

1. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

2. Hem exposed edges of flashings minimum 1/4 inch on underside.

B. Sheet Metal: Prefinished galvanized steel, 0.018 inch/26 gage thick, minimum G90/Z275 hot-dipped galvanized; PVC coated, color as selected.

PART 3 EXECUTION

3.01 GENERAL

A. Install in accordance with this specification and the following, whichever is more stringent:

1. Applicable building code(s).
2. CSSB New Roof Construction Manual.
3. Manufacturer's instructions.

3.02 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify deck surfaces are dry, free of ridges, warps, or voids.

3.03 PREPARATION

A. Broom clean deck surfaces before installing underlayment or eave protection.

B. Install eave edge and gable edge flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 24 inches on center.

3.04 INSTALLATION - EAVE PROTECTION MEMBRANE

A. Install eave protection membrane from eave edge to minimum 4 ft up-slope beyond interior face of exterior wall.

B. Install eave protection membrane in accordance with manufacturer's instructions.

3.05 INSTALLATION - UNDERLAYMENT

A. At Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches over eave protection.

B. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

3.06 INSTALLATION - METAL FLASHING AND ACCESSORIES

A. Install flashings in accordance with CSSB New Roof Construction Manual.

B. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.

C. Secure in place with nails at 12 inches on center. Conceal fastenings.

D. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

3.07 INSTALLATION - SHINGLES AND SHAKES

A. Install using not less than 2 fasteners each.

B. On Roofs: Install to produce coursing pattern to match the nearby picnic shelter building.

C. Install with double course at eaves.

D. Project first roofing course 1-1/2 inches beyond face of fascia boards.

E. Interleave roof eave protection membrane into roofing courses from eave edge to 4 feet upslope from eave.

F. Install hip and ridge caps on ridges, maintaining 5 inch weather exposure. Place to avoid exposed nails.

G. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counter flashings.

H. Complete installation to provide weather tight service.

I. Apply dip type preservative treatment by brush after installation; apply one coat to exposed surfaces.

3.08 PROTECTION

A. Do not permit traffic over finished roof surface.

END OF SECTION

SECTION 07 46 23

WOOD SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board siding for Walls with batten strips.

B. Trim, flashings, accessories, and fastenings.

C. Cedar board siding

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Siding substrate.

B. Section 09 90 00 - Painting and Coating: Prime and finish painting.

1.03 REFERENCE STANDARDS

A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

B. AWPA U1 - Use Category System: User Specification for Treated Wood; 2010.

C. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; Redwood Inspection Service; 2000.

D. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; West Coast Lumber Inspection Bureau; 2004, and supplements.

E. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating materials, fastening methods, sizes, surface texture, finishes, and accessories.

1.05 QUALITY ASSURANCE

A. Grade lumber in accordance with the following:

1. Redwood: RIS (GR).

2. Western Red Cedar: WCLB (GR).

PART 2 PRODUCTS

2.01 SIDING

A. Board Siding: Flat redwood, Clear grade, maximum moisture content of 10 percent.

1. Profile: Vertical.

2. Surface Texture: Rough sawn.

3. Preservative Treatment: Pressure treatment in accordance with AWPA U1, using water borne preservative.

B. Cedar Board Siding: Beveled cedar, maximum moisture content of 10 percent.
1. Surface Texture: Rough sawn.

C. Batten Strips: Same species as siding; 1x2 inch.

2.02 ACCESSORIES

A. Nails: Hot dipped galvanized type; non-staining, of size and strength to securely and rigidly retain the work.

B. Flashing: 28 gage galvanized steel.

C. Soffits: Aluminum, prefinished panels. Vented type. Color to match finished siding.

D. Fascia: Aluminum, prefinished panels. Color to match soffits.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are ready to receive work.

B. Verify that water-resistive barrier has been installed over substrate completely and correctly.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is the responsibility of another installer, notify COTR of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Install siding, soffits, and batten strips in accordance with manufacturer's instructions.

B. Fasten siding in place, level and plumb.

1. Arrange for orderly nailing pattern. Blind nail except on over trim.

2. Install siding for natural shed of water.

C. Install board siding using single course method with 8 inch exposure.

1. Nail at 12 inches on center.

2. Miter horizontal joints tight at 45 degrees. Miter external and miter internal corners.

D. Install corner strips, closures, trim, and battens.

E. Install metal flashings at internal and external corners and sills.

F. Prepare for site finishing specified in Section 09 90 00.

3.03 TOLERANCES

A. Maximum Variation From Plumb and Level: 1/4 inch per 10 feet.

B. Maximum Offset From Joint Alignment: 1/16 inch.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. ANSI A250.3 - Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames; 2007.

C. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.

D. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).

E. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

F. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

G. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).

H. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

1.05 QUALITY ASSURANCE

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

B. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:

1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.

2. Windsor Republic Doors: www.republicdoor.com.

3. Steelcraft: www.steelcraft.com.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:

1. Accessibility: Comply with ANSI/ICC A117.1.

2. Door Edge Profile: Beveled on both edges.

3. Door Texture: Smooth faces.

4. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.

5. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.

6. Finish: Completely factory finished.

2.03 STEEL DOORS

A. Exterior Doors:

1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 1, full flush.

2. Core: Polystyrene foam.

3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.

4. Weather-stripping: Separate, see Section 08 71 00.

2.04 STEEL FRAMES

A. General:

1. Comply with the requirements of grade specified for corresponding door.
   a. ANSI A250.8 Level 3 Doors: 14 gage frames.

2. Finish: Same as for door.

B. Exterior Door Frames: Face welded, seamless with joints filled.

1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.

2. Weather-stripping: Integral, recessed into door edge or frame.

2.05 ACCESSORY MATERIALS

A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

B. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Factory Finish: Complying with ANSI A 250.3, manufacturer's standard coating.

1. Color: To be selected by COTR from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. Coordinate frame anchor placement with wall construction.

C. Coordinate installation of hardware.

D. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for hollow steel doors.

B. Thresholds.

C. Weather-stripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. BHMA A156.1 - American National Standard for Butts and Hinges; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.1).

C. BHMA A156.13 - American National Standard for Mortise Locks & Latches; Builders Hardware Manufacturers Association; 2005 (ANSI/BHMA A156.13).

D. BHMA A156.18 - American National Standard for Materials and Finishes; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.18).

E. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.

F. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2009.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.

C. Keys: Deliver with identifying tags to USDA Forest Service - Ottawa National Forest by security shipment direct from hardware supplier.

1.06 QUALITY ASSURANCE

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

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.08 COORDINATION

A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

1.09 MAINTENANCE PRODUCTS

A. Provide special wrenches and tools applicable to each different or special hardware component.

B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 DOOR HARDWARE - GENERAL

A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide all items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:

1. Applicable provisions of federal, state, and local codes.

2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.

D. Finishes: All door hardware the same finish unless otherwise indicated.

1. Primary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).

2. Finish Definitions: BHMA A156.18.

2.03 HINGES

A. Hinges: H1

B. Hinges: Provide hinges on every swinging door.

1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.

2. Provide ball-bearing hinges at all doors.

3. Provide non-removable pins on exterior out swinging doors.

C. Quantity of Hinges per Door:

1. Doors up to 60 inches High: Two hinges.

2. Doors From 60 inches High up to 90 inches High: Three hinges.

D. Manufacturers - Hinges:

1. Assa Abloy McKinney: www.assaabloydss.com.

2. Bommer Industries, Inc: www.bommer.com.

3. C. R. Laurence Co., Inc: www.crlaurence.com.

4. Hager Companies:

5. Stanley Hardware: www.stanleyworks.com.

2.04 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.

1. Hardware Sets indicate locking functions required for each door.

2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.

3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.

B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.

1. Provide cams and/or tailpieces as required for locking devices required.

C. Keying: Keyed in like-groups.

1. Supply keys in the following quantities:
   a. 3 change keys for each lock.

D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.05 MORTISE LOCKSETS

A. Model 3553 Grade 2 Storeroom Lockset.

B. Locking Functions: As defined in BHMA A156.13, and as follows:

1. Entry, Deadbolt: F20, may be locked without key, free egress.

C. Manufacturers - Mortise Locksets:

1. Assa Abloy Corbin Russwin, Sargent, or Yale: www.assaabloydss.com.
   a. Model 3504 Hamilton Style Brass Mortise Entrance Set; Rubbed Bronze finish

2. Best Access Systems, division of Stanley Security Solutions: www.bestlock.com.

3. Hager Companies: www.hagercom.com.

4. Schlage: www.schlage.com.

5. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

A. Provide products that comply with the following:

1. Applicable provisions of Federal, State, and local codes.

2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.

3. Applicable provisions of NFPA 101, Life Safety Code.

B. Finishes: Satin chromium.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as instructed by the manufacturer.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Mounting heights for hardware from finished floor to center line of hardware item:

1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."

3.03 ADJUSTING

A. Adjust work under provisions of Section 01 70 00.

B. Adjust hardware for smooth operation.

3.04 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 01 70 00.

B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and stains.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:

1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.

2. Items indicated to receive other finishes.

3. Items indicated to remain unfinished.

4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

5. Floors, unless specifically so indicated.

6. Glass.

7. Concealed pipes, ducts, and conduits.

8. Exposed interior stud framing in mechanical spaces.

1.02 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products, including VOC content.

C. Samples: Submit two paper chip samples, 1x1 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Maintenance Materials: Furnish the following for USDA Forest Service - Ottawa National Forest's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.

2. Extra Paint and Coatings: 1 gallon of each color; store where directed.

3. Label each container with color, type, and texture in addition to the manufacturer's label.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:

1. Comex Group (Color Wheel, Frazee, General Paint, Kwal, or Parker): www.thecomexgroup.com.

2. Duron, Inc: www.duron.com.

3. Glidden Professional: www.gliddenprofessional.com.

4. Benjamin Moore & Co: www.benjaminmoore.com.

5. PPG Architectural Finishes, Inc: www.ppgaf.com.

6. Pratt & Lambert Paints: www.prattandlambert.com.

7. Sherwin-Williams Company: www.sherwin-williams.com.

C. Transparent Finishes:

1. Sherwin-Williams Company: www.sherwin-williams.com.

2. Benjamin Moore & Co: www.benjaminmoore.com.

D. Stains:

1. Sherwin-Williams Company: www.sherwin-williams.com.

2. Benjamin Moore & Co: www.benjaminmoore.com.

E. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.

1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Supply each coating material in quantity required to complete entire project's work from a single production run.

3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:

a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: As indicated on drawings

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint WE-TR-VS - Wood, Transparent, Varnish, Stain:

1. One coat of stain.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:

1. Interior Wood: 15 percent, measured in accordance with ASTM D 4442.

2. Exterior Wood: 15 percent, measured in accordance with ASTM D 4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

H. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

I. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied. Back prime concealed surfaces before installation.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:

1. Items fully factory-finished unless specifically noted.

2. Fire rating labels, equipment serial number and capacity labels.

3. Stainless steel items.

B. Paint the surfaces described in PART 2, Paint Systems Articles.

END OF SECTION

SECTION 22 10 05

PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for piping systems.

1. Sanitary sewer.

2. Supply water

1.02 RELATED REQUIREMENTS

A. Section 31 23 16 - Excavation.

B. Section 31 23 23 - Fill.

1.03 REFERENCE STANDARDS

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2001 (R2005) (ANSI B16.18).

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2001 (R2005).

C. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2008 (ANSI/ASME B31.9).

D. ASTM B 32 - Standard Specification for Solder Metal; 2008.

E. ASTM B 42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2002.

F. ASTM B 88 - Standard Specification for Seamless Copper Water Tube; 2009.

G. ASTM B 88M - Standard Specification for Seamless Copper Water Tube (Metric); 2005.

H. ASTM D 3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

I. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2010.

J. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2008.

K. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 1996.

L. NFPA 54 - National Fuel Gas Code; National Fire Protection Association; 2009.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Project Record Documents: Record actual locations of valves.

D. Maintenance Materials: Furnish the following for USDA Forest Service - Ottawa National Forest's use in maintenance of project.
   1. Valve Repacking Kits: One for each type and size of valve.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan, standards.

   1. Maintain one copy on project site.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.06 REGULATORY REQUIREMENTS

A. Perform Work in accordance with State of Michigan plumbing code.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.08 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.01 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. HDPE Pipe: PE 6408 high density extra high molecular weight polyethylene meeting the requirements of ASTM D3350.

   1. Fittings: ASTM D3261

2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. HDPE Pipe: PE 6408 high density extra high molecular weight polyethylene meeting the requirements of ASTM D3350.

   1. Fittings: ASTM D3261

2.03 WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. HDPE Pipe: PE 6408 high density extra high molecular weight polyethylene meeting the requirements of ASTM D3350.

   1. Fittings: ASTM D3261

2.04 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Pipe: ASTM B 42, hard drawn.

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.

2. Joints: ASTM B 32, alloy Sn95 solder.

2.05 WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), Drawn (H).

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.

2. Joints: ASTM B 32, alloy Sn95 solder.

2.06 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches and Under:

1. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 1 Inch:

1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.

2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.07 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping - Water:

1. Conform to ASME B31.9.

2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

3. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

4. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.

B. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:

1. Concrete Screw Type Anchors: Complying with ICC-ES AC193.

2. Other Types: As required.

2.08 GATE VALVES

A. Manufacturers:

1. Milwaukee Valve Company: www.milwaukeevalve.com.

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Up To and Including 3 Inches:

1. MSS SP-80, Class 125, bronze body, bronze trim, rising stem, hand wheel, inside screw, solid wedge disc, solder ends.

2.09 GLOBE VALVES

A. Manufacturers:

1. Milwaukee Valve Company: www.milwaukeevalve.com.

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Up To and Including 3 Inches:

1. MSS SP-80, Class 125, bronze body, bronze trim, hand wheel, bronze disc, solder ends.

2.10 BALL VALVES

A. Manufacturers:

1. Milwaukee Valve Company: www.milwaukeevalve.com.

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze, two piece body, chrome plated brass ball, regular port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends with union.

2.11 SPRING LOADED CHECK VALVES

A. Manufacturers:

1. Milwaukee Valve Company: www.milwaukeevalve.com.

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Class 125, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.

2.12 STRAINERS

A. Size 2 inch and under:

1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.

2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless

steel perforated screen.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 05 16.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Establish elevations of buried piping outside the building to ensure not less than 2 ft of cover.

I. Excavate in accordance with Section 31 23 16.

J. Backfill in accordance with Section 31 23 23.

K. Install valves with stems upright or horizontal, not inverted.

L. Install water piping to ASME B31.9.

M. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.

2. Support horizontal piping as scheduled.

3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

4. Place hangers within 12 inches of each horizontal elbow.

5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for

pipe movement without disengagement of supported pipe.

6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

7. Provide copper plated hangers and supports for copper piping.

8. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 22 05 48.

3.04 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Install globe valves for throttling, bypass, or manual flow control services.

3.05 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.06 SCHEDULES

A. Pipe Hanger Spacing:

1. Metal Piping:

a. Pipe size: 1/2 inches to 1-1/4 inches:

1) Maximum hanger spacing: 6.5 ft.

2) Hanger rod diameter: 3/8 inches.

END OF SECTION

SECTION 22 30 00

PLUMBING EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water storage tanks.

B. Pumps.

1. Pressure Washer Systems
2. Centrifugal Self-priming pumps
3. Submersible Wastewater Pumps
4. Submersible Well Pumps

1.02 RELATED REQUIREMENTS

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.

B. Product Data:

1. Indicate pump type, capacity, and power requirements.
2. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
3. Provide electrical characteristics and connection requirements.

C. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

D. Warranty: Submit manufacturer warranty and ensure forms have been completed in USDA Forest Service - Ottawa National Forest's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.

C. Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation; operate within 25 percent of midpoint of published maximum efficiency curve.

1.05 CERTIFICATIONS

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for water storage tanks, submersible sump pumps, and sewage ejectors.

PART 2 PRODUCTS

2.01 WATER STORAGE TANKS

A. Manufacturers:

1. Chem-tainer Industries, Inc: www.chemtainer.com.

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Model: TC2448AA.

C. Construction: Linear Polyethylene (PE). Must comply with USFDA 21 CFR 177.1520 (c) 3.1 and 3.2.

D. Color: Translucent for visible content level.

E. Capacity: 90 gallons.

F. Dimensions: 24" diameter x 48" high.

G. Configuration: cylindrical, flat bottom.

H. Stand: Part #TC-2448AK/AM. 20" high metal stand with 76" bracket.

I. Cover: QF - QA series, designed for mounting pumps, level controls, switches, etc.

J. Accessories: Tank drain, water inlet and outlet

2.02 PRESSURE WASHER SYSTEMS

A. Manufacturers:

1. Pump: Cat Pumps; Model 310: www.catpumps.com

2. Spray gun: Suttner America Company; Model ST1500W: www.suttner.com

3. Lance: Suttner America Company; Model Flex Wand: www.suttner.com

4. Nozzle: Suttner America Company; Model www.suttner.com

5. Hose: Suttner America Company; Model B3V00334 3000 PSI 3/8" high pressure

hose (50'): www.suttner.com

6. Wand Holder: Suttner America Company; Model 711B-SST: www.suttner.com

7. Hose reel: Hannay Reels, Inc.; Model PW-2, with PWK-200 mount: www.hannay.com

8. Substitutions: See Section 01 60 00 - Product Requirements.

B. Pump System: Packaged with belt drive plunger type pump, 5 HP 1 phase motor, stainless steel belt guard, stainless steel base plate, pressure gauge, v-belts, pulleys, belt tightener, factory assembled, tested, and adjusted; shipped to site as integral unit; assembled on fabricated steel base with structural steel framework.

C. Pump System to provide 4 GPM flow at 1500-2000 PSI.

2.03 CENTRIFIGUAL SELF-PRIMING PUMPS (Dock Pump P-1):

A. Manufacturers:

1. Pumps: Gould's Pumps; GT Series: www.goulds.com.

2. Control Panel: Same as pump manufacturer

3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Casing: Cast Iron, minimum 1-1/2" discharge

C. Impeller: Thermoplastic, corrosion and abrasion resistant. Semi open nonclog design, keyed and secured to shaft.

D. Leg: Galvanized steel housing, stainless steel shaft, bronze sleeve ball bearings, ball thrust bearing with cover-accessible lubricant lines.

E. Motor Shaft: stainless steel with factory sealed, grease-lubricated ball bearings, flexible coupling.

F. Capacity: 10 GPM @ 80' total dynamic head. Minimum suction lift of 10'-0"

G. Motor: ¾ HP, 230 V, single phase, 3500 RPM. Built-in overload protection.

H. Controls: Wall-mounted NEMA 4X enclosure, simplex 4-float arrangement. Run light, TEST-OFF-AUTO and disconnecting means for pump, high water alarm with remote horn strobe & light assembly, silencing button, and dry contacts for output to shut-off pressure-washer assembly in the event of a low-water alarm. Refer to drawings for remote horn strobe/light location. Interconnecting control wiring between control panel and wiring shall be the responsibility of this contractor. Floats and float rod shall be stainless steel with brass adjustable stops. Floats shall be mercury free.

2.04 SUBMERSIBLE WASTEWATER PUMPS (Pumps P-2 and P-3)

A. Manufacturers:

1. Gould's Pumps; Model EP04: www.goulds.com.

2. Control Panel: Same as pump manufacturer

3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Casing: Thermoplastic

C. Impeller: Thermoplastic, corrosion and abrasion resistant. Semi open nonclog design, keyed and secured to shaft.

D. Bearings: Upper and Lower Ball bearings.

E. Accessories: Severe duty rated oil and water resistant 3 prong power chord.

F. Motor Housing: Cast iron.

G. Capacity: 20 GPM @ 20’ total dynamic head.

H. Motor: 0.4 HP, 230 V, single phase, 1550 RPM. Built-in overload protection.

I. Controls: Wall-mounted NEMA 4X enclosure, simplex 3-float arrangement. Run light, TEST-OFF-AUTO and disconnecting means for pump, high water alarm with remote horn strobe & light assembly, and silencing button. Refer to drawings for remote horn strobe/light location. Interconnecting control wiring between control panel and wiring shall be the responsibility of this contractor. Floats and float rod shall be stainless steel with brass adjustable stops. Floats shall be mercury free.

2.05 SUBMERSIBLE WELL PUMPS

A. Manufacturers:

1. Gould’s Pumps; Model 5G05411: www.goulds.com.

2. Control Panel: Same as pump manufacturer

3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Casing: Polished stainless Steel

C. Accessories: Exterior silicon bronze check valve

G. Capacity: 7 GPM @ 300’ total dynamic head.

H. Motor: 1/2 HP, 230 V, single phase, 1550 RPM. Built-in overload protection.

I. Controls: Wall-mounted NEMA 4X enclosure, simplex 4-float arrangement. Run light, TEST-OFF-AUTO and disconnecting means for pump, high water alarm with remote horn strobe & light assembly, silencing button, and dry contacts for output to shut-off pressure-washer assembly in the event of a low-water alarm. Refer to drawings for remote horn strobe/light location. Interconnecting control wiring between control panel and wiring shall be the responsibility of this contractor. Floats and float rod shall be stainless steel with brass adjustable stops. Floats shall be mercury free.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

B. Coordinate with plumbing piping and related electrical work to achieve operating system.

C. Domestic Water Storage Tanks:

1. Provide steel pipe support, independent of building structural framing members.

2. Clean and flush after installation. Seal until pipe connections are made.

D. Pumps:

1. Provide line sized isolating valve and strainer on suction.

2. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge line sizes 4 inches and over.

3. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

4. Align and verify alignment of base mounted pumps prior to start-up.

5. Install all product's per manufacturer's instructions.

6. Install pumps and arrange to provide access for maintenance including removal of motors, impellers, couplings, and accessories.

E. Control Panel:

1. Mount control panel within enclosure on wall within required distance for cables and wiring. Provide unistrut mounting frame for the control panel if wall space is not available. Properly anchor frame to floor.

END OF SECTION

SECTION 26 00 00

ELECTRICAL PERFORMANCE SPECIFICATIONS

PART 1 GENERAL

1.01 DEFINITIONS

A. Accepted/Approved: Shall mean accepted by the Project Representative.

B. Project Representative: Shall mean the Owner-authorized representative.

C. Furnish: Shall mean deliver to the project site.

D. Install: Shall mean build into the work, including connections and all parts considered incidental to a complete installation.

E. Provide: Shall mean furnish and install complete.

F. Work or Project: Shall mean all work required by the Contract Agreement.

1.02 ABBREVIATIONS AND INITIALS

Any or all of the following may appear in the Specifications, and shall be applied per the following explanations:

AFF Above Finished Floor

AIC Amperes Interrupting Capacity (RMS Symmetrical)

ANSI American National Standards Institute

ASTM American Society for Testing and Materials

AWG American Wire Gauge Size

EMT Electrical Metallic Tubing

GND Ground

HP Horsepower

IEEE Institute of Electrical and Electronics Engineers

IES Illuminating Engineering Society

NEC National Electrical Code

NIC Not In Contract

NECA National Electrical Contractors Association, Inc.

NEMA National Electrical Manufacturers Association

OSHA Occupational Safety and Health Administration

RGS Rigid Galvanized Steel Conduit

UL Underwriters Laboratories

1.03 SUBMITTALS

A. See section 01 30 00 – Administrative Requirements for submittal procedures.

B. See Part 3 for Required Submittal Items.

1.04 COORDINATION

A. The Electrical Contractor shall review the Contract Documents of other trades involved in the Project and shall coordinate the installation of electrical features with the work of all other trades. Where conflicts are likely with structural, mechanical or other features, perform the electrical installation after the other trades and arrange to eliminate conflicts.

1.05 CODES AND FEES

All work shall comply with the latest editions of:

- The National Electrical Code (NEC).
- The National Electrical Safety Code (NESC).
- The NFPA Codes.
- OSHA Regulations.
- The International Building Code (IBC).
- The International Fire Code (IFC).
- Americans with Disabilities Act (ADA)
- Previous editions of the above, where required by Federal, State, or Local laws and regulations.
- All applicable Federal, State, and Local laws and regulations.

The Contractor shall obtain and pay for all permits and connection fees required for the work in this Division.

Unless otherwise noted or specified, all materials and work shall be in conformance with the applicable standards of the following organizations:

- American National Standards Institute (ANSI).
- American Society for Testing and Materials (ASTM).
- Institute of Electrical and Electronic Engineers (IEEE).
- National Electrical Contractors Association (NECA).
- National Electrical Manufacturers' Association (NEMA).
- Underwriters Laboratories (UL) or Factory Mutual (FM).

PART 2 PRODUCTS

2.01 MATERIALS

A. Refer to the pertinent sections of Part 3 - Execution for materials to be provided.

PART 3 EXECUTION

3.01 SCOPE OF WORK

A. GENERAL REQUIREMENTS: This project requires the installation of electrical systems and equipment, in accordance with the project drawings and these Specifications, for the new Boat Washing Facilities at Black River Harbor and Hagerman Lake recreational facilities, Ottawa National Forest.

B. Service: Provide all conduit, wire, grounding, metering and coordination to connect the service. Utilize a single exterior service entrance for the buildings. The service shall be single-phase, 120/240 volts, with main disconnects sufficient for all the work of this project.

C. Distribution: Provide an adequate distribution panel board in each building to serve all loads at each site. Equip each panel board with sufficient circuit breakers to serve the various loads plus 2 spare 20 ampere, single-pole circuit breakers. All feeder circuits shall be run in metallic conduit and all branch circuits shall be in metallic conduit. Type MC (metal clad) cable or type NM (nonmetallic sheathed) cable may be used in concealed spaces. Provide separate equipment grounding conductors in all runs.

D. Receptacles: Provide GFI duplex convenience receptacles at a minimum spacing of eight feet on center. Circuit loading shall be limited to no more than six devices per circuit. Ensure all Ground Fault Interrupting (GFI) devices are provided and located as required by the NEC.

E. Equipment: Provide final electrical connection to all mechanical, equipment specified herein or provided on the job by others. Include disconnects, over current protection, flexible connections, access and guards as required by the equipment, these Specifications and pertinent codes.

F. Lighting: Provide lighting as specified and described herein and on the project drawings.

3.02 WORK INCLUDED

A GENERAL: Provide all work designated in these specifications for a complete, safe and functional installation. Unless otherwise noted, all materials shall be of new manufacture, American-made, of the manufacturer's standard construction for the application. The omission of express reference to any part, supplies, services, or facilities necessary for or incidental to a complete installation shall not be construed as a release from furnishing such items. Any deviations from the installation due to a particular manufacturer's requirements shall be made without additional cost to the Owner.

B INSTALLATION: All materials shall be installed in a neat, orderly and secure fashion, as required by these specifications and commonly recognized standards of good workmanship, for which the Project Representative's judgment shall be final. In addition to the access and clearance requirements of the NEC, all items normally considered to be factory or field-serviceable shall be installed in such a manner as to be easily and safely accessible and removable without dismantling surrounding construction.

C PROTECTION AND CLEANING: All electrical materials and equipment shall, both in shipment and during the entire duration of construction work, be protected against water, dust, debris, over spray or any other contamination or damage, whether environmental in origin or as a result of handling or construction work. Any damaged items shall be replaced or repaired to original manufactured condition, at no additional cost to the Owner. All construction dust, debris, over spray, scrap and surplus materials, etc.

resulting from this work shall be cleared away, leaving the installation in completely clean condition.

D WIRING OF UTILIZATION EQUIPMENT: Where equipment arrangement varies, making necessary additional disconnect switches in order to comply with the NEC, such disconnects shall be provided at no additional cost to the Owner. Prior to ordering materials or performing the installation, the Electrical Contractor shall verify the sizes, configurations, and locations of all equipment, to ensure that all required connections are correctly provided.

E REPAIR OF EXISTING FEATURES: Where previously completed building surfaces or other features must be cut, penetrated or otherwise altered for the installation of electrical features, such work shall be carefully laid out and performed, and any subsequent patching or repairs performed by skilled mechanics of the trades involved, at no additional cost to the Owner.

3.03 O & M MANUALS, AS-BUILTS

A. OPERATION & MAINTENANCE MANUALS: The electrical Contractor shall submit for review two (2) copies of Operation and Maintenance Manuals for the project. These manuals shall be bound and shall include:

- All information covered by the final accepted submittals, modified as necessary to reflect the final as-built condition.
- Complete listings of repair and replacement parts for all equipment, and names and addresses of the suppliers from which the equipment was obtained.
- Complete listing of all equipment that may require periodic servicing, with recommended schedules and complete instructions for performing said servicing. Service instructions shall include complete English-language narrative descriptions and illustrations necessary to describe all service operations.

B. AS-BUILT DRAWINGS: The Electrical Contractor shall at all times keep a current set of Contract Drawings on the project site. This set shall be kept in good condition, and shall be neatly and accurately marked to show the as-built condition of the electrical installation. Of particular importance are the precise locations of buried or otherwise concealed features such as conductors, raceways and junction boxes. Upon completion of the project, the field-marked set of drawings shall be forwarded to the COTR, along with any supplementary drawings, sketches, notes or other materials necessary to completely describe the as-built condition of the electrical installation.

3.04 IDENTIFICATION

A. EQUIPMENT LABELING: Panel boards, disconnect switches, switches, circuit breakers and the like shall be labeled with laminated plastic labels engraved with white letters on black background. Lettering shall be block style, 1/4" tall, except where space limitations, drawing notes, or other requirements dictate otherwise. Labels shall be secured with pop rivets or threaded fasteners. Adhesive attachment is not acceptable. Temporary markings will not be permitted to remain on equipment; they shall be removed, and any defaced finishes repaired to match original manufactured condition.

B. CONDUCTORS: All conductors in pull or junction boxes or other enclosures shall be permanently and legibly tagged or labeled with panel and circuit numbers or other data that clearly identifies their origin, function, and destination.

3.05 RACEWAYS

A. APPLICATIONS: All conductors shall be run in metal raceways as follows:

- Raceways Outdoors, Buried in Ground or Under Slab: RGS Conduit or PVC Conduit.
- Branch Raceways in Heated Areas Above Slab on Grade: EMT or MC Cable
- The final connection to any motor or other rotating or vibrating equipment, or equipment which may require position adjustment after installation shall be made through a slack section of liquid tight flexible metal conduit 18" to 36" long.
- Type MC Cable may be utilized for accessible lighting and power circuits. All runs for signal, communications, computer and lighting control shall be in raceway.

B. LAYOUT: Raceways shall be concealed within finished walls and ceilings and as otherwise noted. Exposed raceways shall be run square with the building lines. Concealed raceways may be run in direct lines where practical. Under floor raceways for slab-on-grade construction shall be embedded in the fill under the slab, not in the slab itself. Where raceways are required or permitted to be embedded in concrete, the thickness of concrete on all sides of each raceway shall not be less than 2".

C. VAPOR BARRIER: At all raceway penetrations of the vapor barrier provide a double splice patch (one on each side of vapor barrier) by cutting a square piece of vapor barrier 6" larger on all sides than the pipe. Cut a round hole in the center of each splice patch, smaller than the pipe, to form a stretched fit. Force the pipe through each splice patch and tape all sides with vapor-barrier tape.

D. ASSEMBLY: Raceways shall be physically and electrically continuous from enclosure to enclosure. Electrical continuity for non-metallic conduits shall be ensured by inclusion of an NEC-sized grounding conductor. For metallic conduits, all joints and fittings shall be free of foreign materials and made up wrench tight.

E. PULL STRINGS: Provide nylon pull strings in all conduits without conductors.

3.06 WIRE AND CABLE

A. CONDUCTORS: All conductors shall be copper. Conductors #10 AWG and smaller may be solid, unless otherwise noted or specified in a product that is only available stranded. Conductors #8 AWG or larger shall be stranded. Provide an oversized (#10) neutral for all receptacle circuits.

B. INSULATION TYPES: Branch circuit conductors shall be 600 volt insulated, and unless otherwise noted, shall have type THHN/THWN or XHHW insulation. Outdoors or other cold location conductors shall have type THW or XHHW insulation. Nylon-jacketed conductors such as types THHN or THWN shall not be used in any location subject to ambient temperatures below 32º F. Conductors in fluorescent fixture wiring channels shall have 90º C insulation rating.

3.07 OUTLET BOXES

A. BOXES: Provide outlet boxes for connection of branch circuits to fixtures and devices as specified herein. Boxes shall be the products of Raco, Steel City, Appleton, Crouse-Hinds, or accepted equal.

B. INSTALLATION: Outlet boxes shall be installed plumb with, and securely fastened to the structural framing of, the surrounding construction. Recessed boxes shall have plaster rings such that the device cover plates are tight to the wall or ceiling finish.

C. THROUGH-WALL BOXES: No through-wall boxes will be permitted. Where outlets are mounted back-to-back on a common wall, they shall be offset horizontally a minimum of 12", to minimize sound transmission.

3.08 PULL AND JUNCTION BOXES

A. GENERAL: Where necessary in raceway systems to facilitate conductor installation or to redirect raceway runs, provide conduit bodies or pull boxes as further specified herein. At the minimum, raceway runs shall have a pull box or conduit body every 100 feet or after every 270º of bends, whichever comes first. Where otherwise necessary to tap or terminate raceway runs, provide junction boxes as specified herein.

B. SIZES: Unless otherwise noted or specified, pull and junction boxes shall be sized according to NEC requirements for the number, size and entry configuration of the conduits and conductors entering them.

C. INSTALLATION: Pull and junction boxes shall not be installed in visible locations in finished areas unless specifically called for or accepted by the Project Representative. Pull and junction boxes shall be securely fastened to the building structure by means independent of the raceways entering.

3.09 WIRING DEVICES

A. RECEPTACLES: Single and duplex receptacles shall be premium specification grade, ivory-faced, self-grounding, 120 volt, 15 ampere, 3-wire, NEMA 5-15R configuration, with screw terminals. Where individual receptacles are connected to 20-ampere branch circuits, they shall be rated 20 amperes.

B. GFCI: GFCI receptacles shall have NEMA 5-15R face configuration, single-strap mounting and shall have "TEST" and "RESET" buttons accessible from front. Ground fault trip level shall be 5 milliamperes, and the trip circuitry shall be essentially immune to nuisance tripping due to spurious influences such as RF noise.

C. SWITCHES: Switches shall be premium specification grade, AC quiet type, with screw terminals, rated 20 amperes at 120 volts. Switch handles shall be ivory.

D. PLATES: Cover plates for devices in recessed boxes shall be made of break resistant nylon, colored to match the device. Cover plates for devices in surface-mounted boxes shall be of pressed or machined metal construction, specifically designed to suit the boxes.

E. TERMINALS: Wiring devices shall have binding-screw or screw-held pressure-plate type terminals only. Terminals using spring pressure to secure the wire and make electrical contact are specifically forbidden.

3.10 OVERCURRENT DEVICES

A. CIRCUIT BREAKERS: Unless otherwise noted, circuit breakers shall be of the molded-case thermal-magnetic type, with the size, number of poles and interrupting capacity as required by the installation. Ampere ratings shall be clearly visible, even when the breaker is installed in its appropriate enclosure. Each breaker pole shall provide both instantaneous and inverse-time tripping, with tripping clearly indicated, and a common-tripping tie to any other poles in the same breaker. Breakers shall be operated by a toggle handle and shall have a quick-make, quick-break, over-center switching mechanism that includes a trip-free feature so that the contacts cannot be held closed against tripping currents.

3.11 FASTENING HARDWARE

A. FASTENERS: Raceway supports, boxes, fixtures and other electrical features shall be securely fastened by wood screws or sheet metal screws on wooden surfaces, toggle bolts on hollow masonry units, expansion bolts on concrete or brick, and machine screws or welded threaded studs on steel work. Threaded studs driven by a powder charge and provided with a lock washer, flat washer and nut(s) are acceptable in place of expansion bolts or machine or wood screws.

B. ASSOCIATED HARDWARE: All fasteners shall be provided with flat washers. All fasteners having non-tapered threads (such as machine screws) shall also be provided with a lock washer under the bolt head or nut, whichever is turned in the process of tightening. Fasteners through resilient materials shall have stop sleeves. Nuts, washers and sleeves shall be of the same material and finish as the fastener to which they are applied.

C. HARDWARE COMPOSITIONS AND FINISHES: In heated indoor areas, all threaded fasteners and associated hardware shall be steel, with a zinc or cadmium-plated finish. Where PVC or liquid tight flex conduit is installed on wood construction in outdoor, damp or corrosive environments; fasteners shall be made of monel or a stainless steel alloy suitable for marine environments. Fasteners on steel construction in outdoor, damp, or corrosive environments shall be of the largest trade size that will fit the item being fastened, shall have the coarsest threads commercially available in that size and shall be hot-dip galvanized steel. Zinc electroplate will be acceptable only in the smaller sizes where hot-dip galvanized is not commercially available.

D. INSTALLATION: All fasteners shall be tightened to within secure limits for the size of fastener and material(s) fastened. For critical applications, such as busbar connections, a torque wrench shall be used to tighten the fasteners to the manufacturer's recommended value.

3.12 GROUNDING

A. SCOPE: All metal raceways, enclosures, other electrical equipment, as well as non-electrical equipment that may pick up harmful potentials from the electrical system, shall be bonded and grounded as required by the NEC.

B. CONDUCTORS: All grounding conductors and bonding jumpers shall be copper, sized according to the NEC. Where separate equipment grounding conductors are called for, they shall be green insulated where run with branch circuits and bare where run with feeders.

3.13 BRANCH CIRCUIT PANELBOARDS

A. PANELBOARD FEATURES: Branch panel boards shall be of the surface mounted, circuit breaker type, with the following features:

- Current rating of the main buses and all bus components shall be as required by the installation and shall be braced to withstand fault currents of the peak magnitude. Each panel board shall be bussed full height (including bus fingers and related hardware).
- Panel board shall have main lugs only, sized to accommodate the appropriate feeders.
- Panel board front shall not contain any visible screws or other fasteners. Front shall have a lip or bracket that rests on the bottom return flange of the panel enclosure, to permit the front to be held in place with one hand while fastening. Each front shall have a hinged door with a locking latch, furnished with two keys.
- An adequate ground bus shall be provided for all branch circuit equipment grounding conductors, plus 20% spare.

B. BRANCH CIRCUIT BREAKERS: Panel board shall be furnished with bolt-on branch circuit breakers in conformance with Section 16180, in the quantity, size, number of poles, and interrupting ratings specified.

C. CIRCUIT DIRECTORY: Branch panel board door shall have a typed circuit directory card of the two-column type, with odd numbers down the left, and even numbers down the right.

D. INSTALLATION: Branch panel board shall be securely fastened to the structural framing of the surrounding construction and shall be installed plumb with the surrounding construction. Ensure controls or other enclosures are not mounted on or adjacent to the top, bottom or sides in such a manner as to obstruct any future branch raceway entry space.

3.14 LIGHTING

A. SUBMITTALS: Acceptance of lighting equipment shall be obtained via the submittal process before equipment is ordered. Contractors seeking substitution of competitive equipment shall be prepared to furnish samples of specified and proposed substitute fixtures for comparison.

B. LAMPS: Unless otherwise noted, lamps shall be the product of General Electric, Osram Sylvania or Philips.

C. LENSES AND DIFFUSERS: Where plastic lenses or diffusers are used, they shall be made only of discoloration-resistant virgin acrylic, with a minimum overall thickness of 1/8".

D. BALLASTS: Unless otherwise noted, fluorescent lighting ballasts shall be rapid start electronic, high power factor type, listed or labeled by UL and certified by CBM or CSA, sound-rated "A", equipped with Class "P" thermal protection, full light output, energy-saving type. In applications where this type is not commercially available, the most energy-efficient type commercially available for the application will be acceptable. Ballast(s) that the COTR judges to be excessively noisy at the time of final inspection or during the warranty period shall be replaced at no cost to the Owner.

E. ACCESSORIES: Lighting fixtures shall be provided complete with all suspension, trim, mounting and operating accessories normally considered necessary for a complete, functional and safe installation. Canopies for pendant-hung fixtures shall be of the ball-joint type.

F. SPARE LAMPS: Provide spare lamps for each lamp type, in the quantity of 10% of the number of lamps of each type (minimum two of each).

END OF SECTION

SECTION 31 22 00

GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal and storage of topsoil.

B. Rough grading the site.

C. Finish grading.

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing.

B. Section 31 23 16 - Excavation.

C. Section 31 23 23 - Fill: Filling and compaction.

D. Section 32 92 19 - Seeding: Finish ground cover.

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan, Highway Department standards.

1.05 PROJECT CONDITIONS

A. Protect above- and below-grade utilities that remain.

B. Protect plants, lawns, wetlands, and other features to remain as a portion of final landscaping.

C. Protect bench marks, survey control points, and paving from grading equipment and vehicular traffic.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: Topsoil excavated on-site.

1. Graded.

2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.04 SOIL REMOVAL and STOCKPILING

A. Stockpile excavated topsoil on site.

B. Stockpile excavated subsoil on site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:

1. Verify building and trench backfilling have been inspected.

2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 2 inch in size. Remove soil contaminated with petroleum products.

C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

D. Place topsoil in areas where seeding and planting are indicated.

E. Place topsoil to nominal depth of 3 inches.

F. Place topsoil during dry weather.

G. Remove roots, weeds, rocks, and foreign material while spreading.

H. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

I. Lightly compact placed topsoil.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

C. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

D. Top Surface of Finish Grade: Plus or minus 1 inch.

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

3.08 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for slabs-on-grade and paving.

B. Trenching for utilities outside the building perimeter.

1.02 RELATED REQUIREMENTS

A. Section 01 57 13 - Temporary Erosion and Sedimentation Control: Slope protection and erosion control.

B. Section 31 22 00 - Grading: Grading.

C. Section 31 23 23 - Fill: Fill materials, filling, and compacting.

1.03 PROJECT CONDITIONS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Protect bench marks, survey control points, paving, and wetlands from excavating equipment and vehicular traffic.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

D. Protect plants, lawns, rock outcroppings, and other features to remain.

3.03 EXCAVATING

A. Excavate to accommodate new structures and construction operations.

B. Notify COTR of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Cut utility trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 23 23.

G. Grade top perimeter of excavation to prevent surface water from draining into excavation.

H. Remove excavated material that is unsuitable for re-use from site.

I. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 22 00.

J. Remove excess excavated material from site.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.05 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION

SECTION 32 11 23

AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Preparation of site for base course.

B. Section 31 23 23 - Fill: Topsoil fill at areas adjacent to aggregate base course.

C. Section 31 23 23 - Fill: Compacted fill under base course.

D. Section 32 12 16 - Asphalt Paving: Binder and finish asphalt courses.

1.03 REFERENCE STANDARDS

A. Michigan Department of Transportation MDOT Standard Specifications For Construction (latest edition), Section 302, Aggregate Base Courses.

B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2009.

C. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.

D. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2007.

E. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

F. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2009.

G. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2006.

H. ASTM D 6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate stockpiles where designated.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

C. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate Type Aggregate Base Course Class 22A: Dense-graded aggregate, conforming to State of Michigan MDOT Standard Specifications for Construction, most recent version.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.

B. Where aggregate materials are specified using MDOT classification, testing of samples for compliance will be performed before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct, and are dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Place aggregate in maximum six inch layers and compact to specified density.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add water to assist compaction. If excess water is apparent, remove aggregate and

aerate to reduce moisture content.

D. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/2 inch measured with 10 foot straight edge.

B. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted aggregate base course in accordance with ASTM D1556.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T180.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: One per 500 square feet of surface area of aggregate.

F. Proof roll compacted aggregate at surfaces that will be under paving.

3.06 CLEANING

A. Remove unused stockpiled materials; leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Double course hot mix asphalt pavement.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Preparation of site for paving and base.

B. Section 31 23 23 - Fill: Compacted subgrade for paving.

C. Section 32 11 23 - Aggregate Base Courses: Aggregate base course.

1.03 REFERENCE STANDARDS

A. Michigan Department of Transportation MDOT Standard Specifications For Construction (latest edition), Division 5 Hot Mix Asphalt Pavements & Surface Treatments.

B. ASTM D 946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with Michigan Department of Transportation MDOT Standard Specifications For Construction (latest edition).

B. Mixing Plant: Conform to Michigan Department of Transportation MDOT Standard Specifications For Construction (latest edition).

C. Obtain materials from same source throughout.

1.05 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: In accordance with State of Michigan Highways standards.

B. Aggregate for Binder Course: In accordance with State of Michigan Highways standards.

C. Aggregate for Wearing Course: In accordance with State of Michigan Highways standards.

D. Tack Coat: In accordance with State of Michigan Highways standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 BASE COURSE

A. Section 32 11 23 - Aggregate Base Courses.

3.03 PREPARATION - TACK COAT

A. Apply tack coat in accordance with State of Michigan Highways standards.

B. Apply tack coat only when the air temperature is 36 deg. F (2 deg. C) or more and the existing surface is dry and reasonably free of loose dirt, dust, or other foreign material. Do not apply if weather or surface conditions are unfavorable or before impending rains.

C. Apply tack coat on previously placed asphalt binder course before surface course is placed. Apply at uniform rate of.024 gal/sq yd after dilution.

D. Limit application each day to the area the contractor expects to pave during the day.

E. Apply tack coat to vertical surfaces of curbs, gutters and previously placed concrete or asphalt pavement.

3.04 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Place binder and surface courses to compacted thickness indicated on plan.

B. Compact pavement by rolling to MDOT specified density per mix design. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

C. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.05 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Variation from True Elevation: Within 1/2 inch.

3.06 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 1 days or until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Seeding, mulching and fertilizer.

D. Maintenance.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Topsoil material.

B. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

1.03 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass. Also includes Kentucky bluegrass, Canada bluegrass, Meadow fescue, Orchard grass, Reed canary grass, Smooth brome, Tall fescue, Timothy grass, Birds-foot trefoil, Crown vetch, Dame's rocket, White sweet clover, and Yellow sweet clover.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Topsoil samples.

C. Seed mixture

D. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer; and _____.

1.05 REGULATORY REQUIREMENTS

A. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.01 SEED MIXTURE

A. Seed Mixture:

1. Forest Service approved, recommended native grass species:

   a. Big bluestem (Andropogon gerardii)

   b. Bottlebrush grass (Hystrix patula)

   c. Canada wild rye (Elymus canadensis)

   d. Little bluestem (Schizachyrium scoparium)

   e. Path rush (Juncus tenuis)

   f. Sweet grass (Hierochloe odorata)

   g. Virginia wild rye (Elymus virginicus)

2. Forest Service accepted non-native grass species, use when recommended species are not available:

   a. Barley (Hordeum vulgare)

   b. Buckwheat (Fagopyron esculentum)

   c. Oats (Avena sativa)

   d. Wheat (Triticum aestivum)

   e. Red fescue (Festuca rubra)

2.02 SOIL MATERIALS

A. Topsoil: Excavated from site and free of weeds.

2.03 ACCESSORIES

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

B. Fertilizer: Michigan DOT Class A; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, to the following proportions:

C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

D. Mulch Blanket: Excelsior or straw mulch blanket meeting MDOT Standard Specifications for Construction, Section 917, Turf and Landscaping Materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this Section.

3.02 PREPARATION

A. Prepare subgrade in accordance with Section 31 22 00.

B. Place topsoil in accordance with Section 31 22 00.

3.03 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.

D. Mix thoroughly into upper 2 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.04 SEEDING

A. Apply seed at a rate of 2 lbs per 1000 sq.ft. evenly in two intersecting directions. Rake in lightly.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Do not sow immediately following rain, when ground is too dry, or during windy periods.

D. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.

E. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

F. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.05 PROTECTION

A. Cover seeded slopes where grade is 4 inches per foot or greater with mulch blanket. Roll blanket onto slopes without stretching or pulling.

B. Lay blanket smoothly. Provide 12 inch overlap of adjacent rolls.

C. Secure outside edges and overlaps at 36 inch intervals with stakes.

3.06 MAINTENANCE

A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.

B. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

C. Water to prevent grass and soil from drying out.

D. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

E. Immediately reseed areas that show bare spots.

F. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 33 31 11

SITE SANITARY UTILITY SEWERAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sanitary sewerage drainage piping, fittings, and accessories.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16 - Excavation: Excavating of trenches.

B. Section 31 23 23 - Fill: Bedding and backfilling.

1.03 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Project Record Documents:

1. Record location of pipe runs, connections, and invert elevations.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. Plastic Pipe Force Main from pump tank to lift station (Black River Harbor site): ASTM D2737, HDPE, size as shown on drawings.

C. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 PIPE ACCESSORIES

A. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Sewer Service” in large letters.

2.03 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: As specified in Section 31 23 23.

B. Pipe Cover Material: As specified in Section 31 23 23.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 23 16 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, and then complete backfilling.

3.02 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

B. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

C. Connect to building sanitary sewer outlet, through installed sleeves.

D. Install trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Section 01 40 00.

3.04 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 33 36 00

UTILITY SEPTIC TANKS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Holding and Pump Tanks

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Soil cover over tank and drainage field.

B. Section 31 23 16 - Excavation: General requirements for trenching for drainage field and connecting piping.

C. Section 31 23 16.13 - Trenching: General requirements for trenching for drainage field and connecting piping including compaction testing.

D. Section 31 23 23 - Fill: General requirements for backfilling piping trenches including compaction testing.

1.03 REFERENCE STANDARDS

A. ASTM D 2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2003.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate plan, location and inverts of filter field, inverts of connecting piping.

C. Manufacturer's Installation Instructions: Indicate special procedures for septic tank installation.

PART 2 PRODUCTS

2.01 PUMP AND HOLDING TANKS

A. Manufacturers:
   1. Weiser Concrete.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Septic Tank: Reinforced precast concrete construction, 4,000 psi 28 day minimum strength, concrete partitioned chambers, concrete lid with lift rings, vent, inlet inspection hole, inlet turned down minimum 12 inches below effluent level.

C. Septic Tank: Steel with protective epoxy coating, partitioned chambers, and lid with lift rings, vent, inlet inspection hole, and inlet turned down minimum 12 inches below effluent level.

D. Tank Capacity: As shown on drawings

E. Tank Configurations: As shown on drawings

2.02 BEDDING AND BACKFILL MATERIALS

A. Provide bedding and backfill materials as specified in Section 31 23 23 and as follows:

B. Tank Bedding Material: Sand.

C. Tank Backfill Material: Granular fill.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building sanitary sewer connection, size, location and invert are as indicated.

3.02 PREPARATION

A. Ream pipe ends and remove burrs.

B. Remove scale and dirt from components before assembly.

C. Establish invert elevations for all components in the system.

3.03 EXCAVATING AND TRENCHING

A. See Section 31 23 16 and Section 31 23 23 for general requirements.

3.04 TANK INSTALLATION

A. Hand trim excavation for accurate placement of tank to elevations indicated.

B. Place bedding material level in one continuous layer not exceeding 6 inches compacted depth, compact to 95 percent.

C. Install septic tank and distribution box and related components on bedding in accordance with manufacturer's instructions.

D. Backfill around sides of tank, tamped in place and compacted to 95 percent.

END OF SECTION