SPECIFICATIONS FOR GRAND ISLAND NATIONAL RECREATION AREA WATER SYSTEM IMPROVEMENTS

DATED 1/26/2026

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SECTION 011000 – SUMMARY

PART 1 - GENERAL

1.1 PROJECT IDENTIFICATION

A. Project Name and Location: Grand Island Recreation Area Water Systems Improvements. From the Munising Ranger District Office at 400 E Munising Ave, Munising, MI 49862, take M-28 West approximately three (3) miles to the Grand Island ferry service facility. Take a boat across Lake Superior to the island. Williams Landing is on the South side of the island. From William's Landing project sites can be accessed by island roads and trails.

B. Access:

1. **Access by Ferry/Barge**: The island can be accessed by using the Grand Island Landing (Powell Point) ferry or barge on the mainland to the Williams Landing on the south end of the island. Ferry/barge service, most notably barge service, can be impacted by weather/wind conditions on a daily basis. The contractor must coordinate the details of using the ferry/barge service if using this method to access the island. See www.grandislandup.com for information about the ferry service.

   Access to Grand Island is available via passenger ferry and barge service offered through our Grand Island Ferry Service concessionaire the Friday before Memorial Day to Columbus Day annually (subject to change). The passenger ferry schedule for 2026 as is follows (this is a reference and is subject to change annually**):

   May 26th through June 13th:
   Ferry Times: 9am, 10am, 11am, Noon, 1pm, 2pm, 3pm, 4pm
   June 14th through September 8th:
   Ferry Times: 9am, 10am, 11am, Noon, 1pm, 2pm, 3pm, 4pm, 5pm, 6pm
   Fourth of July Schedule:
   Ferry Times: 9am, 10am, 11am, Noon
   September 9th through October 14th:
   Ferry Times: 9am, 10am, 11am, Noon, 4pm

   The current price for 2026 for the passenger ferry is $25.00 for one roundtrip, per person. The Forest Service owns an 80 foot long by 30 feet wide by 6-foot draft steel barge that was inherited from Cleveland Cliff Industries upon transfer of ownership to the Forest Service in 1990. The gross tons for this barge are 94.5 tons. The Grand Island Ferry Service is permitted and USCG certificated to operate the barge on the Forest Service's behalf. Below is the current rate and schedule for the barge service for 2026 (this is a reference and is subject to change annually**):

   Barge runs will occur on Thursday's beginning at 7:00 a.m., to be completed by 11:00 a.m. (weather permitting) and with confirmation with concessionaire. Barge runs will cost $500.00.

   Barge runs must be scheduled and paid for no less than 48 hours in advance. Fee is due from the customer that schedules service. Coordination for sharing the cost amongst residents is the responsibility of the customer.

   Barge run is defined as leaving Grand Island Landing (Powell Point), arriving at Williams Landing, waiting up to 20 minutes, and returning to Grand Island Landing. Customer caused departure delays will be billed at $100.00 per hour.

   It will be the responsibility of the selected contractor to work directly with the Grand Island Ferry Service concessionaire to coordinate the needs for transportation as they relate to completion of the specification of this contract (I.e., transportation of equipment, supplies, personnel). The Island can be accessed by personal watercraft directly and the determination as the suitability of direct water access to the project locations articulated in the project plans within this contract package are the responsibility of the selected contractor.

2. **Access by Watercraft:** It may be possible to access the project location by watercraft directly. The contractor is responsible for the determination of the suitability of this type of access and confer with the COR for written authorization of such watercraft and landing location on the island.

3. **Island Roads and Trails:** The project locations can be accessed by using the island roads and trails

that are designated on the project access map(s) within this contract package. The condition and geometry of the existing island roads and trails must be assessed before attempting to drive or haul equipment and materials on the roads. If improvements to the island roads or trails are required to allow access by large vehicles, equipment, or materials (such as road/trail widening or vegetation clearing) such improvements must be approved in advanced by the COR. Allow at least 7 days for evaluation and approval or rejection of the requests by the COR. Such improvements will be considered incidental to other work on this contract and will not be paid for separately. (It is suggested that the contractor include any costs for such access improvements be included in the mobilization item within the schedule of items).

4. Cell-service is intermittent and unpredictable within the project area.

C. Project Summary Description: The project includes but is not limited to the following: the construction of 2 new board and batten well houses at Juniper Flats and Murray Bay locations including the installation of all necessary piping and electrical systems and the subsequent demolition of the entire existing well enclosure. Farrell Cabin work includes raising existing well casing, installation of new waterline and water spigot pedestal, and demolition of existing pedestal. Mather Lodge work includes the demolition of the existing concrete pad, installation of new concrete pad, installation of all necessary piping and electrical systems into the existing structure that will be placed on the new concrete pad, and repairs to the building. Work includes but is not limited to, the following:

1. Mobilization to site.
2. Demolition of existing well enclosures at Juniper Flats and Murray Bay locations, and water valves, water lines, etc. at all locations.
3. Construct a new board and batten well house at Juniper Flats and Murray Bay onto new concrete slab.
4. Relocate Mather Lodge pumphouse onto new concrete slab adjacent to existing pumphouse location. Perform all necessary repairs to the structure including replacing cedar shakes, staining, roofing, and any necessary bracing for a stable building.
5. Install all new water piping & fixtures at all locations.
6. Install new 1-1/4" HDPE water line from new well house or new pedestal to the water well.
7. Remove existing submersible pump & drop pipe, extend well casing at Mather Lodge and Farrell Cabin, replace pitless adapter, and reinstall drop pipe.
8. Perform all necessary electrical solar work including moving pole as needed, running new underground electrical line to the new well house, & interior well house electrical work.
9. Pressure test all Contractors water line work.
10. Chlorinate all water systems.
11. Perform all well water quality testing.
12. Perform all site restoration.
13. Perform all system commissioning.

D. Government or Owner refers to the USDA Forest Service. Contracting Officer (CO) refers to the person assigned by the USDA Forest Service to administer the Contract. Soon after Contract award, the Contracting Officer will designate a Contracting Officers Representative (COR).

1.2 REQUIREMENTS OF THE OFFER'S PROPOSAL

A. The Government DRAWINGS and SPECIFICATIONS are the basis for this Contract.

B. Those products listed in the SPECIFICATIONS are preferred products, chosen for compatibility, longevity, durability and quality. **Equal or better alternatives submitted by the OFFERER will be considered, but must be approved by the CO/COR prior to use in the Project. Bidders are cautioned assumed equal or better alternatives may not be accepted by the Government and the selected Contractor will be required to provide the Work as specified.**

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 011000

SECTION 011400 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 CONTRACTOR USE OF PREMISES

A. The Government will conduct a pre-construction survey with the Contractor to review and document the existing project conditions prior to construction.

B. No work is permitted without written authorization by COR on Government Holidays or weekends.

C. The Contractor shall limit use of the premises to the work in areas indicated.

1. Confine operations at the site to areas indicated. Do not disturb portions of the site beyond the areas in which Work is indicated.
2. Schedule deliveries to minimize on-site storage of material and equipment.
3. Repair damage caused by construction operations. Take precautions to protect the public during the construction period.
4. It may be possible for the contractor to use one or more of the campsites or the Forest Service administrative site shown on the project map near the project areas: Gull Point, Preservation Point, Shelter Ridge, Freighter View. Other campsites are shown for reference only and will remain open to the public while work under this contract is being performed. (see attached Grand Island map). Administrative closure of a campsite(s) shall be submitted to the COR for consideration during Pre-Construction Meeting.
5. The contractor is responsible for providing and maintaining restroom/sanitation facilities in accordance with state and federal waste disposal regulations. Primitive toilet facilities are located at campsites (see list in item 4) as well, but keep in mind that campsites are reservation based and may be occupied by campers during the performance period.
6. Existing materials and equipment that are removed as part of the construction operations, and that are not reused or salvaged as Government property, shall become the property of the Contractor and shall be promptly removed from the site.

1.3 GOVERNMENT OCCUPANCY AND TIME FRAME

A. Cooperate with the Government's representatives during construction operations to minimize conflicts and facilitate Government usage. Perform the Work in a manner that does not interfere with the Government operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011400

SECTION 012700 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings entitled "Grand Island National Recreation Area Water Systems Improvements" and applicable provisions of the Solicitation/Contract including but not limited to: Section B - Schedule of Items.

1.2 SUMMARY

A. This Section includes:

1. Measurement and payment criteria applicable to the work performed.
2. Administrative and procedural requirements necessary to prepare and process Applications for Payment.
3. Defect assessment and non-payment for rejected work.
4. General description of work included under each pay item.

B. Related Requirements:

1. Invoice Processing Platform (IPP) System: All invoices are to be submitted via the electronic IPP System. The contractor must follow the instructions on how to register and submit invoices via IPP as prescribed in communications from USDA and Treasury. This is a mandatory requirement initiated by the U.S. Department of Treasury and you can find more information at this website: https://www.ipp.gov. Ensure your company has registered at https://www.ipp.gov/vendors/enrollment-vendors to establish your account. Offeror must have an established account prior to commencement of work.
2. Certified Payrolls: Certified payrolls for construction work must be submitted to the CO/COR for review at regular intervals as work progresses. At least one week prior to Contractor requesting payment via IPP, all certified payrolls related to the subject pay request work must have been received by the COR. Incomplete or inaccurate payroll submittal will result in rejection of the IPP invoice. Contractor and all subcontractors, through the contractor, shall furnish all certified payrolls covering payments to laborers and mechanics for on-site work. Payroll hourly rates and fringe benefits must be in accordance with the established Davis-Bacon Wage Determination for the project.

1.3 MEASUREMENT OF QUANTITIES

A. Lump Sum Quantities (LSQ): These quantities denote one complete unit of work as required by or described in the Contract, including all necessary materials, equipment, and labor to complete the job. They will not be measured.

1.4 PAYMENT

A. Pay Request Documentation from Contractor: Contractor must submit the following documentation to the CO/COR for review and approval at least seven (7) days prior to requesting a payment via IPP.

1. All Certified Payroll forms from the general contractor (including payrolls from all sub- contractors) for work covered by the pay request.
2. A completed Schedule of Items form for work covered by the pay request, indicating the percent complete for each line item in the Schedule of Items.
3. Written Quality Control testing results if applicable to items in the payment request.

B. Payment Includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services, and incidentals; erection, application, or installation of an item of the Work; overhead and profit.

1. "Incidentals" are to be considered as an additional obligation to the other work required for the item(s). Incidental work is not payable directly but is to be considered included in the contract price for the item(s) of work specified.
2. All work not specifically identified as a separate bid item is "Incidental".

C. The accepted quantities will be paid for at the contract unit price for each item as shown in the Schedule of Items.

D. Payment will not be made for any of the following:
1. Products or construction placed beyond the lines and levels of the required work.
2. Products or construction determined as unacceptable before or after placement.
3. Products wasted or disposed of in a manner that is not acceptable.
4. Products remaining on hand after completion of the Work.
5. Loading, hauling, and disposing of rejected products.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 012700

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 SUMMARY

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

1.2 GENERAL PROJECT COORDINATION

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

1.3 CONSERVATION

A. Use best management practices for the conservation of energy, water and materials during construction operations.

1.4 SPILL AND EROSION CONTROL

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

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

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

1.6 CONFERENCES AND MEETINGS

A. Pre-construction Conference: The Contracting Officer or Contracting Officer's Representative will schedule a pre-construction conference before starting construction at a time and place agreeable and convenient to both the Contractor and Government and will review responsibilities and personnel assignments in accordance with FAR 52.236-6 Preconstruction Conference.

1. Progress Meetings: Progress meetings at the Project Site shall be conducted at regular intervals. Dates of meetings shall be coordinated with preparation of the payment request in accordance with FAR 52.232-5 Payments Under Fixed-Price Construction Contracts.
2. Agenda: Include topics for discussion as appropriate to the status of the Project. Include review of the Contractor's Construction Schedule and of the present and future needs of each entity present.
3. Schedule Updating: If the progress of the work falls behind the approved Contractor's Construction Schedule, the Contractor shall submit a supplementary schedule for approval by the Contracting Officer in accordance with FAR 52.236-15 Schedules for Construction Contracts.

1.7 SUBMITTALS

A. Spill and Erosion Control Plans shall be submitted within 5 calendar days after Notice to Proceed.

B. Staff Names: Within 5 calendar days after Notice to Proceed, submit a list of principal staff assignments, including the Superintendent, other primary personnel, and any subcontractors/staff. Identify individuals by name, duties and responsibilities, and business/cell telephone numbers. Post copies of this list in the temporary field office (if present).

C. Construction Schedules shall be submitted as directed in FAR 52.236-15 Schedules for Construction Contracts. **THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION SCHEDULE TO THE COR 48 HOURS BEFORE THE PRE-CONSTRUCTION CONFERENCE.**

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Prior to installations, require the installer of each major component to inspect both the substrate and conditions under which work is to be performed.

B. Construction in Progress: Keep construction in progress, adjoining materials in place, and clean during handling and installation. Apply protective enclosures or coverings for protection from damage or deterioration.

C. Completed Construction: Clean completed construction and provide maintenance to prevent damage, soiling or other deterioration through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damage.

D. Limiting Exposures: Supervise construction operations to prevent exposure of any part of construction, completed or in progress, to harmful, dangerous, damaging or otherwise deleterious conditions during the construction period.

END OF SECTION 013100

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section and FAR 52.236-21 include requirements for Shop Drawings, as defined by FAR 52.236-21 and Designs. Shop drawings and Designs may include drawings, specifications, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data furnished by the Contractor to explain in detail specific portions of the work required by the Contract.

B. This section includes requirements for Samples, if any. Samples may include mailed samples, field samples or mock-ups of full-size physical examples erected on-site or elsewhere.

C. This section includes requirements for Product Data. Product Data includes any manufacturer products' (used in this project) standard catalogs, manuals, pamphlets and other printed materials, and includes but is not limited to the following: product specifications and installation instructions, color charts and catalog cuts, rough-in diagrams and templates, wiring diagrams, performance curves, operational range diagrams, mill reports, test reports, shop drawings and code approvals. **THE CONTRACTOR MUST CLEARLY INDICATE ON THE SUBMITTED MATERIALS WHICH PRODUCT THEY ARE PROVIDING. FOR EXAMPLE – A PUMP CURVE WITH 5 PUMPS SHOWN ON THE SAME PAGE SHALL HAVE THE PUMP BEING SUPPLIED CLEARLY INDICATED AS SUCH.**

D. This section includes other quality assurance submittals such as certifications of compliance or conformance, manufacturer's instructions and field reports, any permits received, test reports, lab or test results, etc.

E. Following is a partial list of required submittals:

1. Work plan/schedule
2. Record Drawings
3. Record Product Data
4. Operation and Maintenance Manuals
5. Utility Lines Site Plan
6. Concrete mix design
7. Concrete formwork shop drawings
8. Concrete test reports (complete for all required tests)
9. Reinforcing steel mill certificates
10. Reinforcing steel layout drawings
11. Metal Roof Panels – Product Data & Color Samples
12. Hollow metal doors and frames
13. Unit Skylights
14. Door Hardware
15. Exterior Paint
16. Pumps and pump control components
17. Solar Panels, batteries, control panels and accessories
18. Product data for piping specialties including, pipe, valves, accessories, backflow preventers, yard hydrants and hydrants.

1.2 GENERAL SUBMITTAL REQUIREMENTS

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

construction activities and with the schedule.

1. Allow 15 calendar days each for submittal review, corrections following the initial review and re-submittal review before activities scheduled after the submittal approval.
2. Incomplete submittals will be returned to the Contractor with no further review. Delays due to incomplete or rejected submittals will not be excused with no compensation in the form of monetary or time being provided to the Contractor.
3. When the Contractor desires to submit for approval a product for an "approved equal", the Contractor MUST provide documentation of the original specified product and the Contractor proposed product in a side-by-side comparison, such as a table, which clearly demonstrates the Contractor proposed product meets or exceeds the originally specified product. If this comparison is not done the first time it is submitted, the proposed product will be rejected **AND THE CONTRACTOR WILL HAVE TO PROVIDE THE SPECIFIED PRODUCT. THE GOVERNMENT WILL NOT REVIEW A SECOND PROPOSAL SUBMITTAL.** If the proposed product comparison shows it may meet the specification requirements but is missing some minor information, the COR will contact the Contractor for further information **ONE TIME** to obtain the missing information. If the information is not received, then the proposed product will be rejected **AND THE CONTRACTOR WILL HAVE TO PROVIDE THE SPECIFIED PRODUCT.**
4. Submittal Transmittal: Transmit each submittal from the Contractor to the Government by use of one transmittal form per submittal. Transmittal format to be approved by CO and shall include the following information on the transmittal form.
    a. Project name and Forest Service contract number.
    b. Date.
    c. Name, address and telephone number of firm or entity that prepared the submittal
    d. Names of subcontractor, manufacturer, supplier, etc. as applicable.
    e. Category and description of submittal.
    f. Section of Specifications or Drawing sheet number the Submittal is representing.
    g. Certification by Contractor stating that submittal complies with the Contract, or statement of deviations from the requirements of the Contract.
    h. **CLEARLY INDICATE ON THE SUBMITTAL INFORMATION THE PRODUCT BEING SUBMITTED IF THE INFORMATION SHEETS CONTAIN MORE THAN ONE SELECTION, OPTION, ETC. FAILURE TO CLEARLY INDICATE WHAT IS BEING PROPOSED FOR ACCEPTANCE WILL RESULT IN NO REVIEW BY THE GOVERNMENT AND THE SUBMITTAL WILL BE REJECTED.**
    i. Signature of transmitter.
    j. Space to record Contractor's review and approval markings, and for Government response.

B. Submit 3 hardcopies of each submittal to the COR for review unless otherwise stated. One copy will be returned to the Contractor and two copies will be retained, one for the COR and one for the Inspector.

C. Electronic file submittal (email, thumb drive, etc.) will be acceptable in lieu of hardcopies when appropriate. However, the files shall be in PDF format, one submittal per file, be of high quality (not upside down, pages mixed up, not-legible, black and white when it should be color, etc.) and the files shall be named as to what submittal it is and the version of the submittal (such as a resubmittal).

1.3 SHOP DRAWINGS AND DESIGNS

A. Submit originally prepared information, drawn accurately to scale.

B. Submittals: Submit three blue-line or black-line prints of each drawing submittal. One print will be marked with action taken and returned. Distribution: When submittal is approved, the Contractor shall prepare and submit three final copies.

C. Shop drawings shall be done in *AutoCAD* format. Upon final approval the drawings (dwg format) shall be sent on a thumb drive or via email to the COR.

1.4 PRODUCT DATA

A. Collect Product Data into a single submittal for each system or element of construction. Mark each copy to show specific product choices and options applicable to the project. Product Data shall include the following information, where applicable:

1. Manufacturer's printed recommendations.
2. Compliance with recognized trade association standards.
3. Compliance with recognized testing standards.
4. Applicability of testing agency labels and seals.
5. Notation of dimensions verified for fit by field measurements.
6. Notation of coordination requirements.

B. Preliminary Submittal: Prior to submittal of complete Product Data, submit a preliminary single copy of that part of Product Data when selection of options is required, such as for color charts. Preliminary submittal will be returned, with selection noted, for the Contractor's use in subsequent submittals.

C. Submittals: Unless otherwise indicated, submit 3 copies of each Product Data submittal. Two copies will be retained, and the remaining copy will be marked with action taken and returned.

D. Material and Product substitution shall be in accordance with FAR 52.211-6 and Section 013300-1.2.A.3.

1.5 SAMPLES

A. Submit full-size, fully fabricated samples, cured and finished in the manner specified, if required. Samples shall be physically identical to the material or product proposed for use.

B. Preliminary Submittal: Where color, pattern, texture or similar characteristics are to be selected from a manufacturer's range of standard choices, submit a preliminary single set sample of available choices when required by the CO.

1.6 OTHER QUALITY ASSURANCE SUBMITTALS

A. Submit other quality assurance submittals in compliance with requirements in the individual specification sections.

1.7 REVIEW ACTION ON SUBMITTALS

A. Except for submittals for the record or for information or for another purpose where no action and return is required, the Government will review submittals and mark returned copies to indicate action taken within a maximum time period of 15 calendar days.

B. Submittals that do not contain an appropriate marking of approval by the Government shall not be used for construction.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 013300

SECTION 014000 - QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This section, FAR 52.246-1 Contractor Inspection Requirements and FAR 52.246-12 Inspection of Construction include requirements for quality control services to verify quality assurance requirements specified elsewhere in the Contract.

B. The Government reserves the right to conduct independent tests.

C. This section includes, but not limited to, requirements for quality control services such as soil density compaction, concrete mix and strength testing, water and/or sewer line pressure tests, bedding and sand gradation tests per MDOT, electrical inspections, etc.

D. The quality control services include tests and related actions, including reports, performed by the Contractor, independent agencies or governing authorities.

1.2 RESPONSIBILITIES

A. Contractor Responsibilities: The Contractor shall provide for tests, inspections and other quality control services where specified in the Contract or when required by authorities having jurisdiction. Costs for these services are included in the Contract price. The Contractor shall maintain complete inspection records and make them available to the Government.

B. The Contractor is responsible for all survey work associated with this project unless specified elsewhere.

C. The Contractor shall employ and pay for a qualified independent testing agency (Agency) to perform the quality control services unless the COR and Contractor agree to other arrangements.

D. Retesting: The Contractor is responsible for retesting, including repeated inspections and other services, where results of the initial tests, inspections or other quality control services indicate noncompliance with the requirements of the Contract.

E. Associated Services: The Contractor shall cooperate with others performing required tests, inspections and other quality control services, shall provide access to the work, and shall furnish incidental labor and facilities necessary to facilitate inspections and tests.

F. Take adequate quantities of representative samples of materials that require testing or assist the Agency in taking samples.
   1. Deliver samples to testing laboratories.
   2. Provide security and protection of samples and test equipment at the Project site.

G. The Agency/Contractor shall provide qualified personnel to perform required inspections and tests.

H. The Agency shall notify the Government and the Contractor of irregularities or deficiencies observed in the Work during performance of their services.

I. The Agency is not authorized to change requirements of the Contract or approve or accept any

portion of the Work. The Agency shall not perform any duties of the Contractor.

1.3 QUALIFICATIONS OF INDEPENDENT TESTING AGENCIES

A. A qualified independent testing Agency shall be an accredited entity engaged to perform tests or inspections, and to report on and, if required, to interpret results of those tests or inspections.

1.4 SUBMITTALS

A. Reports: The Contractor shall submit a certified written report, in duplicate, of each test, inspection or other quality control service to the Government.

B. Written reports shall include but not be limited to the following:
1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the test or inspection.
6. Designation of the work and test method.
7. Identifications of product and specification section.
8. Complete test or inspection data.
9. Test results and an interpretation of test results.
10. Ambient conditions at the time of sample taking and testing.
11. Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting.

C. Permits, Licenses, and Certificates: For the Government's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work. The Government is actively pursuing one or more permits, approvals, or authorizations necessary to execute portions of the Work. The Government may make award prior to its receipt of all Required Permits. The Contractor shall not commence any physical Work at the Site until the Contracting Officer issues a written Notice to Proceed (NTP).

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide temporary utilities, support facilities, sanitary facilities, protection, and controls required for construction activities in accordance with this specification and FAR 52.236-10 Operations and Storage Areas. Provide project work signs and secured areas to direct safe construction operations.

1.2 QUALITY ASSURANCE

A. Comply with industry standards, codes, and with applicable laws and regulations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES

A. Temporary Utility Services: Provide as needed to keep normal site operations from being interrupted. Project schedule will dictate which campsites will be closed to the public when the Contractor is working.

3.2 TEMPORARY SUPPORT FACILITIES

A. Provide temporary enclosures for protection of construction as needed. Collect waste from construction areas and elsewhere daily.

3.3 TEMPORARY PROTECTION FACILITIES

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

3.4 OPERATION, TERMINATION, AND REMOVAL

A. Maintain facilities in good operating condition until removal. Each temporary facility shall be removed when need for it has ended and the area rehabilitated to its original state.

END OF SECTION 015000

SECTION 015950 - SAFETY AND HEALTH

PART 1 - GENERAL

1.1 SUMMARY

A. References: In addition to publications referenced in the Contract and FAR 52.236-13, the following Code of Federal Regulations (CFR) publications designate and define hazardous materials and conditions and establish procedures for handling these materials and conditions.
   1. 29 CFR, Part 1910: Occupational Safety and Health Administration (OSHA) General Industry and Health Standards.
   2. 29 CFR, Part 1926: OSHA Construction Industry Standards.
   3. 40 CFR, Part 261: Environmental Protection Agency (EPA) Characteristics of Hazardous Waste.

B. Acquisition of Publications: Referenced CFR publications may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

1.2 COMPLIANCE WITH REGULATIONS

A. Contractor Responsibility: The Contractor shall assume full responsibility and liability for compliance with all applicable codes, standards and regulations pertaining to the health and safety of personnel during execution of the Work. The Contractor shall have written safety and health programs in compliance with 29 CFR Parts 1910 and 1926.

PART 2 - PRODUCTS

2.1 PERSONNEL PROTECTIVE EQUIPMENT

A. Special facilities, devices, equipment and similar items used by the Contractor in execution of the Work shall comply with 29 CFR Part 1910, Subpart I and other applicable regulations.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 015950

SECTION 017000 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 QUALITY ASSURANCE

A. Workmanship Standards: Initiate and maintain procedures to ensure personnel performing the Work are skilled and knowledgeable in the methods and craftsmanship needed to produce the required levels of workmanship. Remove and replace Work that does not comply with workmanship specified and standards recognized in the construction industry for the applications indicated. Remove and replace Work damaged or deteriorated by faulty workmanship or replacement of other Work.

B. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable installation instructions and recommendations to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in the Contract. The Contracting Officer’s Representative shall be immediately notified of conflicts between manufacturer’s instructions and the Contract.

C. Minimum Quality and Quantity: The quality level or quantity shown or specified shall be the minimum required for the Work. Except as otherwise indicated, the Work shall comply exactly with that minimum or may be superior to that minimum. Specified numeric values are either minimums or maximums as indicated or as appropriate for the context of the requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 LAYING OUT THE WORK

A. Before proceeding to lay out the Work, verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, building conditions, current locations of utilities, wells, buildings, etc. If discrepancies are discovered notify the Contracting Officer's Representative promptly.

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

3.2 PREPARATION

A. Site Improvements: The Contractor is responsible for all staking, maintaining and replacing of staking, unless specifically noted on the Drawings or in the Specifications.

B. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.

C. Take field measurements as required to fit the Work properly.

3.3 INSTALLATION

A. Locate the Work and components of the Work accurately. Make vertical work plumb and horizontal work level.

B. Ensure valves and operational components are easily accessible. Valve handles shall be placed on front face of vertical pipes and on the top face of horizontal pipes.

C. All utility piping is to be installed with identification wording on the front face of vertical pipes and on the top face of horizontal pipes.

D. Install products at the time and under conditions that will produce the optimum results.

E. Conduct construction operations so that no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Anchors and Fasteners: Provide anchors and fasteners as required to withstand stresses, vibration and physical distortion. Anchor each component securely in place, accurately located and aligned with other Work.

G. Adjust operating components for proper operation without binding, vibrating, distorting or non-designed movement.

3.4 CORRECTION OF DEFECTIVE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

B. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and proper adjustment of operating equipment.

C. Remove and replace damaged surfaces that are exposed to view if the surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired to operate properly.

E. Remove and replace chipped, scratched, dented or broken surfaces.

3.5 CLEANING

A. Maintain the project site and work areas free of waste material and debris. The area may be frequented by black bears, which may become habituated to humans and may be attracted by activity and food. Maintain control of garbage and food so that no wildlife can access them and dispose of all garbage created during the performance of the contract.

B. Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the work. Before any suspension of work including end of day all trailways shall be left in a condition suitable for traffic.

C. Remove liquid spills promptly.

D. Remove debris from concealed spaces prior to enclosing the space.

E. No burial of debris, garbage, etc. is allowed in any excavation.

F. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at the time of project completion.

3.6 PROTECTION

A. Protect installed work from soiling and damage.

B. Protective Coverings: Provide appropriate protective coverings for work that might be damaged by subsequent operations. Maintain protective coverings in place until project completion.

END OF SECTION 017000

SECTION 017320 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes, but is not limited to, the following:
   1. Complete removal of the ENTIRE existing wooden well enclosure at Juniper Flats and Murray Bay. Complete removal of existing concrete slab at Mather Lodge and hydrant post at Farrell Cottage. This includes all associated electrical and plumbing distribution lines necessary to remove in order to install the new water distribution or electrical lines. All material is to be lawfully disposed off Government property.

1.2 SUBMITTALS

A. Contractor shall submit a written statement of where the materials were lawfully disposed, such as a dump receipt, recycling center receipt or similar.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site.

B. Existing to Remain: Protect property and equipment, designated to remain, from damage and soiling during selective demolition.

C. Abandon: Remove items indicated that are visible above ground. Below ground utilities may remain in place unless designated to be removed. Utilities that interfere with construction shall be removed to the limit required for new construction or as SHOWN ON THE DRAWINGS.

1.4 QUALITY ASSURANCE

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

B. Standards: Comply with
   1. ANSI A10.6 http://webstore.ansi.org
   2. NFPA 24 http://www.nfpa.org/assets/files/PDF/241.pdf.

1.5 PROJECT CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Government as far as practical.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected, reattached and/or capped as necessary.

B. Survey existing conditions and correlate with requirements indicated on the drawings and/or in the specifications to determine extent of selective demolition required.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Complete removal of the ENTIRE existing wooden well enclosure at Juniper Flats and Murray Bay and the interior components of Mather Lodge pumphouse. This includes all associated electrical and plumbing, water lines from the well house to where they turn horizontal and any existing water or electrical distribution lines necessary to remove in order to install the new water distribution or electrical lines. All existing valve boxes as shown on the drawings shall be completely removed. Any water lines that are disconnected and abandoned in place shall be plugged with neat cement/grout on ends only.

B. Water well renovations shall be as per section 221114 Water Distribution.

C. Electrical Service line removal and reroute shall be as per Section 260500 Basic Electric.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with buildings, roads, streets, walks, walkways, and other adjacent occupied and used facilities. Barricade work areas from Public access, as needed.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. Disposal: Transport & legally dispose of demolished materials off Government property.

B. Clean Up: After demolition work has been completed, finish all disturbed areas, except trench areas required to be mounded, to a smooth, uniform grade and texture, well blended to the original contours, showing minimum evidence of construction activity. Clean all interior surfaces of buildings of concrete dust, debris, etc. to pre- construction condition where those buildings have been impacted by the Contractor’s operations.

END OF SECTION 017320

SECTION 017700 - CLOSEOUT

PROCEDURES PART 1 - GENERAL

1.1 SUMMARY

1.1 This Section includes requirements for Contract Closeout.

1.2 FINAL ACCEPTANCE

1.1 Preliminary Procedures: Before requesting inspection for Final Acceptance, complete the following:

1. Submit final payment request with releases and supporting documentation not previously submitted and accepted.
2. Submit an updated final statement accounting for final additional changes to the Contract price, if any.
3. Submit a certified copy of the previous Substantial Completion inspection list of items.
4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
5. Submit record documents and similar final record information.
6. Deliver tools, spare parts, extra stock and similar items.
7. Complete final clean-up requirements including touch-up painting of marred surfaces, adjustments, lubrication, etc.

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

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

1.3 RECORD DOCUMENT SUBMITTALS

1.1 Record Drawings (a.k.a. as-built drawings): Maintain a clean, undamaged set of blue or black line prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies from the Work as originally shown. Mark all drawings that are affected by the variation(s) fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed and buried elements that would be difficult to measure and record at a later date. These record Drawings shall be a part of the Operation and Maintenance manuals and reviewed in the field during the Commissioning. If these plans are inaccurate or incomplete, the Contractor shall correct and resubmit the Operation and Maintenance manuals.

1.2 The O&M manuals shall also include accurate utility line site plans. Provide accurately dimensioned site plans showing survey location and elevation of all utility lines, including valves, connections and changes in

direction, as installed under the Contract within property lines and outside of building walls. These plans shall be a part of the Operation andMaintenance manuals and reviewed in the field during the Commissioning. If these plans are inaccurate or incomplete, the Contractor shall correct and resubmit the Operation and Maintenance manuals.

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

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily determined later by direct observation.

1.4 OPERATION AND MAINTENANCE MANUALS

1.1 Organize operation and maintenance data in suitable sets of manageable size for each location and provide 2 complete copies. Bind properly indexed data in individual, heavy-duty, 2-inch to 3-inch, 3- ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. These manuals shall also be scanned to a SINGLE PDF project file and provided to the COR on two (2) thumb drives. **THIS SHALL BE PROVIDED PRIOR TO PROJECT COMMISSIONING. ACCORDING TO FINDINGS/OMISSIONS IN THE COMMISSIONING, THE CONTRACTOR MAY HAVE TO MAKE CORRECTIONS TO THE O&M MANUALS FOR RESUBMITTAL.** Include the following types of information.

(1) Emergency instructions.
(2) Spare parts lists.
(3) Copies of warranties.
(4) Copies of all permits obtained and inspections.
(5) Well logs.
(6) Water quality testing.
(7) Wiring diagrams.
(8) Inspection procedures.
(9) Shop Drawings and Product Data.
(10) Equipment manuals.
(11) Start-up procedures.
(12) Shut-down procedures.
(13) Trouble shooting techniques.
(14) Typical routine maintenance.
(15) Contact information for contractors and suppliers who performed the original work.

1.5 UTILITY LINES SITE PLAN

1.1 Provide an accurately dimensioned site plan showing survey location and elevation of all utility lines, including valves, connections and changes in direction, as installed under the Contract within property lines and outside of building walls.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES – PROJECT COMMISSIONING

A. Operation and Maintenance Instructions: At the completion of the project and after all known final inspection items have been completed, the Contractor shall provide a Commissioning of the new system. This shall consist of the Contractor training (hands-on at the job site) FS personnel and others as invited by the FS, on the proper operation and maintenance of the system. The Contractor and FS shall use the Contractor's proposed, pre- submitted O&M manuals to systematically go through the entire system. Deviations, omissions or corrections found during this training that need to be changed or added to the O&M manuals shall be made by the Contractor. Contractor will not receive Final Payment and the FS will not issue Final Acceptance until these corrections are made. The Contractor shall demonstrate with FS participation that all systems work according to design and manufacturer's ratings. The commissioning shall include, but is not limited to:

1. Use of maintenance manuals.
2. Review of record documents/as-built drawings and where utilities are located.
3. Identification systems.
4. Proper startup of system components.
5. Operation of valves and electrical breakers/disconnects/well rest buttons.
6. Proper shutdown of system components.
7. Routine maintenance of system components.
8. Trouble shooting of common issues.
9. Hazards of the system and how to mitigate them for safe operation of the system.
10. Warranties and bonds.
11. Emergency operations.
12. Contact information of prime, subcontractors and vendors.

3.2 FINAL CLEANING

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

B. Complete the following cleaning operations before requesting inspection for Final Acceptance.

1. Remove labels that are not permanent labels.

2. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

3. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean, and remove stains, spills, and other foreign deposits. Rake other grounds that are neither paved nor planted to a smooth, even-textured surface.

C. Compliance: Do not burn waste materials. Do not bury debris or excess materials on Government property. Do not discharge volatile, harmful, or dangerous materials into drainage or septic systems. Remove waste materials from the site and dispose of it lawfully. Clean and grade all surfaces soiled/disturbed by Contractor to leave the site in pre-construction conditions, including paved and unpaved roads, walkways, etc.

END OF SECTION 017700

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. See Section "Earth Moving" for earthwork.

1.2 SUBMITTALS

A. Design Mixtures: For each concrete mixture.

B. Material **test reports** and **certificates**.

1.3 QUALITY ASSURANCE

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

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

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

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A, Grade 60, deformed.

1. Reinforcing Bars: ASTM A 767/A, Class

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

2.3 CONCRETE MATERIALS

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

1. Portland Cement: ASTM C 150, Type **I** or **III**.

B. Normal-Weight Aggregates: ASTM C 33, graded, **3/4"** nominal maximum coarse-aggregate size.

1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M **and potable**.

D. Air-Entraining Admixture: ASTM C 260.

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

2.4 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745.

2.5 CURING MATERIALS

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

B. Water: Potable.

2.6 CONCRETE MIXTURES

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

B. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: **4000 psi** at 28 days.
2. Slump Limit: **4 inches max.**
3. Air Content: **5-1/2** percent, plus or minus 1.5 percent at point of delivery for ¾" nominal maximum aggregate size.

2.7 FABRICATING REINFORCEMENT

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

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

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

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

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

3.2 EMBEDDED ITEMS

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

3.3 VAPOR RETARDERS

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

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

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

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

3.5 CONCRETE PLACEMENT

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

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

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

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

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

3.6 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces. While concrete is still plastic, slightly scarify surface with a fine broom. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

3.7 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

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

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.8 FIELD QUALITY CONTROL

A. Testing and Inspecting: Contractor shall engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports. Tests shall be performed according to ACI 301. Slump and Air Content Tests will be performed every 50 cubic yards of concrete. Slump must be 3.5” max and air content between 5-8%.

END OF SECTION 033000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following framing with dimension lumber.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.

C. Application: Treat all rough carpentry
1. Wood sills, sleepers, blocking, [furring,] [stripping,] and similar concealed members in contact with masonry or concrete.
2. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

2.3 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.

B. Exposed Exterior Framing Indicated to Receive a Stained or Natural Finish: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

1. Species and Grade: As indicated above for load-bearing construction of same type.
2. Species and Grade: Western cedars, Select Structural grade; WCLIB, or WWPA.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

2.5 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged,[fire-retardant treated,] in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A with ASTM A 563 hex nuts and, where indicated, flat washers.

2.7 METAL FRAMING ANCHORS

A. Basis-of-Design Products: Subject to compliance with requirements, provide [products indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable products by one of the following:
1. Simpson Strong-Tie Co., Inc.
2. USP Structural Connectors.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit.

B. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

C. Do not splice structural members between supports, unless otherwise indicated.

D. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

END OF SECTION 061000

SECTION 062013 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes Exterior standing and running trim, Plywood siding and Plywood soffits.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.

B. Softwood Plywood: DOC PS 1.

2.2 STANDING AND RUNNING TRIM

A. Lumber Trim:
   1. Species and Grade: Western red cedar, Grade A; NLGA, WCLIB, or WWPA.
   2. Maximum Moisture Content: 19 percent.
   3. Face Surface: Saw textured.

2.3 PLYWOOD SIDING

A. Plywood Type: APA-rated siding, in panel sizes indicated.

B. Thickness: 5/8 inch.

C. Face Species: Western red cedar.

D. Pattern: Plain.

E. Surface: Rough sawn.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.
   1. For applications not otherwise indicated, provide hot-dip galvanized steel fasteners.

B. Insect Screening for Soffit Vents: Aluminum, 18-by-16 mesh.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

3.2 STANDING AND RUNNING TRIM INSTALLATION

A. Install flat grain lumber with bark side exposed to weather.

B. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.

1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

C. Fit exterior joints to exclude water. Cope at returns and miter at corners.

3.3 SIDING INSTALLATION

1. Plywood Siding: Install panels with edges over framing or blocking. Nail at 6 inches o.c. at panel perimeter and 12 inches o.c. at intermediate supports unless manufacturer recommends closer spacing. Leave 1/16-inch gap between adjacent panels and 1/8-inch gap at perimeter, openings, and horizontal joints unless otherwise recommended by panel manufacturer.

2. Cedar Siding: Comply with manufacturer’s written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

END OF SECTION 062013

SECTION 074113 - METAL ROOF PANELS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Summary: Factory-formed metal roof panels.

B. Submittals: Product Data and color Samples.

C. Provide roof assemblies that comply with requirements in UL 580 for Class 90 wind-uplift resistance.

D. Warranties: Provide standard manufacturer's written warranty, without monetary limitation, signed by manufacturer agreeing to promptly repair or replace metal roof panels that fail to remain weather tight within 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL ROOF PANELS

A. Products:

1. Central States PBR Commercial Panel https://centralstatesco.com.

C. Metallic-Coated Steel Roof Panels: Fabricated from galvanized structural-steel sheet, ASTM A 653, G90.

1. Metal Thickness: 26 ga..
2. Finish: Manufacturer's standard Kynar 500 or Kylar 5000 premium finish.
3. Color: Brown

2.2 ACCESSORIES

A. Provide components required for a complete roof panel assembly including trim, clips, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Formed from 0.0179-inch- thick, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet. Provide flashing and trim as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal roof panels.

C. Underlayment: CertainTeed Winter Guard or approved equal

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install underlayment on roof sheathing under metal roof panels, unless otherwise recommended by metal roof panel manufacturer.

1. Apply slip sheet over underlayment before installing metal roof panels.

B. Anchor panels securely in place, with provisions for thermal and structural movement. Field cutting exterior panels by torch is not permitted. Install panels with concealed fasteners, unless otherwise indicated.

1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.
2. Aluminum Roof Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior and aluminum or galvanized steel fasteners for surfaces exposed to the interior.

C. Install gaskets, joint fillers, and sealants where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants recommended by metal roof panel manufacturer.

D. Separate dissimilar metals with a bituminous coating or polymer-modified bituminous sheet underlayment.

E. Coat back side of aluminum panels with bituminous coating where they will contact wood, ferrous metal, or cementitious construction.

END OF SECTION 074113

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS, Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS, Type B.

C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

2.2 STANDARD HOLLOW METAL DOORS

A. General: Comply with ANSI/SDI A250.8.

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

3. Vertical Edges for Single-Acting Doors: Square edge.
4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
5. Tolerances: SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Comply with ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush).

C. Hardware Reinforcement: ANSI/SDI A250.6.

2.3 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.
1. Fabricate frames as full profile welded unless otherwise indicated.
2. Frames for Level 2 Steel Doors: 0.053-inch- thick steel sheet.

C. Hardware Reinforcement: ANSI/SDI A250.6.

2.4 FRAME ANCHORS

A. Jamb Anchors:
1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

2.5 FABRICATION

A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

B. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.

C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non templated, mortised and surface-mounted door hardware.

2.6 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: ANSI/SDI A250.10.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
2. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

B. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

3.2 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes commercial door hardware.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Deliver keys to the Government upon completion

1.3 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 HINGES, GENERAL

A. Hinge Base Metal: Unless otherwise indicated, provide the following: Exterior Hinges: Stainless steel, with stainless-steel pin.

B. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors.

C. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors. Finish screw heads to match surface of hinges.

2.2 HINGES

A. Butts and Hinges: BHMA A156.1.

B. Template Hinge Dimensions: BHMA A156.7.

C. Available Manufacturers:
1. Hager Companies (HAG).
2. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

2.3 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

B. Lock Trim: Levers: Latch by Townsteel – Dormitory SKU RM31090

C. Backset: 2-3/4 inches, unless otherwise indicated.

D. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

2.4 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following: Bored Locks: BHMA A156.2.

B. Bored Locks: BHMA A156.2, Grade 2

1. Lock must match CXT outhouse keys found at: https://cxtincparts.com/cxtinc/product/latch-by-townsteel-corridor.html

2.5 OPERATING TRIM

A. Standard: BHMA A156.6.

B. Materials: Fabricate from stainless steel, unless otherwise indicated.

2.6 DOOR GASKETING

A. Standard: BHMA A156.22.

B. General: Provide continuous weather-strip gasketing on exterior doors. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

1. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

2.7 THRESHOLDS

A. Standard: BHMA A156.21.

B. Accessibility Requirements: Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.

D. Available Manufacturers:

1. Hager Companies (HAG).
2. M-D Building Products, Inc. (MD).
3. Pemko Manufacturing Co. (PEM).
4. Reese Enterprises (RE).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.

B. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

C. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to comply with referenced accessibility requirements.

END OF SECTION 087100

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:
   1. Steel.
   2. Wood.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

B. Colors: Gull Gray. See attachments for pigment code.

2.2 METAL PRIMERS

A. Quick-Drying Alkyd Metal Primer: MPI #76.

   1. VOC Content: E Range of E1.

2.3 QUICK-DRYING ENAMELS

A. Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).

   1. VOC Content: E Range of E1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

B. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulates.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 EXTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Quick-Drying Enamel System: MPI EXT 5.1A.

a. Prime Coat: Quick-drying alkyd metal primer.
b. Intermediate Coat: Quick-drying enamel matching topcoat.
c. Topcoat: Quick-drying enamel (semigloss).

B. Plywood/Lumber Substrates:

1. Exterior Acrylic Latex Enamel Paint

a. Prime Coat: Exterior Acrylic Primer, 1 coat.
b. Topcoat: Royal by Ace Exterior 100% Acrylic Latex Enamel Paint or approved equal, satin, 2 coats.

END OF SECTION 099113

SECTION 101100 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Sliding visual display units.

PART 2 - PRODUCTS
   1. Visual display boards are job site constructed according the the details Shown on the Drawings.

2.2 MATERIALS, GENERAL

A. Cork Sheet: MS MIL-C-15116-C, Type II.

B. Natural Cork Sheet: Seamless, single layer, compressed fine-grain cork sheet, bulletin board quality; face sanded for natural finish.

C. Extruded Aluminum Track: Rockler Easy Glide #26617 (1-800-279-4441).

D. Clear Sliding Doors: Lexan, ¼-inch thickness.

E. Lock: Rockler #32389 (1-800-279-4441).

2.3 FABRICATION

A. Fabricate visual display surfaces to sizes indicated on Drawings.

B. Visual Display Boards: Field assemble visual display boards, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install visual display surfaces in locations and at mounting heights indicated on Drawings. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Field-Assembled Visual Display Units: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.

   1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints.

C. Sliding Visual Display Units: Install units in recessed locations indicated on Drawings. Attach to wall framing with fasteners at not more than 16 inches (400 mm) o.c.

1. Adjust panels to operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

END OF SECTION 101100

SECTION 221114 - WATER DISTRIBUTION

PART 1 - GENERAL

C.2 SUMMARY

1. This Section includes water-distribution piping and specialties for water services including, but not limited to, water well, submersible well pumps, water lines, well house equipment and fixtures, pressure testing, chlorination/disinfection and well water quality testing.

C.3 DEFINITIONS

1. Water Service: Exterior domestic-water piping.

2. The following are industry abbreviations for piping materials:
    1. PE: Polyethylene plastic.
    2. PVC: Poly Vinyl Chloride pipe
    3. GIP or GS: Galvanized Iron Pipe or Galvanized Steel, used interchangeably.
    4. HDPE: High Density Polyethylene plastic.

C.4 SUBMITTALS

1. Product Data: For all piping specialties to include, but not limited to, valves, transition fittings, GI Pipe and fittings, PVC pipe and fittings, HDPE pipe and fittings, drain pipe ends, pipe supports, water meters, pressure gages, pressure switches, sample taps, pressure relief valves, well pump control box , well pump wiring, pressure tanks, curb stop valves, spigot vacuum breakers, spigot caps, tracer wire, warning tape and any other item used in the construction of the well house and the water distribution system.

2. Field Quality-Control Test Reports:

    1. Water well quality testing results and interpretations. See Section 3.16 Water Well Quality Testing for exact requirements.

3. Pressure test results.

4. Current water well driller license for State of Michigan.

5. Operation and Maintenance Data: For specialties to include in Operation and Maintenance manuals such as water meter, shut down and start up, etc.

C.5 QUALITY ASSURANCE

1. Product Options: Drawings indicate size, profiles, and dimensional requirements of piping and specialties and are based on the specific system indicated.

2. Regulatory Requirements:

    1. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

    2. Comply with permit requirements of authorities having jurisdiction for potable-water systems.

    3. All work shall be performed by a State of Michigan Licensed Well Driller and meet the Michigan Water Well Construction and Pump Installation Code, latest edition.

    4. All work shall be oversaw by a Master Plumber and meet International Plumbing Code.

3. Piping materials shall bear label, stamp, or other markings of specified testing agency.

4. Comply with ASTM F 645-Guide for Selection, Design and Installation of Thermoplastic Water-Pressure Piping Systems for the selection, design, and installation of thermoplastic water piping.

5. Comply with National Science Foundation - NSF 14 for plastic potable-water-service piping.

6. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

7. Comply with lead free requirements for all potable water fixtures as per Section 1417 of the Safe Drinking Water Act.

PART 2 - PRODUCTS

2.1 HDPE PIPE AND FITTINGS

A. HDPE, AWWA Pipe: AWWA C901 or C906 Pipe meeting PE 4710 SDR 11 required to give pressure rating not less than 160 psig. The pipe shall be continuously marked with durable printing including: nominal size, dimension ratio, pressure class, manufacturer's name and product series, cell class, ASTM #, NSF-PW, and production date.

    1. HDPE, AWWA Fittings: AWWA C901, pack joints, socket- or butt-fusion type, matching pipe and PE compound number required to give pressure rating not less than 160 psig.

2.2 GS PIPE AND FITTINGS

A. Galvanized steel, Schedule 40, pipe shall be in accordance with ASTM A53 Grade B and have threaded and coupled fittings in accordance with ANSI B16.1. Pipe shall be NSF 61 approved and rated not less than 160 psig.

2.3 PVC PIPE AND FITTINGS

A. All PVC pipe shall be Sch 40, NSF 61 approved for potable water and meet ASTM D 1785 Specification for PVC Plastic Pipe, Schedules 40, 80 and 120. The pipe shall be continuously marked with durable printing including: nominal size, pressure class/Sch rating, manufacturer's name and product series, cell class, ASTM #, NSF-PW, and production date.

B. All PVC fittings (Tees, bushings, elbows, plugs, unions, couplers, etc.) shall be Sch 40 PVC with a pressure rating of not less than 150 PSI WOG and meet ASTM D1784, ASTM D 2464, ASTM D2467 or ASTM F 1970 and NSF 14 and NSF 61 requirements.

2.4 TRACER WIRE

A. Tracer wire shall be installed on top of all new underground utilities. Terminations of tracer wire at each end shall be affixed to a permanent structure or post. Tracer wire shall be Trace- Safe water blocking tracer wire or approved equal having the following physical characteristics:

1. 19 AWG solid copper conductor with tin coating for corrosion protection.
2. Polyolefin insulation material.
3. Water-blocking yarns.
4. Woven polyester for 1800 psi tensile strength.
5. Outer jacket of 32 mill HDPE.
6. Color shall be for the utility it is installed for.

2.5 CAUTION TAPE

A. Metal detectable polyester underground tape, minimum of 2 inches wide by 5 mils thick, in color for the utility it is describing, with metallic core and continuously printed black-letter caption "CAUTION—(type of utility) BURIED BELOW."

2.6 JOINING MATERIALS

A. Transition Couplings:

1. Underground Piping, NPS 2" and Smaller: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

2. Above ground – proper PVC reducers or transitional fittings from HDPE to PVC pipe or as required.

B. Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

C. PVC cement shall be new, in original containers and shall meet ASTM F 656 Specification for Primers for Use in Solvent Cement Joint of PVC Plastic Pipe and Fittings and ASTM D2564 Specification for Solvent Cements for PVC Plastic Piping Systems.

D. Pipe thread compound shall be Blue Magic Industrial Grade or approved equal. It shall be NDF 61 approved for potable water, grit free, lead free and non-hardening once applied to the pipe threads.

E. HDPE Pipe joints: All HDPE pipe splicing and fitting installation shall be made with welded/fused connections unless at a location where a change in direction is not possible without a mechanical joint or if the location is not accessible to the pipe welding equipment. These connections shall be made with an approved brass joint coupling such as a Ford Pack Joint coupling or with a Victaulic Style 905 coupling.

2.7 BALL VALVES

A. Ball valves for water supply and distribution lines shall be ¼ turn, brass, lead-free for potable water of the same size as the water pipeline at the ball valve. Valves shall have a pressure rating of not less than 150 PSI WOG and meet NSF 61 requirements.

2.8 CURB STOP VALVE BOXES AND VALVES

A. Curb stop valve boxes shall be made of PVC as per the detail sheet for Farrell Cottage and Mather Lodge locations.

B. Curb Valve Shutoff Wrenches shall be steel, tee-handle, stem of length to operate deepest buried valve + 2', and slotted end matching curb valve. Provide one (1) wrench.

C. Curb Valves shall comply with AWWA C800, NSF 61 and be lead free. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.

2.9 POTABLE WATER PRESSURE TANKS

A. Potable water tanks shall be NSF 61 approved, steel, precharged diaphragm pressure storage tanks. Wound fiberglass tanks are NOT allowed. They shall be 20-gallon size, with a pre- charge pressure of 38 psi. Tanks shall be Amtrol Well-X-Trol model WX-202 with steel stand or approved equal at Juniper and Murray Bay sites. Mather Lodge shall be a 119-gallon size, with a pre-charged pressure of 38 psi. Tank shall be Amtrol Well-X-Trol model WX-350 with steel stand or approved equal.

B. Potable water tanks shall be set on standard 8"x8"x16" cement blocks as shown in the drawings.

2.10 DRAIN SCREENED OUTLET

A. The 3/4" HDPE drain screened outlet shall be a 3/4" "Foot Valve Screen" as manufactured by "Spears" part number FVS-0107, or equal.

2.11 PRERSSURE RELIEF VALVE

A. Pressure relief valve shall be 1.5" diameter inlet and outlet, be lead-free bronze, have a test handle

and be either adjustable up to 160 psi or be factory pre-set at 75 psi. Disc material shall be brass meeting ASTM B16. McDonald Model 72049 is pre- approved.

2.12 SAMPLE TAPS

A. Sample taps shall be 1/2" no-lead low pressure valve hose bibb with no threads on end (smooth nosed) by A.Y. McDonald Mfg. CO. part number 72002NT. They shall be NSF 61 approved.

2.13 HOSE-CONNECTION, BACKFLOW-PREVENTION DEVICES

A. Hose bibb/boiler drain valve vacuum breakers shall comply with ASSE 1011 standards, be NSF 61 approved for potable water, low-lead compliant bronze with the Safe Drinking Water Act, with ASME B1.20.7, garden-hose threads on outlet.

2.14 WATER METER

A. Water meter shall be a no-lead high copper alloy main case, nutating disc measuring chamber, non-freezing, "Neptune T-10", ¾" direct read in US gallons or approved equal. It shall be ANSI/NSF 61 Certified with a lifetime guarantee. Proper flagged fittings for 1" SCH40 PVC main line water piping to the water meter shall be provided by the Contractor.

2.15 PITLESS ADAPTER

A. The well pitless adapter shall be a weld on type of adapter, MAASS Model J, or approved equal, and met R 325.1657 and R325.1657a of the Michigan Water Well Construction and Pump Installation Code. Bury depth shall be 5'.

2.16 WELL CASING, DROP PIPE AND TORQUE ARRESTOR

A. Well casing extension shall be new PVC meeting R 325.1626 of the Michigan Water Well Construction and Pump Installation Code and match the existing well casing at Farrell Cottage. Well casing extension shall be new steel meeting R 325.1626 of the Michigan Water Well Construction and Pump Installation Code and match the existing well casing at Mather Lodge The diameter of the existing well casing is 6" at both locations. Contractor to verify diameter and length needed to extend the casing.

B. All drop pipe shall be removed and reinstalled. Any additional drop pipe needed shall be 2" diameter, Schedule 40 GIP in accordance with ASTM A53 Grade B and have threaded and coupled fittings in accordance with ANSI B16.1. Pipe shall be NSF 61 approved and rated not less than 160 psig.

2.17 SUBMERSIBLE WELL PUMPS – SOLAR (DC) POWERED

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide the product Specified or an equal product:

C. For Juniper Flats and Murray Bay Locations: Sunpumps Model SDS-T-128 (30V)

D. For Mather Lodge Location: Sunpumps Model SDS-Q-135 (30V)

E. Description: Submersible, positive displacement DC powered diaphragm well pump complying with the following features:

1. Screen Material: 50 mesh Stainless steel
2. Body – Stainless Steel with stainless steel fasteners.
3. Motor: Capable of continuous operation under water, with protected submersible power cable.
4. Discharge and Column Piping: ASTM D 2239, SIDR Numbers 5.3, 7, or 9 PE pipe; made with PE compound number required to give pressure rating not less than 160 psig. Include NSF listing mark "NSF pw."
   a. Insert Fittings for PE Pipe: ASTM D 2609, made of PA, PP, or PVC with serrated, male insert ends matching inside of pipe. Include bands or crimp rings.

F. Capacities and Characteristics for Juniper Flats and Murray Bay Pump:

1.1 Depth Range: 230 feet (70 meters)
1.2 Flow Range: 0.6 – 2 GPM (2.3 – 7.6 LPM)
1.3 Max Load Current: 4.2 Amps
1.4 Max Load Power: 126 Watts
1.5 Discharge Size: 1/2″ NPT or 15mm BT
1.6 DC Voltage Range: 30DC

G. Capacities and Characteristics for Mather Lodge Pump:

1.1 Depth Range: 60 feet (18 meters)
1.2 Flow Range: 1.8 – 4.8 GPM (6.8 – 18 LPM)
1.3 Max Load Current: 3.9 Amps
1.4 Max Load Power: 118 Watts
1.5 Discharge Size: 3/4″ NPT
1.6 DC Voltage Range: 30DC

2.18 WELL CAP

A. Well cap shall be new at all locations. New well cap shall be vented, vermin proof, weathertight and met R 325.1657 and R325.1657a of the Michigan Water Well Construction and Pump Installation Code. It shall be aluminum, cast iron or steel, not PVC.

2.19 PRESSURE GAUGE AND PRESSURE SWITCH

A. Pressure gauge shall be 316 stainless steel with a range of 0-100 psi and a gauge nominal dial size of 2.5” diameter with gauge connection location on the bottom. It shall be lead-free. Wetted parts shall be of brass or bronze. Window shall be laminated safety glass with glycerin liquid fill. Provide “Trerice Model 700LFSS2502LA110 Industrial Gauge” or approved equal.

B. Pressure switch shall be UL approved Square D, or approved equal, for use in a pump house environment and factory set for 20 psi – 40 psi cut in and out pressure.

2.20 PIPE SUPPORTS

A. Pipe supports shall be adjustable and be made of non-rusting material. Each support shall be able

to withstand 300 pound vertical load, be stable in the horizontal direction using a flat base plate 8" x 8" and utilize a saddle to distribute the pipe's weight over an area (a point load is not acceptable). Supports are not to be attached to the floor unless directed by the COR. Trumball Manufacturing, Inc. saddle style adjustable pipe supports in an electro-galvanized finish are pre-approved.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 312000 Earth Moving for warning tape, tracer wire, excavating, trenching, and backfilling requirements.

3.2 PIPING APPLICATIONS

A. Do not use flanges, unions, or keyed couplings for underground piping.

3.3 JOINT CONSTRUCTION

A. Make pipe joints according to the following:

1. PE Piping Insert-Fitting Joints: Use plastic or stainless steel insert fittings and fasteners according to fitting manufacturer's written instructions.
2. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.
3. PVC pipe: Follow ADTM D 2855 Practice for Making Solvent-Cemented Joints with PVC Pipe and Fittings.
4. HDPE pipe: Follow ASTM D 2774 Practice for Underground Installation of Thermoplastic Pressure Piping and ASTM F 645 Guide for Selection, Design and Installation of Thermoplastic Water-Pressure Piping Systems.
5. Galvanized Iron Pipe: Use proper thread compound.

3.4 EXISTING HAND PUMP REMOVAL

A. Remove existing hand pumps, concrete slabs, drop pipe, rod, cylinders and appurtenances. The removed hand pump and appurtenances shall be salvaged and returned to the Government at the site.

3.5 PIPING INSTALLATION

A. Water-Main Connection: Connect to water tanks and supply pipe from well.

B. Pipe shall be laid and covered with a sand bedding depth of not less than 10 inches above and 4 inches below the pipe when trenching.

C. Install piping by tunneling, jacking, or combination of both, under streets and other obstructions that cannot be disturbed.

D. Terminate water-service piping in planned building area. Terminate piping with caps, plugs, or flanges as required for piping material until all piping is connected to keep out foreign material.

E. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports as shown on the drawings.

F. Where piping enters or exits the well house, the knock out shall be filled with gravel and the top 1" shall be grouted smooth and flush with the building floor. Wrap plastic sheeting around the pipe prior to grouting.

3.6 ANCHORAGE INSTALLATION

A. Install anchorages for tees, plugs and caps, bends, crosses, valves, and distribution branches as needed. Include anchorages for gasketed-joint, PVC water-service piping according to AWWA M23.

3.7 VALVE INSTALLATION

A. Ball Valves: Install with head pointed up or in direction of easy operation.

B. Curb Valves: Install each underground curb valve with head pointed up and with service box.

3.8 WATER-METER, PRESSURE GAUGE & SWITCH & PRESSURE RELIEF VALVE INSTALLATION

A. Install as per manufacturer's recommendations as shown on the drawings.

3.9 WOOD POST HYDRANTS

A. Install wood post hydrants as indicated on the Drawings.

3.10 WELL PUMP AND APPURTENANCES

A. Remove existing well pump, drop pipe etc. from the well. Extend the existing well casing at Farrell Cabin and Mather Lodge as shown on the Drawings. Replace pitless adapter at all locations. Backfill around casing with clean sand fill.

B. Flush well for a minimum of 30 minutes by air development or until flushing indicates clear water as demonstrated using a clean, white, 5 gallon bucket. This shall be completed with the COR present.

C. Install new well pump, torque arrestor, and replace drop pipe as needed as indicated on drawings and as per manufacturer's recommendations. Well driller must clearly indicate on a new well log or an amendment/submittal to the existing well log, the depth the pump is set, drop pipe information, torque arrestor position, depth of well, casing length, diameter of casing, etc.

D. Install new PVC electrical conduit, electrical wires, etc. from the well head to a new well control box installed in the well house and make all connections as required for a working water system.

3.11 CONNECTIONS

A. Drawings indicate general arrangement of piping and specialties. Great care was taken in drawing the piping arrangement to indicate fitting, alignment with floor knockouts, specified equipment,

etc. If alignment does not correspond to the drawings, the Contractor shall immediately inform the COR so field adjustments can be made.

3.12 PRESSURE TANK INSTALLATION

A. Install pressure tanks as shown on the Drawings. Set pre-charge pressure as per manufacturer's recommendation and neatly write on each tank with a black marker the date and pressure the pre-charge was set.

3.13 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping pressure tests **IN THE PRESENCE OF THE COR** before joints are covered and after thrust blocks have hardened sufficiently. **IF THE TEST IS NOT PERFORMED IN THE PRESENCE OF THE COR, THE CONTRACTOR WILL HAVE TO RETEST AND UNCOVER ANY PIPING THAT WAS COVERED AT NO COST TO THE GOVERNMENT.** Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at 70 psi pressure for 2 hours.

C. Increase pressure in 35-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour. Slowly increase to test pressure and hold for 1 more hour. There is no allowable leakage. All joints shall be leak free. If leaks are detected, repair at no expense to the Government and retest starting at time zero.

D. Prepare reports of testing activities in the form of a submittal indicating test date, time, witnesses, photographs, results, repairs needed, etc.

3.14 IDENTIFICATION

A. Install continuous underground warning tape and tracer wire during backfilling of trench for underground water-service piping. Locate below finished grade, directly over piping in accordance with the drawing details.

B. Prior to backfilling, ensure all pipe locations are clearly depicted on the Contractor's two sets of as-built copy of prints.

3.15 CLEANING

A. Purge new water-distribution piping systems.

B. Use purging and disinfecting/chlorination procedure described in AWWA C651 or as below. US Forest Service (COR) will be present and assist with the chlorination of the water system such as location of drains, fixtures, etc.

1. Chlorinate well using a minimum 50 ppm chlorine solution. Ensure all well casing interior and drop pipe exterior are contacted by the solution.
2. Pump chlorine solution throughout the ENTIRE water system and that all fixtures indicate they have a chlorine residual.
3. Let stand for 24 hours. After 24 hours, flush the entire system so there is no chlorine residual. Use chlorine test strips to validate.
4. Submit 2 each water samples taken at least 24 hours apart in sterile bottles to State authorized laboratory. Repeat procedure if biological examination shows evidence of

contamination at no cost to the Government.

3.16 WATER WELL QUALITY TESTING

A. After well cleaning, chlorinating and flushing, the Contractor shall have the water well tested by a State of Michigan certified laboratory for the following analytes:

1.

Primary Contaminants		**Secondary Contaminants**	
Antimony	Cyanide	Aluminum	Odor
Arsenic	Fluoride	Chloride	pH
Asbestos	Lead	Color	Silver
Barium	Mercury	Corrosivity	Sulfate
Beryllium	Nitrate	Foaming Agents	Total Dissolved Solids
Cadmium	Nitrite	Iron	Zinc
Chromium	Selenium	Manganese	
Copper	Thallium		
	Turbidity		

2. All samples shall be taken by a licensed well driller or master plumber. All test results shall be sent to the USFS in PDF format and the sample results must clearly indicate whether the test exceeds the MCL, what the maximum containment level (MCL) is for each contaminant, what units of measure are used (ppm, ppb, ug/l, etc.) and must meet acceptable testing requirements such as sample blanks, stored/delivered to lab properly on ice, etc. Test results that are not acceptable due to not meeting approved testing procedures will result in the Contractor resampling and testing at no cost to the Government.

END OF SECTION 221114

SECTION 260500 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Solar panels.
2. Charge & discharge controllers.
3. Electric panels.
4. Wiring in building, to solar panel and to DC pump.
5. Building lights.
6. Batteries.
7. Volt & current meter.
8. Surge arrester.
9. Pump pressure switch.
10. Support pole and brackets for solar panels.

1.2 SUBMITTALS

A. Design Data: Load and Voltage Drop calculations. Electrical System schematics including distribution panel layouts and wire /conduit sizes.

B. Product Data: Wire, PVC conduit, distribution panels, junction boxes, circuit breakers, disconnects and other miscellaneous electrical devices as required.

C. Licenses and Permits: Provide copies of current Michigan electrician license and all required electrical permits.

1.3 QUALITY ASSURANCE/PERMITS

A. All electrical work shall be performed by a State of Michigan licensed electrician under the current National Electric Code (NEC) and shall be inspected by the proper state authority in accordance with state code requirements. The Contractor is responsible for obtaining the permits and coordinating the required state inspections. The Government shall be notified, in writing, by the electrical inspector that all work is in compliance with the NEC and local regulations. **An electric permit is required.**

PART 2 – PRODUCTS

2.1 SOLAR POWER WATER DELIVERY SYSTEM

A. Solar power water system components are available individually or as a package system from Sunwize or other major suppliers of solar system components.

2.2 CONDUCTORS, CABLES AND GROUNDING RODS

A. Copper Conductors: Comply with NEMA WC 70. Wire size and type varies by site. Provide as required by the NEC.

B. Conductor Insulation: Comply with NEMA WC 70.

C. Factory-fabricated connectors and splices: Of size, ampacity rating, material, type, and class for application and service indicated.

D. Provide copper grounding rods of size and length required by the NEC.

2.3 SOLAR PANELS (PV MODULES)

A. Solar panels shall be rated 180 watt peak power (minimum), be of crystalline-silicon construction and carry a 20 year limited warrantee. The following product meet this specification:
   1. SLD Tech Model ST-180P-24

2.4 ELECTRIC PANELS AND CONTROLS

A. Panel(s) and controls shall include the following:
   1. 4, 10 amp dc-rated circuit breakers for battery (2), pump and light circuits.
   2. 24 volt, 10 amp minimum, 3-step charge controller, "Sunwize 230042 PR Express Control Panels, PS 30M" or equal.
   3. Battery temperature sensor for temperature compensation of battery controller.
   4. Digital meter displaying system voltage, charging current and accumulated charge.
   5. Silicon-oxide 4,000 joule lightning surge arrestor, "Delta Lightning Arrestor Model LA302DC, www.deltala.com" or equal.
   6. 1, PV circuit dc-rated disconnect circuit breaker.
   7. NEC required posted system placards and a laminated wiring schematic of the system.
   8. Panels shall be as required by the NEC to house the required controls, switches and accessories.

2.5 BATTERIES

A. Batteries shall be gel, valve regulated, lead acid batteries, non-spillable, using a recombination reaction to prevent the escape of hydrogen and oxygen gasses.
   1. Battery terminals shall have screw lugs with wing nuts.

2.6 SUPPORT POLE AND BRACKETS

A. Support poles and brackets shall be reused if possible. If existing poles and brackets are unusable, new poles and brackets shall be used and are compatible with the solar panels. They shall be able to withstand 80 mph wind load.

2.7 PRESSURE SWITCH

A. The pressure switch shall be 24 volt dc rated to turn the pump on and off on 40-60 psi pressure settings. Switch shall be:
   1. "Square D Pumptrol FSG2J24BP", www.squared.com, or equal.

2.8 LIGHTS

A. The lamp on the ceiling of the pump houses shall provide a minimum of 1600 lumens, 24 volt, LED lamp in a protective cover.

B. The exterior lamp must be motion censored and provide a minimum of 1600 lumens, 24 volt, LED.

2.4 PANELS, CONDUIT, JUNCTION BOXES, WIRE AND WIRING DEVICES

A. As required by NEC and as indicated on the drawings. **All conductors shall be copper unless otherwise noted**.

B. All interior well house conduit shall be EMT and securely fastened to the walls. Conduit for the pressure switch to the pump control box shall utilize flexible liquid tight conduit and connections.

C. Proper circuit breaker(s) shall be installed AND LABELED in the existing power panel in the new well house. All new disconnects and controls shall be clearly labeled as to their function.

D. All underground conduit for wires shall be Sch 40 PVC.

2.5 MISCELLANEOUS ELECTRICAL COMPONENTS

A. GROUNDING AND BONDING
1. A minimum of two grounding rods shall be installed outside of the new well house and connected to the new electrical system. Electrical contractor shall ensure the entire electrical system is properly grounded **AND** bonded per the NEC.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, as shown on the drawings, unless otherwise indicated.

B. Ground and bond distribution panels, control panels and all equipment in accordance with NEC requirements.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Well service line from the well head to the control box inside the new well house shall be run in 1" minimum Sch 40 PVC conduit as shown on plans and at a minimum cover depth of 18". Conductors shall be copper with no splices other than at the top of the well. Wire nuts shall be pointed up and shall be fully taped with electrical tape.

3.2 SUPPORT INSTALLATION

A. All new electrical components shall be installed on the interior wall of the new well house on ¾" thick treated plywood that is securely fastened to the interior wall of the new well house.

B. Secure electrical items and their supports to structures, using the following methods unless other fastening methods are indicated:
1. Wood: Wood screws or screw-type nails.
2. Treated wood – Galvanized or coated screws specifically designed for treated wood.
3. Masonry: Toggle bolts on hollow block and expansion bolts on solid block. Seal around sleeves with mortar, both sides of wall.
4. New Concrete: Concrete inserts with machine screws and bolts.
5. Light Steel Framing: Sheet metal screws.
6. Fasteners for Damp, Wet, or Weather-Exposed Locations: Stainless steel.
7. Light Steel: Sheet metal screws.

3.3 CUTTING AND PATCHING

A. Cut, channel, bore, chase, and drill floors, walls, partitions, ceilings, roads, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair, refinish and touch up disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

3.4 DEMOLITION

A. Disconnect electric service to the old wooden structure and abandon in place all underground wiring from the old wooden structure.

B. The Contractor is responsible for removing from site and for disposing of legally all removed electrical equipment.

END OF SECTION 260500

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Excavating and backfilling for utility trenches.
   2. Excavating for any demolition.
   3. Excavating for any structures.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

   1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Government. Authorized additional excavation and replacement material will be paid for according to Contract provisions Changes in the Work.
   2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Government. Unauthorized excavation, as well as remedial work directed by Government, shall be without additional compensation.

D. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

E. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

F. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 EXISTING UNDERGROUND UTILITIES

A. The Contractor shall contact the Michigan MISS DIG Notification Center at 811 or 1-800-482-7171 for buried utility location identification and marking at least 3 business days prior to, but no more than 14 days before doing any excavating on site. Contractor is to coordinate locating utility locations with SECTION 011400 WORK RESTRICTIONS and SECTION 017000 - EXECUTION REQUIREMENTS.

B. The locations of existing underground utilities Shown on the Drawings are approximate. The Contractor shall repair at his own expense any damaged underground utilities Shown on the Drawings, located by the Government, or those identified by the locating service or utility companies. There are no phone, sewer, natural gas or propane services at the old wooden structures. There are electric and water services to the old wooden structures.

2.9 SUBMITTALS

A. Product Data Sheet for tracer wire

B. Product Data Sheet for all warning tape products.

2.10 QUALITY ASSURANCE

A. Quality control is the responsibility of the Contractor. Any testing required to verify materials meet the specifications shall be conducted by an independent Testing Agency hired and paid for by the Contractor.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Unsatisfactory Soils: ASTM D 2487 Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT or AASHTO M 145 Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

C. Satisfactory Soils – Backfill and Fill: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

D. Select Backfill or Bedding Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

E. Terms, descriptions, and gradations of granular soil materials in paragraphs below are examples only. Revise to comply with local practices and to suit Project. For example, granular materials may be referenced by state or local highway designations rather than by ASTM classifications.

F. Topsoil: Onsite topsoil shall be stockpiled and re-used. The Contractor may supplement with approved material from an outside source that meets the requirements of MDOT 2012 Standard Specifications Section 917.07

2.2 ACCESSORIES

A. Metal detectable polyester underground tape, minimum of 2 inches wide by 5 mils thick, in color for the utility it is describing, with metallic core and continuously printed black-letter caption "CAUTION—(type of utility) BURIED BELOW."

B. Tracer wire shall be installed on top of all new underground utilities. Tracer wire shall be Trace-Safe water blocking tracer wire or approved equal having the following physical characteristics:

1. 19 AWG solid copper conductor with tin coating for corrosion protection.
2. Polyolefin insulation material.
3. Water-blocking yarns.
4. Woven polyester for 1800 psi tensile strength.
5. Outer jacket of 32 mill HDPE.
6. Color shall be for the utility it is installed for.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations. Protect plant life, lawns, rock outcropping and other features remaining as a portion of final landscaping. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from damage by excavation equipment and vehicular traffic.

B. Prior to beginning work, the Government shall validate and approve locations in which the Contractor proposes to install utility system components.

C. The Contractor shall salvage and stockpile topsoil.

D. Install, protect, and maintain erosion and sedimentation controls during earthwork operations.

3.2 HERITAGE RESOURCE PROTECTION:

A. Some areas in or near the improvement sites have potential for archeological/ Heritage concerns. The contractor shall ensure that all workers are aware of this condition.

B. The contractor shall coordinate work schedules for each site with the COR at least 7 days prior to any ground-disturbing activities. The COR will coordinate with the proper FS staff to determine if any heritage monitoring or other restrictions are required for that area while the work is being performed.

C. If any suspected archeological/ heritage items are encountered, follow attached inadvertent discovery plan.

3.3 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing utilities, services, and other construction, for required compaction equipment and for inspections, etc.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and sub-grades.

B. Neat cut existing asphalt pavement in road crossing locations, as indicated.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated slopes, lines, depths, and invert elevations. Maintain 6 inches of working clearance on each side of pipe or conduit or a minimum trench width of 18" wide as per the drawings. Trenching of electrical lines may use a trench width of 6" minimum. If un-excavatable rock is encountered, contact CO for approval of change of alignment or approval of a shallower depth of installation. The Contract Sum will be adjusted for any changes required due to encountering rock, per the Changed Conditions Clause.

B. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course.

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavations under other construction or utility pipe as directed by the CO.

3.7 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.8 STRUCTURE BACKFILL

A. Compact subgrade material by 3 complete passes with a 200 pound rammer type hand tamper prior to placing bedding course. Compact material that is at or near optimum moisture.

B. Place and compact bedding course where indicated. Extend bedding course minimum 24" beyond the extents of the structure on all sides. Compact bedding material by 3 complete passes with a 200 pound rammer type hand tamper prior to placing structure. Compact material that is at or near optimum moisture.

C. Install structures so they are level, plumb and to the elevations shown on the drawings.

D. Place approved backfill and fill in layers not more than 8 inches in loose depth at optimum moisture content. Compact each layer thoroughly with a mechanical tamper. Compact each lift until visible deformation of the layer ceases.

E. Install continuous underground detectable warning tape during backfilling of any feature so required by the Project Specifications or drawings.

F. Place and compact backfill of satisfactory soil to final topsoil subgrade elevation.

G. Place topsoil over disturbed areas, mound slightly to allow for settling. Grade areas to a smooth surface to cross sections, lines, and elevations to match existing ground and conditions before disturbance.

3.9 UTILITY TRENCH BACKFILL

A. **No utility trench backfill shall occur until the COR inspects the utility, as-built drawings have been accurately marked indicating where the utility line is located and all testing has been performed (such as pressure, continuity, proper slope, tracer wire installation and warning tape installation verified, etc.). Contractor's failure to comply with this direction will require the Contractor to re-excavate to completely expose the utility for COR inspection at no cost to the Government.**

B. Place all backfill on subgrades free of mud, frost, snow, or ice.

C. Place and compact bedding course where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

D. Place and compact select backfill to a height of 10 inches over the utility pipe or conduit.

1. Carefully compact select backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Place backfill and fill in layers not more than 8 inches in loose depth at optimum moisture content. Compact each layer thoroughly with a mechanical tamper. Compact each lift until visible deformation of the layer ceases.

F. Install continuous underground detectable warning tape clearly indicating the utility in the trench during backfilling of trench for underground piping. Locate 6" to 12" below finished grade per the drawings, vertically over piping. **Ensure the appropriate tracer wire has been installed with the utility prior to any backfill operations.**

G. Place and compact backfill of satisfactory soil to final topsoil subgrade elevation.

H. Place topsoil over disturbed areas, mound slightly to allow for settling. Grade areas to a smooth surface to cross sections, lines, and elevations to match existing ground and conditions before disturbance.

3.10 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes and matching surrounding grade. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. All excess soil material, construction debris, merchantable timber, concrete, metals and other manufactured components and garbage shall be removed from Government property and disposed of lawfully.

END OF SECTION 312000

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes seeding, fertilizing and mulching all Contractor disturbed soil areas.

1.2 DEFINITIONS

A. Finish Grade: Elevation of finished surface of topsoil.

B. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.3 SUBMITTALS

A. Product Data: Seed and Fertilizer.

B. Planting Schedule: Indicating anticipated planting dates for each type of seeding (can be indicated on the Construction Schedule).

1.4 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

PART 2 - PRODUCTS

2.1 SEED

A. Seed mixture shall have the following composition:

Type	Rate
Quick Cover Oats (Avena sativa)	15lbs./acre
Virginia Wild Rye (Elymus virginicus)	7lbs/acre
Bottlebrush Grass (Elymus hystrix)	3lbs./acre
Red Baneberry (Actaea rubra)	8oz./acre
Columbine (Aquilegia canadensis)	12oz./acre
Big-Leaved Aster (Eurybia macrophylla)	6oz./acre
Sweet Cicely (Osmorhiza claytonii)	6oz./acre

2.2 TOPSOIL

A. Topsoil Surface: Reuse surface soil stockpiled on-site to obtain 3" minimum depth.

2.3 FERTILIZER

A. Fertilizer shall be Scotts Turf Builder, or approved equal applied at 15#/5000 sft.
   1. Composition: 24 percent nitrogen, 25 percent phosphorous, and 4 percent potassium, by weight.

2.4 MULCHES

A. Mulch shall be dry, weed free straw applied at 2 each 50 pound bales per 1000 sft. Lighter bails shall be prorated to obtain 100 pounds of straw per 1000 sft. Straw may also be applied as a blanket with enough stakes to secure it firmly to ground.

PART 3 - EXECUTION

3.1 GROUND PREPARATION

A. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 2 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Government property.
   1. Spread topsoil to a depth of **3 inches** but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if topsoil or subgrade is frozen, muddy, or excessively wet.
   2. Contractor is responsible for determining the amount of existing topsoil that can be salvaged.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

C. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.2 SEEDING AND MULCHING

A. First, apply fertilizer at prescribed rate as shown in Products. Lightly rake into soil prior to seeding. Second - apply seed at prescribed rate as shown in Products. Use two passes perpendicular to each other and lightly rake into soil. Third – lightly water all seeded areas using spray nozzle on hose. Contractor can use water from the new well house at no charge. Fourth – apply straw mulch at prescribed rate as shown in Products. Fluff straw as to not apply in clumps, but a uniform blanket cover of 1"-2" shall be obtained. Fifth – lightly water all mulched areas to prevent excessive wind erosion using spray nozzle on hose. Contractor can use water from the new well house at no charge.

3.3 CLEAN UP

A. Clean any surfaces of the new well house, existing well, monitoring well, etc. that received

unnecessary coverage of fertilizer, seed or mulch.

END OF SECTION 329200