

USDA FOREST SERVICE, DAKOTA PRAIRIE GRASSLANDS  
BUFFALO GAP CAMPGROUND BOOSTER PUMP

SECTION 011250 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Measurement and payment for contract work will be made only for and under those pay items included in the Schedule of Items. All other work, labor, materials, equipment, and incidentals necessary to successfully complete the project will be considered as included in the payment for items shown. This section defines the method of measurements and basis of payment for work items listed in the Schedule of Items.

1.2 DETERMINATION OF QUANTITIES

- A. The following measurements and calculations shall be used to determine contract quantities for payment.
  - 1. For Structures, they shall be measured according to neat lines shown on the drawings or as altered by the CO, in writing, to fit field conditions.
  - 2. For standard manufactured items (such as booster pump, wire, valves and pipe conduits) identified by gauge, weight, section dimensions, and so forth, such identifications shall be considered the nominal weights or dimensions. Unless controlled by tolerances in cited specifications, manufacturer's tolerances shall be accepted.

1.3 UNITS OF MEASUREMENT

- A. Payment shall be by units defined and determined according to U.S. Standard measure and by the following:
  - 1. Each (EA): One complete unit, which may consist of one or more parts.
  - 2. Lump Sum (LS): One complete unit.

1.4 METHOD OF MEASUREMENT

- A. One of the following methods of measurement for determining final payment is designated on the Schedule of Items for each pay item:
  - 1. ACTUAL QUANTITIES (AQ) - These quantities are determined from actual measurements of completed work.
  - 2. LUMP SUM QUANTITIES (LSQ) - These quantities denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job. They shall not be measured.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 011250

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SECTION 011900 - MOBILIZATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This item is intended to compensate the Contractor for operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for payment of premiums for bonds and insurance for the project; and for any other work and operations which must be performed or costs that must be incurred incidental to the initiation of meaningful work at the site and for which payment is not otherwise provided for under the contract.

1.2 MEASUREMENT AND PAYMENT

- A. The measurement shall be lump sum for mobilization. Payment shall be as follows:
  - 1. 50% of the lump sum, not to exceed 5% of the original contract amount, will be paid following completion of 5% of the original contract amount not including mobilization.
  - 2. Payment of the remaining portion of the lump sum, up to 10% of the original contract amount, will be paid following completion of 10% of the original contract amount not including mobilization.
  - 3. Any portion of the lump sum in excess of 10% of the original contract amount will be paid after final acceptance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 011900

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SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals. See Table 013300-1 for a summary of required submittals.
- B. See other specification section within this package for additional requirements on submittal.

1.2 SUBMITTALS

- A. Submit sufficient descriptive literature to demonstrate compliance with these specifications for the pump, motor, pump drive, pressure tank, disconnect and valves.

1.3 MEASUREMENT AND PAYMENT

- A. No separate measurement and/or payment will be made for this section. Payment shall be included with work shown in the schedule of items.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS – (Submittals requiring CO approval)

- A. Product Data: Collect information for each type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's product specifications.
    - b. Manufacturer's installation instructions.
    - c. Manufacturer's catalog cuts.
- B. Contractor's Construction Schedule: The contractor shall submit a Construction Schedule, for approval by CO, in accordance with the contract provisions within 5 days of commencement of work.

2.2 INFORMATIONAL SUBMITTALS – (Submittals NOT requiring CO approval)

- A. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment.

PART 3 - EXECUTION

3.1 GENERAL

- A. Substitutions – Whenever materials, products, and equipment are listed by name or brand in the specifications and/or on the drawings, it is used as a measure of quality, utility, or standard. If the Contractor prefers to use any other brand or manufacturer of same quality, appearance and utility

to that specified, they shall request substitution as provided below, not less than 30 days before the planned installation of the item. The Contracting Officer will approve or disapprove the request for substitution.

- B. Requests for substitutions will only be considered if contractor submits the following:
1. Complete technical data including drawings, complete performance specifications, test data, samples and performance tests of the article proposed for substitution. A statement by the Contractor that the proposed substitution is in full compliance with the contract documents, applicable codes, and laws.
  2. The Contractor shall be responsible for any effect upon related work in the project for any substitution and shall pay any additional costs generated by any substitutions.

3.2 SUBMITTAL SCHEDULE – The following table is a summary of the required submittals for the project - the table is to assist the Contractor and may not be all inclusive – additional submittals may be required by specific specifications:

TABLE 013000-1

Spec. Section	Section Title	Subsection	Required Submittal
013300	Submittal Procedures	2.1D	Construction Schedule
014100	Quality Control	1.3 D	As-Built drawings
221103	Plumbing Appurtenances	1.2A	Product Data
221103	Plumbing Appurtenances	1.2B	Operation and Maintenance Data
221122	Booster Pump	1.2A	Product Data
221122	Booster Pump	1.2C	Maintenance Data

END OF SECTION 013300  
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SECTION 014100 - QUALITY CONTROL

PART 1 - GENERAL

- 1.1 This work shall consist of providing quality control in conformance with the inspection, testing, and product certification requirements of this contract to ensure compliance with the drawings and specifications. The Contractor shall provide all personnel, equipment, tests, and reports necessary to meet the requirements of the contract.
- 1.2 QUALITY CONTROL
- A. The Contractor shall provide and maintain a quality control system that will ensure all services, supplies, and construction work required under this contract conforms to the contract requirements. The Contractor shall perform, or cause to be performed, the sampling, inspection, and testing required to substantiate that all services, supplies, and construction conform to the contract requirements.
- 1.3 SUBMITTALS
- A. As-Built Drawings
- 1.4 MEASUREMENT AND PAYMENT
- A. No separate payment will be made for the work included under this section; rather payment shall be considered to be included in the items of work listed in the Schedule of Items.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

- 3.1 QUALITY CONTROL SYSTEM
- A. General: Perform required testing, inspections, sampling, and similar services in accordance with established industry standards.
- 3.2 AS-BUILT DRAWINGS
- A. The Contractor shall maintain a set of the contract drawings depicting as-built conditions. These drawings shall be maintained in a current condition and shall be available for review. All variations from the original contract drawings shall be indicated in red on the drawings. Upon completion of the contract work, as-built drawings shall be submitted to the Contracting Officer.

END OF SECTION 014100

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SECTION 133402 – PRECAST CONCRETE WELL PIT

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the precast concrete well pit including plumbing appurtenances, ladder, lid and all work within 5 feet of the outside of the box.
- B. Related sections include the following:
  - 1. Section 221103 “Plumbing Appurtenances.”
  - 2. Section 312000 “Earthwork.”

1.2 DEFINITIONS

- A. HDPE: High density polyethylene

1.3 SUBMITTALS

- A. Product data for the following:
  - 1. Well pit and lid materials.

1.4 MEASUREMENT AND PAYMENT

- A. Payment will be lump sum for the well pit and will include the lid, bedding material, floor drain and all other work and incidentals necessary to complete the item as shown on the drawings.

PART 2 - PRODUCTS

2.1 PREFABRICATED CONCRETE WELL PIT AND LID

- A. Prefabricated Concrete Well Pit: High density reinforced concrete.
  - 1. Dimensions: 50” wide X 8’ length X 80” high
- B. Steel Lid: Steel, ASTM A36, hot dip galvanized after fabrication or constructed of Cor-Ten “Weathering Steel” as manufactured by U.S. Steel, or an approved equal.
  - 1. Hinges and Hasps: Hinges and hasp for the pit cover shall be plated steel Stanley Extra Heavy Quality, or approved equal.
  - 2. Base Section: Monolithic base with 6-inch minimum thickness for floor slab and 5-inch minimum thickness for walls and base riser section.
  - 3. Steps shall be a ½-inch steel rod encapsulated with polypropylene, 12-inch step, 10 inches center to center leg distance x 5 ¾-inches projection, designed for installation into precast concrete.

2.2 LOCKING MECHANISM

- A. Provision shall be made to secure the lid to the pit using a padlock. The padlock will be furnished by the Forest Service.
- B. Provision shall be made to secure the lid to the pit using vandal resistant bolts.

## 2.3 PLUMBING APPURTENANCES

- A. According to Section 221103 "Plumbing Appurtenances."

## PART 3 - EXECUTION

### 3.1 WELL PIT INSTALLATION

- A. Excavation and Pit Placement: Excavation shall be made with minimum damage to surrounding vegetation, and adjacent slopes. Place the pit as indicated on the Drawings. Compact the surface on which the pit sets. Install pit with top of riser 4" above ground line.
  - 1. Pipe Clearance: 1/2" to 3" clearance between the pit and pipeline at any point.
- B. Backfilling
  - 1. Remove all debris from the excavation before backfilling.
  - 2. Compaction: Backfill shall be placed in 6-inch maximum thickness layers and compacted by three passes of a mechanical vibrator which has been approved by the Contracting Officer.
  - 3. No rocks larger than 2-inches in diameter shall be placed within 6 inches of inlet and outlet pipes, or pit.
- C. Installation of Plumbing Appurtenances: Install plumbing appurtenances as shown on the Drawings and according to Section 221103 "Plumbing Appurtenances." Support all appurtenances and piping near floor and on brick or concrete piers.

### 3.2 CLEANUP

- A. After backfilling and installation is complete, the general area shall be cleaned by removing all excavated material not used in the backfill and all debris and construction material. Finish-grade the area to blend into the surroundings and create a natural appearance.

END OF SECTION 133402

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SECTION 221103 - PLUMBING APPURTENANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes piping, fittings, valves, and other plumbing devices within well pit. Related sections include the following:
  - 1. Section 133402 "Well Pit."
  - 2. Section 260500 "Common Work Results for Electrical."

1.2 MINIMUM SYSTEM REQUIREMENTS

- A. Unless otherwise noted, the minimum working pressure for piping and specialty valves and devices shall be 125 psig.

1.3 MEASUREMENT AND PAYMENT

- A. There will be no separate measurement or payment for work in this Section. Plumbing Appurtenances is considered incidental to other items of work shown in the Schedule of Items.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All plumbing appurtenances shall be new and unused, of the type, pressure rating or class, and size specified and as shown on the Drawings.

2.2 BALL and CHECK VALVES

- A. Description: Ball valves are Lead free bronze, ¼ turn, 200 psi
- B. Check Valves are Lead free bronze.
- C. As manufactured by Merrill Mfg., or an approved equal.

2.3 UNION

- A. Description: Female type, malleable iron, 150 pound, with ground brass to iron seat.
- B. Model: Manufactured by Crane Company, or an approved equal.

2.4 PRESSURE GAUGE

- A. Description: 2-inch diameter or larger, 0 to100 psi range, liquid filled, with brass movement, steel case and bottom mounting with NPT ¼" threads.

2.5 PIPE AND FITTINGS

- A. PVC: ASTM A53, Schedule 40, threaded ends meeting ASME B1.20.1.
  - 1. Fittings: Threaded, ASTM A 338.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install piping, fittings, valves, gauge and other plumbing devices within well pit or at other locations according to the manufacturer's written instructions and as indicated on the Drawings. Install so water can be drained from each appurtenance for winterization of the system.

END OF SECTION 221103

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SECTION 221122 - BOOSTER PUMP

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Booster pump package

1.2 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.

1.3 SUBMITTALS

- A. Product Data:
  - 1. Booster pump package
  - 2. Pipe and fittings/ connectors.
- B. Maintenance Data: To include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. All work is to be done according to applicable Federal, State, and Local codes.

1.5 MEASUREMENT AND PAYMENT

- A. Payment will be lump sum for Booster Pump and will include the pump, pump drive, suction pipe, 50 amp disconnect, pressure tank, and all other equipment, material, work and incidentals necessary to complete the item.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Products shall be kept free from damage during delivery, storage, and handling. Protect from dirt and moisture during storage.

PART 2 - PRODUCTS

2.1 BOOSTER PUMP

- A. Model: Goulds, eSV Multi Stage centrifugal pump. Model 3SV3, .75 (3/4) horse power, 230/460 volt, 3 phase TEFC electric motor or an approved equal. Pump shall be capable of delivering at a maximum 15 GPM at a constant pressure of 50 psi.
- B. Pump Drive
  - 1. Model: Goulds, Aquavar, Single Pump Drive # SPD200050 or approved equal.
- C. Pressure Tank
  - 1. Model: Well X-Trol, 26 gallon pro series or approved equal.

- D. Suction Pipe
- 1. PVC: NPS 1.25, ASTM D 1785, Schedule 40; threaded joints.
  - a. Labeled with NSF International logo, "NSF-PW."
  - b. Fittings: Threaded, ASTM D2464.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install booster pump and all related components according to the manufacturer's requirements.

#### 3.2 CLEANING

- A. Prior to assembly and installation of the suction pipe assembly, Contractor shall clean the cylinder, pipe and rod of all foreign substance and then disinfect the components with the chlorine solution.

END OF SECTION 221122

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SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Electrical equipment coordination and installation.
  - 2. Grout.
  - 3. Common electrical installation requirements.

1.2 SUBMITTALS

- A. Product Data:
  - 1. For any substitutions for equipment referred to by name in Division 26 specifications or the drawings.

1.3 QUALITY ASSURANCE

- A. The installation shall conform to the 2011 Edition of the National Electrical Code (NFPA 70) and to the requirements specified herein.
- B. The Contractor shall perform all work necessary and required to accomplish the task as detailed on the drawings and discussed in the installation notes. All work shall be done by a state licensed electrician.

1.4 MEASUREMENT AND PAYMENT

- A. The work in this section, including all incidentals in other electrical sections, shall be incidental to the installation of the booster pump package.
  - 1. Electrical Distribution System - Lump Sum including full compensation for all labor, materials, and incidentals necessary to complete the work as shown on the drawings including all wiring, trenching, bedding, backfill, and all other incidentals necessary for a functional system.

PART 2 - PRODUCTS

2.1 PRODUCTS REFERRED TO BY NAME

- A. The materials referred to by trade name, make, or catalog number shall be regarded as establishing a minimum standard of quality; substitutions of equal or greater quality can be made by submitting a data sheet of the proposed substituted item to the Contracting Officer, for approval.

2.2 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

3.2 RACEWAY AND SIMILAR PENETRATIONS (NON-FIRE RATED, NOT SLEEVED)

- A. Concrete Walls: Core-drilled holes.
  - 1. Fill oversized holes with grout to within 1/4-inch (6 mm).

END OF SECTION 260500  
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SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment plus the following special applications:
  - 1. Underground distribution grounding.

1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

1.3 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work specified in this section. All work will be included in other items listed in the Schedule of Items.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
  - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rod: Copper-clad steel; 3/4 inch (19 mm) in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

- B. Underground Grounding Conductors
  - 1. Bury at least 24 inches below grade.
- C. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors, except as otherwise indicated.
  - 3. Connections to Ground Rods: Bolted connectors.

### 3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Well Pit: Install a driven ground rod through well pit floor, close to wall, and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before pit is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into pit through a waterproof sleeve in pit wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, non-shrink grout.
- C. Grounding Connections to Well Pit Components: Bond exposed-metal parts such as inserts, ladders, and cable shields within the pit, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to pit walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

### 3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits. Size per NEC 250.122 minimum.

### 3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

### 3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Test completed grounding system at service disconnect enclosure grounding terminal and at individual ground rods. Make tests at ground rods before any conductors are connected.
    - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method according to IEEE 81.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 260526

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SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. LFNC: Liquidtight flexible nonmetallic conduit.
- G. RNC: Rigid nonmetallic conduit.

1.3 QUALITY ASSURANCE

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

1.4 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work specified in this section. All work will be included in other items listed in the Schedule of Items.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. IMC: ANSI C80.6.
- C. PVC-Coated Steel Conduit: PVC-coated IMC.
  - 1. Comply with NEMA RN 1.
  - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- D. EMT: ANSI C80.3.
- E. FMC: Zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket.
- G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable:

NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Fittings for EMT: Steel or die-cast, set-screw or compression type.
2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

## 2.2 NONMETALLIC CONDUIT AND TUBING

- A. ENT: NEMA TC 13.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- C. LFNC: UL 1660.
- D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- E. Fittings for LFNC: UL 514B.

## 2.3 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC.

## 2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.
- C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
- F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
  1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  2. Nonmetallic Enclosures: Plastic.

## 2.5 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
  1. Underground Conduit: PVC coated or wrapped rigid steel conduit or IMC is required for the first 5-ft (1.5-m) beyond grade penetration at which point RNC, Type EPC-40 PVC, direct buried may be substituted. 24-inch (600-mm) minimum burial depth unless otherwise indicated on the drawings.
- B. Minimum Raceway Size: **3/4-inch (21-mm)** trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
  1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
  2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

## 2.6 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements in this article are stricter.
- B. Complete raceway installation before starting conductor installation.
- C. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound.
- D. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for motors.
  - 1. Use LFMC in damp or wet locations subject to severe physical damage.
  - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

## 2.7 INSTALLATION OF UNDERGROUND CONDUCTOR

- A. Direct-Buried Conductor:
  - 1. Excavate trench bottom to provide firm and uniform support for conductor.
  - 2. After installing conductor, backfill and compact. Start at tie-in point, and work toward end of conductor run, leaving conductor at end of run free to move with expansion and contraction as temperature changes during this process. After placing backfill to within 12 inches (300 mm) of finished grade, make final conductor connection at end of run and complete backfilling with normal compaction.
  - 3. Underground-Line Warning Tape: Install according to specification 260553-Identification for Electrical Systems.

## 2.8 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

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SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Identification for conductors and control cable.
  - 2. Underground-line warning tape.

1.2 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with 29 CFR 1910.145.

1.3 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

1.4 MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work specified in this section. All work will be included in other items listed in the Schedule of Items.

PART 2 - PRODUCTS

2.1 UNDERGROUND-LINE WARNING TAPE

- A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.
  - 1. Not less than 3 inches (75 mm) wide by 4 mils (0.102 mm) thick.
  - 2. Compounded for permanent direct-burial service.
  - 3. Printed legend shall indicate type of underground line.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Locations of Underground Lines: Identify with underground-line warning tape for power.

3.2 INSTALLATION

- A. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade.

END OF SECTION 260553

June 2014

USDA FOREST SERVICE, DAKOTA PRAIRIE GRASSLANDS  
BUFFALO GAP CAMPGROUND BOOSTER PUMP

SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Excavating and backfilling trenches for buried electrical utilities and pits for buried well pit.

1.2 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
- B. Borrow or Select Borrow: Satisfactory soil material used for embankment, backfill, or fill construction that is excavated from designated locations at the site.
- C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  - 1. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction of the Contracting Officer. Unauthorized excavation, as well as remedial work directed by Contracting Officer, shall be without additional compensation.
  - 2. Unclassified Excavation: Excavation to subgrade elevation and to lines and dimensions indicated regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
- D. Structures: Pit, foundations, slabs, tanks, 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, aggregate base, drainage fill, initial or subsequent backfill, or topsoil materials.
- F. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building.

1.3 MEASUREMENT AND PAYMENT

- A. There will be no separate measurement or payment for work in this Section. Payment will be included in the contract unit price as shown on the Schedule of Items.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIALS, GENERAL

- A. Excavated material will be processed and used for backfill. If excavated material is not sufficient to meet requirements, Contractor shall borrow needed material from site.
- B. Backfill and Fill: Satisfactory soil materials.
  - 1. Remove rocks over 8 inches in maximum dimension, ice or frozen earth, muck, debris, and earth with high void content.
  - 2. Remove rocks over 4 inches in maximum dimension for backfill placed within 12 inches of foundation.

## 2.2 BACKFILL MATERIALS, UTILITY TRENCHES

- A. Pipe Zone Material
  - 1. Backfill material for electrical cable and all types of pipe shall consist of soil, sand, or fine granular material free of ¾ inch or larger stones, and free of organic material.
  - 2. Frozen material will not be allowed.
  - 3. Backfill material shall be trench-excavated material.
- B. Above-Pipe-Zone Material
  - 1. Backfill material shall be free from brush, perishable material, trash, rocks, or boulders larger than 6 inches in greatest dimension, or frozen material.
  - 2. Backfill material shall be trench-excavated material.

## 2.3 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 3 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
  - 1. Red: Electric.

## PART 3 - EXECUTION

### 3.1 LOCATION, ALIGNMENT AND GRADE

- A. The location of all structures shall be staked out and grades established by the Contractor. Locations shall be approved by the Contracting Officer before excavation is started.

### 3.2 PREPARATION

- A. Protect structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

### 3.3 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
  - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

### 3.4 EXPLOSIVES

- A. Do not use explosives.

### 3.5 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Topsoil shall be removed from the area to be excavated and from the area where excavated material will be piled, prior to excavation. Topsoil shall be stored as specified below.
- C. Maintain the excavations to guard against and prevent injury to employees and the public. Excavations left open at the end of the working day shall be fenced to protect the public.

### 3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Classification of Excavation Material - Excavation will be unclassified as to materials and shall include all materials which are encountered in the required excavation.
- B. Unsatisfactory Material - During excavation, if material which does not meet the backfill requirements of Article 2 (such as structurally unstable material, solid rock, over-sized rock, angular or sharp rock), as determined by the Contracting Officer, is encountered at the grade line for the cable, the unsatisfactory material shall be removed to a minimum depth of 6 inches below the utility line. Trenching shall be performed by any acceptable method as permitted by the Contract General Provisions. Trenching by Machine or by Hand - The use of trench digging machines will be permitted except in places where machines may cause damage to existing structures, utilities in which case hand methods shall be employed. Machines shall be of the proper size to operate within the specified working limits. In areas being excavated by machine, any hand digging necessary to locate or cross utilities will not be paid for as hand trenching.
- C. Depth - Trench excavation shall provide a uniform (for all utilities) or gently changing flow line.
- D. Alignment and Grade - The location of the well pit will be staked out before excavation is started.

### 3.7 APPROVAL OF SUBGRADE

- A. Notify Contracting Officer when excavations have reached required subgrade.
- B. If Contracting Officer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Contracting Officer.

### 3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Contracting Officer.
  - 1. Fill unauthorized excavations under other construction as directed by Contracting Officer.

### 3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile, borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water.
  - 1. Stockpile soil materials away from edge of excavations.

- B. Topsoil shall be kept separate from trench-excavated material by either stockpiling or by windrowing on the opposite side of the trench from which the trench excavated material will be placed. Topsoil will be reused after backfilling on those areas from which it came.

### 3.10 UTILITY TRENCH BACKFILL

- A. Backfilling will be permitted only after all inspections of cable have been performed and tests completed and the work to be covered has been approved by the Contracting Officer. Backfill which has been improperly placed and/or compacted shall be corrected, if directed by the Contracting Officer, by reopening the trench to the depth required to obtain proper compaction. Then the trench shall be refilled and compacted according to specifications.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.
- C. Warning Tape and Tracer Wire:
  - 1. Warning Tape: Install directly above utilities.
- D. Excessive settlement or other evidence of improper backfill shall be corrected by reopening the trench or excavation to the depth required for proper compaction and then shall be refilled and satisfactorily compacted.
- E. The correction and retesting of unacceptable work shall be paid by the Contractor at no expense to the Government.

### 3.11 SURFACE FINISH

- A. All surfaces shall be restored to the original ground line and left in a uniform and neat condition. Any stockpiled topsoil shall be smoothly distributed over disturbed areas.

END OF SECTION 312000

June 2014