Section C - Description/Specifications/Statement of Work

GENERAL SPECIFICATIONS
CLIFFROSE TRAIL HEAD

100% Submittal – 08/13/24

1.1 SCOPE OF CONTRACT

A. The Cliffrose Trail Head is the start of the Spring Hollow Bike Trail System. This project consists of creating parking space as well as other facilities for guests to use. The work associated with this project includes:

1. Base Bid:

a. Parking Lot:

1) Removal and disposal of existing material
2) Placing road aggregate

b. Facilities:

1) Placing path aggregate
2) Furnishing and installing site sign
3) Furnishing and installing kiosk
4) Furnishing and installing family unit pads including furniture
5) Furnishing and installing fencing
6) Furnishing and installing bike repair station

B. Optional work that may be awarded includes all work described above associated with:

1. Option 1:

a. Facilities:

1) Furnishing and installing shade structure

2. Option 2:

a. Facilities:

1) Furnishing and installing shade structure

3. Option 3:

a. Facilities:

1) Furnishing and installing shade structure

C. Quantities associated with these options are identified in the Schedule of Items.

1.2 PROJECT LOCATION

A. The project is located on the Dixie National Forest in the Pine Valley Ranger District, Washington County, Utah. It is located approximately 12 miles from Washington City Utah. The project may be accessed from road 1320 E (Cottonwood Springs Rd) and Forest Road 901.

1.3 SITE INFORMATION AND LIMITATIONS

A. The following site conditions are considered incidental to the contract and the contractor will not be paid directly for any of the following items:

1. Construction sites will be closed to the public during construction. The Forest Service will issue a closure order to the public. The Contractor will be responsible for signing and limiting public access.
2. Contractor will provide all materials and labor necessary to protect streams, wet or dry, during construction activities. The Contractor will be required to submit a stream protection plan and receive approval from the COR, in writing, prior to the beginning of construction.
3. All construction equipment shall be pressure washed before entering National Forest System lands. The removal of mud and debris from treads, tracks and undercarriage, with emphasis on axles, frame, cross-members, motor mounts, and underneath steps, running boards, and front bumper/brushguard assemblies will be required. The purpose is to reduce or eliminate the transportation of noxious weeds, which is required by Federal and State regulations.
4. The Contractor shall provide temporary toilet facilities (porta-potty) at the site during all construction work.

1.4 TRAFFIC CONTROL AND CONSTRUCTION SIGNING

A. No work that endangers, interferes, or conflicts with traffic or access to work sites shall be performed until a plan for satisfactory warning and handling of traffic has been submitted by the contractor and approved by the COR and Utah Department of Transportation. Construction signing for traffic control shall conform to the Manual of Uniform Traffic Control Devices (MUTCD). All traffic control signs will be placed in areas adequate for a truck pulling a fifth wheel trailer to be turned around. Contractor shall not be paid directly for this item, rather it will be considered incidental to other items of work listed in the Schedule of Items.

1.5 WORK CAMPS, STAGING AND STORAGE AREAS

A. Areas for staging operations and storage of materials shall be approved by the CO. The Contractor must request in writing for approval from the CO to stage work trailers on site.

B. No overnight camping will be allowed on site.

1.6 INSPECTION OF WORKSITE

A. The contractor acknowledges they have taken the necessary steps to ascertain the nature and location of work, and have investigated and satisfied themselves as to the general and local conditions that can affect the work or its cost. Any failure of the contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from the responsibility of estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expenses to the government.

1.7 START DATE

A. Winter/Spring 2025

1.8 CONTRACT TIME

A. Base Bid: 120 Calendar Days

B. Option #1: 20 Calendar Days

C. Option #2: 20 Calendar Days

D. Option #3: 20 Calendar Days

1.9 SPECIFICATIONS

A. The following specifications are attached. Some sections in the schedule of items refer to other sections not listed and are subsidiary to, or are included in payment for other pay items in this contract. These items are considered incidental and no additional compensation will be made.

SECTION 011250 - MEASUREMENT AND PAYMENT
SECTION 011900 - MOBILIZATION
SECTION 013300 - SUBMITTAL PROCEDURES
SECTION 014100 - QUALITY CONTROL
SECTION 022450 - GRADING
SECTION 023701 - SEDIMENT AND EROSION CONTROL MEASURES
SECTION 024100 - WASTE MATERIAL DISPOSAL
SECTION 033000 - CAST-IN-PLACE CONCRETE
SECTION 047000 - MANUFACTURED MASONRY FOR SIGN BASES
SECTION 053000 - SHEET METAL ROOFING
SECTION 062030 - CARPENTRY (BULLETIN BOARDS)
SECTION 099100 - PAINTING
SECTION 101110 - BULLETIN BOARD
SECTION 101400 - SIGNS
SECTION 101420 - SITE IDENTIFICATION SIGN
SECTION 129300 - SITE FURNISHING
SECTION 136000 - PRE-MANUFACTURED PICNIC SHELTER
SECTION 311000 - CLEARING AND GRUBBING
SECTION 312000 - EARTHWORK
SECTION 312100 - PROJECT SITE PREPARATION AND GRADING

SECTION 312225 - EXCAVATION & EMBANKMENT
SECTION 321204 - CRUSHED AGGREGATE BASE OR SURFACE COURSE
SECTION 322622 - PRECAST CONCRETE CURB STOPS
SECTION 323151 - FENCE

END OF SECTION C
August 2024

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.

B. When more than one class, size, type, thickness, etc. is specified in the Schedule of Items for any pay item, suffixes will be added to the item number to differentiate between the pay items.

1.2 DETERMINATION OF QUANTITIES

A. The following measurements and calculations shall be used to determine contract quantities for payment.

1. For individual construction items, longitudinal and lateral measurements for area computations shall be made horizontally or corrected to horizontal measurement unless otherwise specified. Measurements for geotextiles, netting and erosion control blankets shall be along slope lines.
2. For excavation or embankment volumes, the average end area method shall be used to compute volumes. However, if in the judgment of the Contracting Officer (CO), the average end area method is impractical, measurement shall be made by volume in hauling vehicles or by other three-dimensional methods.
3. 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.
4. For items that are measured by the linear foot, such as pipe culverts, fencing, guardrail, piping, utilities, and underdrains, measurements shall be made parallel to the base or foundation upon which the structures are placed.
5. For aggregates weighed for payment, the tonnage shall not be adjusted for moisture content, unless otherwise provided for.
6. For standard manufactured items (such as fence, wire, plates, rolled shapes, 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.

B. Earthwork Tolerances - Adjustments of horizontal or vertical alignment, within the tolerances specified in this contract, or shifts of balance points up to 100 feet shall be made by the contractor as necessary to produce the designed sections and to balance earthwork. Such adjustments shall not be considered as "Changes."

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. Acre: Make longitudinal and transverse measurements for area computations horizontally.
2. 50lb Bag: Measurement will be for the actual number of 50lb bags of standard bentonite grout.
3. 94lb Bag: Measurement will be for the actual number of 94lb bags of standard cement or grout.
4. Cubic Yard (CY): A measurement computed by one of the following methods:

    a. Excavation, Embankment, or Borrow. The measurement computed by the average end area method from measurements made longitudinally along a centerline or reference line.
    b. Material in Place or Stockpile. The measurement computed using the dimensions of the in-place material.
    c. Material in the Delivery Vehicle. The measurement computed using measurements of material in the hauling vehicles at the point of delivery. Vehicles shall be loaded to at least their water level capacity. Leveling of the loads may be required when vehicles arrive at the delivery point.

5. Each (EA): One complete unit, which may consist of one or more parts.
6. Gallons (GAL): The quantity shall be measured by any of the following methods:

    a. Measured volume in container.
    b. Metered volume by approved metering system.
    c. Commercially package volume.

7. Hour (HR): Measurement will be for the actual number of hours (or fraction thereof) ordered by the Contracting Officer and performed by the contractor.
8. Linear Foot (LF): Measurement of work along its length from point-to-point; parallel to the base or foundation. Do not measure overlaps.
9. Lump Sum (LS): One complete unit.
10. Mile: Measured horizontally along the centerline of each roadway, approach, or ramp.
11. Pound (LB): For sacked or packaged material, measurement will be the net weight as packed by the manufacturer.
12. Square Foot (SF): Measured on a plane parallel to the surface being measured.
13. Square Yard (SY): Measured on a plane parallel to the surface being measured.
14. Ton: Measured as a short ton consisting of 2,000 pounds.

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. DESIGNED QUANTITIES (DQ) - These quantities denote the final number or units to be paid for under the terms of the contract. They are based upon the original design data available prior to advertising the project. Original design data include the preliminary survey information, design assumptions, calculations, drawings, and the presentation in the contract. Changes in the number of units shown in the Schedule of Items may be authorized under any of the following conditions:

    a. As a result of changes in the work authorized by the CO.
    b. As a result of the CO determining that errors exist in the original design that cause a pay item quantity to change by 15 percent or more.
    c. As a result of the Contractor submitting to the CO a written request showing evidence of errors in the original design that cause a pay item quantity to change by 15 percent or more. The evidence must be verifiable and consist of calculations, drawings, or other data that show how the designed quantity is believed to be in error.

3. 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.
4. STAKED QUANTITIES (SQ) - These quantities are determined from staked measurements prior to construction.
5. VEHICLE QUANTITIES (VQ) - These quantities are measured or weighed in hauling vehicles.

1.5 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 for work listed in the Schedule of Items.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 011250
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

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 incident 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. Bond premiums will be reimbursed after receipt of the evidence of payment.
2. 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 and bond premiums.
3. 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 and bond premiums.
4. Any portion of the lump sum in excess of 10% of the original contract amount will be paid after final acceptance.
5. Progress payments for mobilization and preparatory work shall be subject to retainage.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 011900
August 2024

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 SUBMITTAL PROCEDURES

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

1. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

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

B. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on CO's receipt of submittal.

1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. CO will advise Contractor when a submittal being processed must be delayed for coordination.
2. If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Allow 14 days for processing each re-submittal.
4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

C. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by CO.
3. Include the following information on label for processing and recording action taken:

a. Project name.
b. Date.
c. Name and address of Contractor.
d. Name of manufacturer.
e. Unique identifier, including revision number.
f. Number and title of appropriate Specification Section.
g. Drawing number and detail references, as appropriate.
h. If more than one item is shown on submittal sheet, identify item.

D. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

E. Additional Copies: Unless additional copies are required for final submittal, and unless CO observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

F. Use for Construction: Use only final submittals with mark indicating action taken by CO in connection with construction.

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. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. CO will return two copies. Mark up and retain one returned copy as a Project Record Document.

B. Product Data: Collect information into a single submittal for each element of construction and 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 written recommendations.
b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Manufacturer's catalog cuts.
e. Wiring diagrams showing factory-installed wiring.
f. Compliance with recognized trade association standards.

g. Compliance with recognized testing agency standards.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

D. Contractor's Construction Schedule: The contractor shall submit a Construction Schedule, for approval by CO, in accordance with the contract provisions within 5 day of commencement of work.

E. Samples: Prepare physical units of materials or products, including the following:

1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

2.2 INFORMATIONAL SUBMITTALS – (Submittals NOT requiring CO approval)

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. CO will not return copies.
2. Certificates and Certifications: Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements in Section 014100 "Quality Control."

B. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

C. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

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

E. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to CO.

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

C. CO will not review submittals that do not bear Contractor's approval stamp and will return them without action.

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

E. 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, he 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.

F. 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. Submit additional information if required by Contracting Officer. All items in the above information shall be circled, tagged, or marked in some way to indicate all deviations or differences which the proposed item differs from the originally specified item.
2. Similar data as above for item originally specified. All items shall be marked to identify where/how the proposed substitution will differ.
3. A statement by the Contractor that the proposed substitution is in full compliance with the contract documents, applicable codes, and laws.
4. 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 – Submittals shall be made as required by and called for in the drawings and specifications. 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
C	General Specifications	1.3A	Stream Protection Plan
C	General Specifications	1.4A	Traffic Control Plan
013300	Submittal Procedures	2.1D	Construction Schedule
014100	Quality Control	1.3 A	Contractor quality control plan
014100	Quality Control	1.3 B	Permits, Licenses, and Certificates
014100	Quality Control	1.3 C	Test and inspection reports
014100	Quality Control	1.3 D	As-Built drawings
023701	Sediment & Erosion Control Measures	1.2A	Sediment & Erosion Control Plan
033000	Cast-in-Place Concrete	1.3A	Product Data
033000	Cast-in-Place Concrete	1.3B	Design Mixtures
033000	Cast-in-Place Concrete	1.3C	Shop Drawings
033000	Cast-in-Place Concrete	1.3D	Samples
047000	Manufactured Masonry for Sign Bases	1.4A	Product Data, Samples, and Quality Assurance
053000	Sheet Metal Roofing	1.3A	Color Selection Samples
10400	Signs	1.2A	Sign List
312000	Earthwork	1.3A	Bedding and Backfill Certification
312225	Excavation and Embankment	1.3A	Density Test Results
312225	Excavation and Embankment	1.3C	Blasting Plan
312225	Excavation and Embankment	1.3D	Permits and Licenses
321204	Crushed Aggregate Base or Surface Course	1.2A	Aggregate Base – Source, Gradation, Material Properties
321204	Crushed Aggregate Base or Surface Course	1.2B	Compaction Test Results and Proctor

END OF SECTION 013300
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

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.

B. Special Tests and Inspections: Contractor will engage a testing agency to conduct required special tests and inspections. The Contractor shall authorize the testing agency to perform the required testing and inspections on the work completed. The authority shall include:

1. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
2. Testing agency will re-test and re-inspect corrected work.

C. Retesting/Reinspecting: Contractor shall provide quality-control services for retesting and reinspection for replaced construction work or for work that failed to comply with the requirements under the contract.

1.3 SUBMITTALS

A. Contractor Quality Control Plan

B. Permits, Licenses, and Certificates

C. Test and Inspection Reports

D. 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 per direction specified in the contract drawings and specifications and in accordance with established industry standards.

3.2 CONTRACTOR QUALITY CONTROL PLAN

A. At the time of the preconstruction conference, the Contractor shall submit for approval a written Contractor Quality Control Plan.

1. If the plan requires any revisions or corrections, the Contractor shall resubmit the plan within 10 days.
2. The Government reserves the right to require changes in the plan during the contract period as necessary.
3. No change in the approved plan may be made without written concurrence by the Contracting Officer.
4. At a minimum, the plan shall include the following:

a. A list of personnel responsible for quality control and assigned duties. Include each person's qualifications.
b. A copy of a letter of direction to the Contractor's Quality Control Supervisor outlining assigned duties.
c. Names, qualifications, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms.
d. Methods of performing, documenting, and enforcing quality control of all work.
e. Methods of monitoring and controlling environmental pollution and contamination as required by all applicable regulations and laws.

3.3 TEST AND INSPECTION REPORTS

A. Submit three copies of complete test results no later than three calendar days after the test was performed.

B. Submit failing test results and proposed remedial actions within four hours of noted deficiency.

C. Testing and Inspection Reports shall include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples, tests, or inspections.
5. Names of individuals performing tests and inspections.

6. Reference Specification Section(s).
7. Complete test or inspection data.
8. Test and inspection results and an interpretation of test results.
9. Ambient conditions at time sample was taken, tested, or inspected.
10. Comments or professional opinion on whether tested or inspected work complies with the Contract Document requirements.
11. Name and signature of laboratory inspector.
12. Recommendations on retesting and reinspecting.

3.4 PERMITS, LICENSES, AND CERTIFICATES

A. For Contracting Officer'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 relevant to the on performance of the work.

3.5 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.

3.6 SAMPLING, TESTING, AND CERTIFICATION REQUIREMENTS

A. Sampling, testing, and Certification requirements and frequency for specific items shall be as specified in the drawings and specification. The following table is a summary of the required sampling, testing, and certification for the project - the table is to assist the Contractor, but may not be all inclusive – additional submittals may be required by specific specification section:

TABLE 014100-1

Item	Subsection	Certification or Test Required	Frequency
033000	2.13	Mixing and Delivery	Each Truck
033000	3.13	Concrete – Slump, Air, Temperature	1 composite per truck load delivered
033000	3.13	Concrete - Compression Test Specimens	at 7 days and 28 days (see spec)
312000	3.14I	Tracer Wire Conductivity Test	Until Passing
312000	3.17A	Compaction Test – Backfill/Fills	One per Tank, Utility Building or Utility Box
312000	3.20D	Compaction Test – Exterior Concrete Slabs	1 per slab

TABLE 014100-1			
Item	Subsection	Certification or Test Required	Frequency
312225	3.12B	Moisture-Density Relationship	One Test for Each Soil Type Encountered
312225	3.12B	Compaction-Road Embankment (Method 4)	One test every 300 sq. yd. Of embankment per lift
312225	3.12B	Compaction-Subgrade	One test every 1000 sq. yd. of subgrade
321204	3.4A	Compaction Tests – Road Base and Surface Course	One test for every 300 sq. yd. of aggregate
321204	3.4A	Compaction Tests – Aggregate Base for Concrete Slabs	One test for each area
321204	3.4A	Compaction Tests – Aggregate Base for Concrete Slabs	One test for each prefabricated building pad

END OF SECTION 014100
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 022450 - GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes topsoil stripping, rock removal, cutting, filling, compaction and rough grading.

1.2 PROTECTION

A. During grading operations, and before stopping work for the day, blade unfinished areas being graded to provide a well-drained surface so water cannot collect in pools and puddles. Protect newly graded areas from traffic and erosion.

1.3 REFERENCES

A. Standard Moisture Density Test, AASHTO T-99, Method C or D, or ASTM D698, Method C or D.

1.4 MEASUREMENT AND PAYMENT

A. There will be no separate measurement for work in this section. Payment will be included at the contract unit price for work included elsewhere.

PART 2 - PRODUCTS

2.1 FILLS AND EMBANKMENTS

A. Use excavated material, including rock up to 12 inches, in largest dimension. Material removed in stripping shall not be used. Material used must be clean and free from vegetation, pieces of timber, muck, and other foreign material.

1. Rocks over 6 inches in largest dimension not permitted in the top 2 feet of fill. Rocks over 4 inches in largest dimension not permitted in the top 6 inches of fill.
2. No frozen material permitted in the fill.

2.2 TOPSOIL

A. Use material stripped from the cleared area. Remove large roots and stones over 2 inches in maximum dimension.

PART 3 - EXECUTION

3.1 TOPSOIL STRIPPING

A. Strip to a depth of 5 inches within the grading and excavation limits.

B. Remove without contamination with subsoil and stockpile on the site as directed by the Contracting Officer (CO).

3.2 CUTS, FILLS, AND EMBANKMENTS

A. Locations, lines, and grades as indicated on the drawings.

B. Cohesive soils that have become hard or lumpy, or that have been piled and have become dry, shall be broken up and properly conditioned for moisture content for moisture content immediately before use in filling.

C. Surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the compaction specified.

D. Place material in successive layers of 8 to 12 inches in loose depth for the full cross-section and compact to the following percentages of maximum density determined by AASHTO T-99.

1. Under roadways and parking areas: 90%.
2. All other areas: 85%.

3.3 ROUGH GRADING

A. Uniformly smooth grade excavated and filled sections and adjacent transition areas.

B. Grade to 4 inches below finish grade elevation for all areas to be finished with top soil.

C. Grade finished surface for other areas reasonably smooth, compacted, and free from irregular surface changes.

1. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations.
2. The finished surface on which roadway or parking areas are to be placed shall not vary more than 0.05 foot from the established grade. Elevation shall provide for 4 inch compacted aggregate surfacing.
3. Other surfaces shall not vary more than 0.10 foot from the established grade.
4. Slope grade away from structures minimum 6 inches in 10 feet for a distance of 10 feet minimum.

END OF SECTION 022450
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 023701 - SEDIMENT AND EROSION CONTROL MEASURES

PART 1 - GENERAL

1.1 The work under this section consists of furnishing all necessary labor, equipment, materials, and performing all operations in connection with construction sediment and control measures.

A. General

1. All erosion and sediment control measures are to be placed prior to any disturbance caused by grading and or excavation and shall conform to the requirements of the appropriate regulatory agency for the State.
2. The Contractor shall be solely responsible for ensuring that erosion and sediment control measures are implemented and maintained at the site.
3. Soil disturbing activities include but are not limited to: Clearing and grubbing, excavation for utilities and foundations, roadway and parking lot construction, construction or modification of site drainage, grading, and preparation for final seeding.

1.2 SUBMITTALS

A. The Contractor shall be required to submit a sediment and erosion control plan in accordance with this specification for approval by the Contracting Officer 2 weeks prior to start of work.

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 SYNTHETIC FILTER FABRIC FOR SILT FENCES.

A. Pervious sheet of polypropylene, nylon, or polyethylene fabric conforming to the following physical and hydraulic characteristics:

Physical Properties (Min.)	**Requirement**	**Test Method**
Grab Tensile, lbs.	W120/F100	ASTM-D-4632
Grab Elongation, %	15	ASTM-D-4632
Mullen Burst, psi	275	ASTM-D-3786
Puncture, lbs.	65	ASTM-D-4833
Trapezoidal Tear, lbs.	50	ASTM-D-4533
UV Resistance, %	80	ASTM-D-4355

AOS, US Sieve #	30/40	ASTM-D-4751
Permittivity gal/min-sq. ft.	90	ASTM-D-4491

B. Filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 F.

C. Support Posts: 4 foot - 2 x 2 wood.

2.2 STRAW BALES

A. Oat or wheat straw, free from weeds, viable weed seeds, foreign matter detrimental to plant life, and dry.

1. Grass hay bales are not acceptable.
2. In order to prevent deterioration of the bindings, all bales shall be either wire-bound or string-tied so that bindings are oriented around the sides rather than along the tops and bottoms of the bales.

2.3 STRAW WATTLES OR ROLLS

A. Furnish straw wattles or rolls that are manufactured from weed free straw and wrapped in a tubular photodegradable plastic netting made from 85% high density polyethylene, 14% ethyl vinyl acetate and 1% color for UV inhibition. Conform to the following:

1. Diameter 9 inches min.
2. Netting strand thickness 0.030 inches
3. Netting knot thickness 0.055 inches
4. Mass of netting 0.315 to 0.385 ounces per foot

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Install straw bales at local drainage ways to prevent silt intrusion upon adjacent drainage courses. Remove straw bales following establishment of vegetation cover and utilize as mulch at swales or on steep slopes.

B. Prior to construction, install silt fence along the downhill construction limits to prevent silt intrusion upon adjacent land.

C. Install sediment and erosion control measures on the down slope toe of all top soil stock piles.

D. Maintain and remove all erosion controls as specified.

E. Temporary seeding shall be placed on exposed surfaces that will not be brought to final grading or permanent cover treatment within 30 days of the exposure to reduce erosion and sedimentation by stabilizing exposed soils. Seeded areas shall be checked regularly for bare spots, washouts, and healthy growth to assure that a good stand of grass is

being maintained. Reseed areas that fail to establish vegetation cover as soon as such areas are identified.

3.2 DUST CONTROL

A. In areas subject to surface and air movement of dust, where on-site or off-site damage is likely to occur, one or more of the following preventive measures shall be taken for dust control:

1. Minimize the period of soil exposure through the use of temporary ground cover and other temporary stabilization practices.
2. Sprinkle the site with water until surface is wet. Repeat as needed.

3.3 SILT FENCE

A. Silt fences are appropriate for the following general locations:

1. Immediately upstream of the point(s) of runoff discharge from a site before flow becomes concentrated. Below disturbed areas where runoff may occur in the form of overland flow.
2. Along the down slope toe of all top soil stock piles.

B. Materials.

1. Utilize standard strength synthetic filter fabric for sediment barriers. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6 inch overlap, and securely sealed.
2. The standard strength filter fabric shall be stapled or wired to the fence and 6 inches of the fabric shall be extended into the ground. Filter fabric shall not be stapled to existing trees.
3. Support posts shall be spaced at a maximum 6 feet and driven securely into the ground a minimum of 24 inches.
4. Filter fabric shall be buried a minimum of 12 inches.
5. The height of a silt fence shall not exceed 36 inches. Higher fences may impound volumes of water sufficient to cause failure of the structure.

C. Maintenance.

1. Silt fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.
2. Silt fences shall be inspected for depth of sediment, tears, and to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground. Any deficiencies shall be repaired immediately.
3. Should the fabric on a silt fence of filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

4. Sediment deposits should be removed after each storm event and/or when deposits reach approximately 1/3 the height of the barrier or when the sediments limit or prevent the flow of water through the fabric hydraulic.
5. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared, and seeded.

3.4 STRAW BALE EROSION CONTROL FENCE

A. Straw bale erosion control fences are appropriate for the following general locations:

1. Sheet flow applications: Straw bales shall be placed in a single row, lengthwise on the contour with ends of adjacent bales tightly abutting one another.
2. Channel flow applications: Straw bales shall be placed in a single row, lengthwise and oriented perpendicular to the direction of flow with ends of adjacent bales tightly abutting one another. The barrier shall be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment laden runoff will flow either through or over the barrier but not around it.

B. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the barrier. Backfill shall conform to the ground level of the downhill side and shall be built up to 4 inches against the uphill side of the barrier.

C. Each bale shall be securely anchored by at least 2 stakes or rebar driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or rebar shall be driven a minimum of 12 inches into the ground or deep enough into the ground to securely anchor the bales, whichever is greater.

D. The gaps between bales shall be chinked (filled by wedging with straw to prevent water from escaping between the bales). Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency.

3.5 STRAW WATTLE OR ROLL

A. Straw wattles shall be installed in accordance to manufacturer’s installation guidelines.

B. At a minimum:

1. The wattle shall be entrenched and backfilled. A trench shall be excavated the width of the straw waddle and the length of the proposed barrier to a depth of 2-3 inches.
2. Each wattle shall be securely anchored by at least one 18-24 inch stake every 3-4 feet and with a stake on each end. Stakes shall be driven perpendicular to slope face through the middle of the wattle until 2-3 inches remains exposed above the waddle.

3. After the wattles are staked, compact excavated soil against the uphill side of the barrier.
4. Adjacent wattles should tightly abut.

3.6 MAINTENANCE

A. Inspection shall be frequent and repair or replacement shall be made promptly as needed. Straw bale carriers shall be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

END OF SECTION 023701
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAIL HEAD

SECTION 024100 - WASTE MATERIAL DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the loading, handling, hauling, and placing of excess excavation material, unsuitable excavation material, clearing and grubbing debris, and construction and demolition debris.

1.2 MEASUREMENT AND PAYMENT

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

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 WASTE MATERIAL TO BE HAULED TO A DISPOSAL AREA

A. All excavated material not used in the construction of embankments or backfilling of trenches, or other excess material resulting from the excavation and embankment operation shall be hauled to a disposal area.

B. All unsuitable excavated material and oversize boulders shall be hauled to a disposal area.

1. Oversized boulders may be broken into sizes small enough to incorporate into the embankment according to Specification 312225.

C. All stumps, slash and other clearing and grubbing debris shall be hauled to a disposal area**.**

D. Disposal Area: All waste material above shall be hauled to the disposal area on Government property as designated by the Contracting Officer.

1. Waste material shall be piled and compacted to form a dense layer.
2. The size and shape of the piled waste material shall be designated by the Contracting Officer.
3. The piled material shall be covered with soil to a uniform depth of six inches minimum and sloped to 2:1 or flatter.
4. The disposal site shall be left suitable for seeding.

3.2 WASTE MATERIAL TO BE HAULED TO A LANDFILL

A. All demolition materials, garbage, and other refuse generated shall be removed from the project site and legally disposed off of Government property in an approved landfill.

B. All stumps, slash and other clearing and grubbing debris shall be hauled to a landfill.

C. The contractor is responsible for all costs and permits associated with landfill disposal.

D. The Government is not responsible for waste material upon its departure from the project site.

END OF SECTION 024100
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

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.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings when project design requires special consideration.

D. Field quality-control test reports.

1.4 MEASUREMENT AND PAYMENT

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

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.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

    a. Structural 1, B-B or better; mill oiled and edge sealed.
    b. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

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

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

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

B. Plain-Steel Wire: ASTM A 82, as drawn.

C. Deformed-Steel Wire: ASTM A 496.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

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," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 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 II.

B. Normal-Weight Aggregates: ASTM C 33, graded, from a single source.

1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

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

D. Fly ash, ground iron blast-furnace slag, or silica fume may partially replace cement in any mix as follows:

1. Fly Ash:

a. Class F – Not more than 20 percent of the minimum mass of portland cement may be replaced with class F fly ash.
b. Class C – Not more than 25 percent of the minimum mass of portland cement may be replaced with class C fly ash.

2. Ground Iron Blast-Furnace Slag: Not more than 25 percent of the minimum mass of portland cement may be replaced with ground iron blast-furnace slag.
3. Silica Fume (microsilica): Not more than 10 percent of the minimum mass of portland cement may be replaced with silica fume.
4. Additionally, fly ash, slag, and silica fume will constitute no more than 50 percent of the total replacement weight.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

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

1. Retarding Admixture: ASTM C 494/C 494M, Type B.

C. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.

1. Color: As selected by Contracting Officer from manufacturer's full range.
2. Color Pigment shall not exceed 6% by weight of the cement.

D. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.

2.6 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

C. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.

2.7 CURING MATERIALS

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

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

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating or nondissipating. Liquid Membrane-Forming Compounds. Material shall be certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

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.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

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

D. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi (24.1 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 3-5 inch (75-125 mm), plus or minus 1 inch (25 mm).
4. Air Content: 4 percent, plus or minus 1 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi (24.1 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.

3. Slump Limit: 4 inches, plus or minus 1 inch (25 mm).
4. Air Content: 5 percent, plus or minus 1 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi (24.1 MPa) at 28 days.
2. Minimum Cementitious Materials Content: 540 lb/cu. yd. (320 kg/cu. m).
3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
4. Air Content: 5 percent, plus or minus 1 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
6. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.12 FABRICATING REINFORCEMENT

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

2.13 CONCRETE MIXING

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

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

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. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer or round exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

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.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 48 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Contracting Officer.

3.4 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 (150 mm) and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT

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

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

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.6 JOINTS

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

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

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. **No Sawed Joints are allowed on concrete exposed to freezing**.

D. Expansion Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.7 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. Do not add water to concrete during delivery, at Project site, or during placement unless approved by the Contracting Officer.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

D. 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. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or derbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

A. As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

B. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 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. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane.
2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm)

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Contracting Officer before application.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.11 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. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

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

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.12 CONCRETE SURFACE REPAIRS

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

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface.

Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Contracting Officer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Contracting Officer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Contracting Officer's approval.

3.13 FIELD QUALITY CONTROL

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

B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: See Table 3.6 in Section 014100. A composite sample set consists of one slump test, one air entrainment test, and one temperature test.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample. Perform additional tests when concrete consistency appears to change or water is added.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M. Cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

    a. Compressive-Strength Tests: ASTM C 39/C 39M; test one of three laboratory-cured specimens at 7 days and one specimen at 28 days. If either previous tests fail, test third specimen at 28 days.
    b. Strength of each batch delivered will be satisfactory if 28-day compressive-strength tests equals or exceeds specified compressive strength.

C. Test results shall be reported in writing to Contracting Officer and Contractor within 48 hours of testing. Reports shall contain project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

E. Correct deficiencies in the work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 033000
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 047000 - MANUFACTURED MASONRY FOR SIGN BASES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Manufactured stone masonry veneer and application materials.

1.2 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.

1.3 REFERENCES

A. American Concrete Institute (ACI).

B. American Society for Testing and Materials (ASTM):

1. ASTM C 39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
2. ASTM C 67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
3. ASTM C 177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
4. ASTM C 192, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
5. ASTM C 270, Standard Specification for Mortar for Unit Masonry.
6. ASTM C 482, Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.
7. ASTM D 226, Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

C. Building Materials Evaluation Commission.

D. International Code Council (ICC):

1. ES Report.
2. UBC Standard No. 14-1, Kraft Waterproof Building Paper.

E. Masonry Standards Joint Committee (MSJC) of The Masonry Society.

1.4 SUBMITTALS

A. Reference Section 013300 “Submittal Procedures”. Submit following items:

1. Product Data: Manufactured masonry and application materials including mortar color charts, and weather resistant barrier.
2. Samples: Panel containing full-size samples of specified manufactured masonry showing full range of colors and textures complete with specified mortar.
    a. Actual size of masonry sample approximately 12 by 12 inches (300 by 300 mm).
3. Quality Assurance/Control Submittals:
    a. Qualifications:
        1) Proof of manufacturer qualifications.
        2) Proof of installer qualifications.
    b. Certificates: ICC-ES Report.
    c. Test Reports for physical properties.
    d. Manufacturer's Installation Instructions.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications:
    a. Minimum five years experience in producing manufactured masonry.
    b. Member of following organizations:
        1) MSJC.
        2) ACI.
        3) ASTM.
2. Installer Qualifications: Company with documented experience in installation of manufactured masonry including minimum 5 projects within 400 mile radius of this Project.
3. Current ICC-ES Report.
4. UL: Listing in Material Approval Guide.
5. Building Materials Evaluation Commission.
6. Reference Section 01 45 00 – Quality Control.
7. Approved field samples may remain as part of completed Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Follow manufacturer's instructions.

B. Store moisture-sensitive materials in weather protected enclosures.

1.7 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Maintain materials and ambient temperature in area of installation at minimum 40 degrees F (4 degrees C) prior to, during, and for 48 hours following installation.

1.8 WARRANTY

A. Special Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing for a period of 50 years following date of Final Acceptance.

1.9 MAINTENANCE

A. Extra Materials: Furnish extra manufactured stone material in a variety of shapes and sizes in quantity equal to three percent of the installed stone.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Owens Corning Tel: (800) 255-1727
One Owens Corning Parkway Fax: (866) 213-3037
Toledo, OH 43659 Website: www.culturedstone.com

B. Approved equal.

2.2 MANUFACTURED MASONRY MATERIALS

A. Cultured Stone® Textures: Country Ledgestone

B. Manufactured Masonry Physical Properties:

1. Compressive Strength: ASTM C 192 and ASTM C39, 1800 psi (12.4 MPa), 5 specimen average, 1500 psi (10.3 MPa) minimum for individual unit.
2. Bond Between Stone Unit, Type S Mortar, and Backing: ASTM C 482, 50 psi (345 kPa).
3. Thermal Resistance: ASTM C 177, R-factor, 0.355 per inch (25.4 mm) of thickness.
4. Freeze/Thaw: ASTM C 67, no disintegration and less than 3 percent weight loss.
5. Fire Hazard Test, UL 723:

    a. Flame spread: 0.
    b. Smoke Development: 0.

6. Maximum Veneer Unit Weight: 15 psf (73 kg/m^2).

2.3 RELATED MATERIALS

A. Mortar: Premixed Type N or mortar mixed using components and proportions following manufactured masonry manufacturer's installation instructions. Comply with ASTM C 270.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which manufactured masonry will be installed.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

C. Commencement of work by installer is acceptance of substrate conditions.

3.2 PREPARATION

A. Protection: Prevent work from occurring on the opposite of walls to which manufactured masonry is applied during and for 48 hours following installation of the manufactured masonry.

B. Surface Preparation: Follow manufacturer's instructions designated below for the appropriate type of manufactured masonry and substrate.

3.3 INSTALLATION

A. Install Cultured Stone® products in accordance with manufacturer's Cultured Stone® installation instructions using, grouted, mortarless joints.

B. Install Cultured Brick® products in accordance with manufacturer's Cultured Brick® installation instructions.

C. Install/Apply Related Materials specified above in accordance with type of substrate and manufactured masonry manufacturer's installation instructions.

3.4 CLEANING

A. Clean manufactured masonry in accordance with manufacturer's installation instructions.

3.5 Protection

A. Protect finished work from rain during and for 48 hours following installation.

B. Protect finished work from damage during remainder of construction period.

3.6 FINISH GRADING

A. All surfaces and slopes shall be shaped to blend with the original ground line, mounded over or smoothed off, hand raked, and left in a uniform and neat condition. Surface drainage shall be diverted so that it will not enter into the area. See drawings for details.

3.7 CLEANUP

A. After backfilling and grading has been completed, the disturbed area shall be finished to present as near a natural appearance as possible and cleaned up by removing all debris and materials not utilized. Cleanup shall include disposal of waste materials in accordance with Section 024100. Stockpiled topsoil shall be smoothly distributed over disturbed areas and hand raked to blend with ground line.

END OF SECTION 047000
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 053000 - SHEET METAL ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, material, tools, equipment, and services for all preformed roofing as shown on the drawings and as outlined in the specifications. The metal roofing manufacturer shall provide all components required for a complete metal roofing system to include panels, panel clips, fasteners, trim/flashing, fascias, ridge, closures, sealants, fillers and any other required items.

1.2 MEASUREMENT AND PAYMENT

A. There will be no separate measurement or payment for work in this Section. Sheet metal roofing is considered incidental to other items of work shown on the drawings, and/or in the Schedule of Items.

1.3 SUBMITTALS

A. Color Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available or AS SHOWN ON THE DRAWINGS.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet metal:

1. General:

    a. The metal roof system shall be provided by Curtis Steel Co. Inc., 4565 Wynn road Las Vegas, NV 89103 Ph: 702-952-3000 Fax: 702-952-3001 or approved equal.
    b. An alternative roof supplier is Icon Shelter Systems, Inc., 7900 Logistic Drive, Suite C, Zeeland, Michigan 49464 www.iconshelters.com
    c. The metal roof system shall be furnished by the same manufacturer as a complete system. Members and connections not indicated on the drawings shall be the responsibility of the Contractor. All components of the system shall be supplied or specified by the same manufacturer with a minimum roof slope of 2” to 12”.

2. Design loads:

    a. Applicable local building code or as shown on the drawings.
    b. Dead loads:

1) The dead load shall be the weight of the panel. Collateral loads shall be as shown on the contract drawings. Collateral loads shall not be applied to the roof panels.

c. Live loads:

1) The panels and concealed anchor clips shall be capable of supporting a minimum uniform live load of 20 psf.

d. Thermal effects:

1) Roof panels shall be free to move in response to the expansion and contraction forces resulting from temperature variation.

B. Flashings and Trim:

1. Fabricate flashing, trim and accessories to manufacturer's specified profiles.

C. Accessories and their fasteners:

1. Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the roof panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces, except at designed points of roof panel fixity.

D. Components:

1. Components shall be compatible with the roof panel furnished. Flashing, trim, metal closure strips, caps, gutters, downspouts, roof curbs, and similar metal components shall not be less than the minimum thickness specified by the panel manufacturer. Exposed metal components shall be finished to match the panels or trim, as furnished. Molded closure strips shall be closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride or metal pre-molded to match configuration of the covering and shall not absorb or retain water.

E. Sealants:

1. All sealant is to be a pressure sensitive, 100 percent solid. Provide permanently elastic, non-sagging, non-toxic, non-staining sealant approved by the panel manufacturer.
2. The panel manufacturer shall approve all joint sealant that will come into contact with the panel.
3. Seal locations as recommended by the manufacturer.

2.2 COLOR SCHEDULE

A. Sheet metal color shall be "Tudor Brown" or similar as identified by the contracting officer or as listed in Curtis Steel Co. Inc. color table or Icon Shelter Systems, Inc. color table "Kynar 500 Roof colors" as approved by the COR.

PART 3 - EXECUTION

3.1 STEEL METAL ROOFING INSTALLATION

A. Install the panels in accordance with manufacturer's instructions and as shown on the drawings.

B. Install the panel so that it is weather-tight and allows for thermal movements.

C. Locate and space all exposed fasteners in accordance with the panel manufacturer's recommendations. Use proper torque settings to obtain controlled uniform compression for a positive seal without rupturing the neoprene washer.

D. Do not allow panels or trim to come into contact with dissimilar materials (i.e. copper, lead, graphite, treated lumber, mortar, etc). Water run-off from these materials is also prohibited.

E. Comply with the panel manufacturer's approved installation drawings and instructions.

F. Field cutting of panels, trim, and/or flashing shall be accomplished by hand or electric shears. At no time shall a hot saw be used.

3.2 ADJUSTING AND CLEANING

A. Repair panels with minor damage.

B. Remove panels damaged beyond repair and replace with new panels to match adjacent undamaged panels.

C. Clean exposed panel surfaces promptly after installation in accordance with recommendations of panel and coating manufacturers.

D. Remove protective film immediately after installation.

END OF SECTION 053000
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 062030 - CARPENTRY (BULLETIN BOARDS)

PART 1 - GENERAL

1.1 SCOPE

A. Perform all work necessary or required for the construction of the project, as indicated on the drawings. Such work includes, but is not necessarily limited to, the finishing and installing of all rough and finish carpentry work, as shown and noted on the drawings and specified herein.

1.2 PRODUCT HANDLING

A. Stack all lumber to insure proper ventilation. Cover all lumber, millwork, and other materials to protect from moisture.

1.3 GRADE MARKS

A. All lumber and structural panels shall be grade stamped.

1.4 MEASUREMENT AND PAYMENT

A. No separate payment will be made for work included under this section. Payment for this work will be included in the contract unit price for the bulletin board.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All lumber shall be seasoned, surfaced four sides (S4S), except where shown rough-sawn on drawings, shall not exceed a moisture content of 19 percent, and shall not be less than the following grades:

1. Posts and Timbers - Douglas Fir No. 2 and better grade, as graded by the Western Wood Products Association or West Coast Lumber Inspection Bureau, or equal, unless otherwise shown on the Drawings.
2. Light Framing - Douglas Fir, Standard and better grade, except all exterior walls and interior load bearing walls shall be Number one or better as graded by Western Wood Products Association or West Coast Lumber Inspection Bureau, or equal.
3. Pressure Treated Framing - Redwood lumber or FDN grade Douglas Fir as designated by American Wood Preservers Association or American Wood Preservers Bureau.
4. Roof Sheathing, APA Rated sheathing of the span rating or panel thickness shown on the drawings and as graded by The Engineered Wood Association (formerly

American Plywood Association). Use of the term "plywood" on the drawings does not exclude the use of other panels with equivalent span ratings.

5. Wood I-Joist Floor and Roof Framing - Wood I-Joists as shown on the drawings shall be of the manufacturer, size and rating shown. Products of other manufacturers may be submitted to the Contracting Officer for review and approval.
6. Trim and Fascia Boards - Inland Cedar boards, #3 Common and better as graded by Western Wood Products Association, or equal. Where wood fascia is covered by metal fascia, wood shall be Douglas Fir No. 2 or better as graded by Western Wood Products Association.
7. Plywood Panel – Douglas Fir, rough sawn, 3/4", 303 Siding grade as graded by The Engineered Wood Association (formerly American Plywood Association), or equal.

PART 3 - EXECUTION

3.1 NAILING

A. Nailing shall conform with the requirements of the Uniform Building Code, unless otherwise specified.

3.2 ROUGH CARPENTRY

A. All framing shall be accurately cut and constructed plumb, straight, and true to lines and dimensions shown

B. Roof Sheathing - The roof sheathing shall be installed with the panel laid perpendicular to the rafters, end joints staggered, and nailed at each crossing and end.

C. Treated Lumber - All lumber placed in contact with earth or concrete shall be treated lumber.

3.3 FINISH CARPENTRY

A. General - Joints shall be closely fitted, butted, mitered, or housed, as shown or required to provide substantial construction and a neat, finished appearance and to conceal shrinkage. Exposed wood surfaces shall be without surface imperfections which cannot be concealed readily by paint finishes. Use finishing nails set for puttying.

B. Wood Trim - All wood trim shall be run from solid stock with housed joints. Trim shall be set plumb and securely nailed with all joints tightly fit with no gaps. No gaps in joints which would require putty or other fill will be allowed.

1. All trim shall be in single lengths. Running finish, such as base and moldings, shall be in commercial lengths and jointed only where solid fastenings can be made. Where end joints are required, miter joints shall be made.

END OF SECTION 062030
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 SCOPE

A. Perform all work necessary to supply and paint or stain where required on the drawings or in this specification.

1.2 PRODUCT HANDLING

A. All painting material shall be delivered to the site in the manufacturer's original containers with labels intact and seals unbroken. They shall be kept in a locked, well-ventilated storage place assigned for this purpose. Receiving, opening, and mixing of all paint materials shall be done in this room. Storage space shall be kept clean and neat. Oily rags shall be removed and disposed of each day, and all other necessary precautions shall be taken to avoid danger or fire.

1.3 ENVIRONMENTAL

A. Surfaces shall be painted or stained only when they are free from moisture. No painting or staining shall be done when temperature is below 50 degrees F., except when specifically directed otherwise in writing by the Contracting Officer.

1.4 MEASUREMENT AND PAYMENT

A. No separate payment will be made for work included under this section. Payment for this work will be included in the contract unit price for other items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Material shall all be first quality products. The Benjamin Moore & Co. products listed are given to establish the type and quality of products to be used. Other products of equivalent quality may be submitted to the Contracting Officer for review and approval. Top line products of Pratt & Lambert, Sherwin-Williams, Fuller-O'Brien, Olympic, and Pittsburgh paints and stains are equivalent to those listed in this specification.

1. Exterior

a. Wood - Painted: Soft gloss, 100% acrylic house paint; MoorGlo Latex House and Trim Paint, #096 (max. spread rate - 500 sq. ft./gallon). Prime

with exterior latex primer coat; Benjamin Moore Fresh Start All Purpose Acrylic Primer, #023 (max. spread rate - 450 sq. ft./gallon).

b. Wood - Solid Color Stain: Acrylic latex solid color stain; Moorwood Latex Solid Exterior Stain, #089 (max. spread rate - 350 sq. ft./gallon).

B. Paint shall conform to Federal Specification TT-P-19. Colors shall be Federal Standard 595 as shown in the color chart below:

Color	Federal Standard 595 No.	Pantone Matching System (PMS)
Brown	20059	476 opaque
Yellow-cream	23695	

PART 3 - EXECUTION

1.1 PREPARATION OF SURFACES

A. Surfaces to be painted shall be clean and free of dirt, dust and any other substance which might interfere with the functioning of the painting system. All surfaces to be painted shall be in proper condition to accept, and assure the proper adhesion and functioning of the particular painting system or coating specified.

B. All steel and ferrous metal surfaces to be painted will be primed before installation. Bolts, welds and places where prime coat has been damaged shall be wire brushed to remove all loose paint, rust, and scale. Then apply one coat of ferrous metal primer.

C. Galvanized surfaces to be painted shall be cleaned per SSPC-SP1 (Society for Protective Coatings) using a detergent and water or a degreasing cleaner to remove greases and oils

D. Wood surfaces shall be hand sandpapered and dusted clean. All knots, pitch pockets, or sappy portions shall be sealed with clear shellac or knot sealer. Putty all nail holes, cracks, etc., after first or prime coat. Do not seal wood surfaces to receive stain or natural finish. Do not sandpaper saw textured or resawn surfaces.

E. Prime coats and finish coats of any one paint system shall be the products of the same manufacturer, except for manufacturer-applied factory or shop primed surfaces.

1.2 WORKMANSHIP AND APPLICATION

A. Paint shall be applied in accordance with the applicable specification and/or manufacturer's instructions.

B. Paints and finishing materials shall be free from skins, lumps, or any foreign matter, and kept well stirred while being applied.

C. Work shall be protected against spatters. stains, or soiling, and each type of finish shall be protected against similar defacement by other finish and shall be left clean.

D. Each coat of paint shall be evenly worked out and allowed to dry before any subsequent coat is applied or rubbing done.

E. Finish coats shall be the exact shades and textures selected.

F. The finish work shall be free from runs and sags, defective brushing, and clogging of lines or angles.

1.3 COLOR SCHEDULE

A. Metal

1. Metal Primer: Shall be Sherwin-Williams DTM Acrylic Primer/Finish, B66W1, or an approved equal.
2. Industrial Enamel: Shall be Sherwin-Williams Class A Metalatex Semi-Gloss Coating, B42 Series, in accordance with Federal Specification TT-E-489, or an approved equal. A color selection sheet shall be provided to the Contracting Officer for color selection.

B. Wood: Solid Color Stain: Flat, modified linseed-alkyd solid color stain; Moorwood Solid Color Exterior Stain, #80 (max. spread rate – 350 sq. ft./gallon)

1.4 TOUCHING UP

A. At the completion of other branches of the work, all painted and finished work shall be touched up and restored where damaged or defaced, and the entire work left free from blemished.

END OF SECTION 099100
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 101110 - BULLETIN BOARD

PART 1 - GENERAL

1.1 This item shall consist of furnishing and installing bulletin boards constructed as shown on the drawings at the locations shown on the site plan or as staked in the field in conformity with the lines and grades established, or as directed by the Contracting Officer

1.2 METHOD OF MEASUREMENT

A. The quantity to be measured shall be the number of individual "Bulletin Board(s)" of type indicated in the Schedule of Items completed in place and accepted.

1.3 RELATED WORK

A. The work shall be in accordance with the following subsidiary specifications. The subsidiary specifications are referred to in the text by the Section designation only.

1. Section 053000 Sheet Metal Roofing
2. Section 099100 Painting

PART 2 - PRODUCTS

2.1 MATERIALS

A. All lumber shall be seasoned, surfaced four sides (S4S), except where shown rough-sawn on drawings, shall not exceed a moisture content of 19 percent, and shall not be less than the following grades:

B. The posts shall be Douglas Fir No. 2 and better grade, pressure treated, as graded by the Western Wood Products Association or West Coast Lumber Inspection Bureau, or equal, unless otherwise shown on the Drawings.

C. All other beams, frames, rafters, and other dimensioned lumber shall be Douglas Fir, No. 2 or better, S4S, Construction Grade, conforming to paragraph 40.11 of Western Lumber Grading Rules 80 - Western Wood Products Association, latest edition.

D. Plywood Panel – Douglas Fir, rough sawn, 3/4", 303 Siding grade as graded by The Engineered Wood Association (formerly American Plywood Association), or equal. (Paint display panel only in accordance with Section 099100)

E. Lumber preservatives and treatment methods shall meet the requirements of AASHTO M133.

F. All lumber shall be pressure treated using the "Empty Cell Process" as required by the American Wood Preservers Association (AWPA), with a copper naphthenate solution.

The copper naphthenate solution shall contain not less than 6% or more than 8% copper in the form of copper naphthenate, in petroleum oil, AWPA P9, conforming to AWPA P8 and AWPA C1 for oil-borne preservatives.

G. The minimum amounts of preservative treatment retained and the amount of penetration required for the Species Indicated on the Drawings, shall be the minimum values that are shown in AWPA C2. Methods of determining the amount of penetration and retention shall conform to AWPA C1, and AWPA C2. The amount of retention shall be determined by the assay method for timber with soil contact. Test results shall be forwarded to the Contracting Officer with the "Certificate of Inspection of Treatment."

H. Before any lumber is placed in the work, the Contractor shall furnish to the Contracting Officer a "Certificate Confirming Compliance for Retention and Penetration", issued by an approved inspection agency, testing laboratory or treating plant, for each charge, in each shipment.

I. Roof sheathing shall be C-D grade, exterior glue, plywood, in accordance with American Plywood Association standards.

J. All nails, bolts, lag screws, washers, etc., shall be bright (non-galvanized) finish.

K. Sheet metal roofing shall be in accordance with Section 053000.

PART 3 - EXECUTION

3.1 FINISH CARPENTRY

A. General - Joints shall be closely fitted, butted, as shown or required to provide substantial construction and a neat, finished appearance and to conceal shrinkage. Exposed wood surfaces shall be without surface imperfections which cannot be concealed readily by paint finishes. Use finishing nails set for puttying.

3.2 PREPARATION OF SURFACES

A. Surfaces to be painted shall be clean and free of dirt, dust and any other substance which might interfere with the functioning of the painting system. All surfaces to be painted shall be in proper condition to accept, and assure the proper adhesion and functioning of the particular painting system or coating specified.

B. Wood surfaces shall be hand sandpapered and dusted clean. All knots, pitch pockets, or sappy portions shall be sealed with clear shellac or knot sealer. Putty all nail holes, cracks, etc., after first or prime coat. Do not seal wood surfaces to receive stain or natural finish. Do not sandpaper saw textured or re-sawn surfaces.

3.3 WORKMANSHIP AND APPLICATION

A. All above grade portions, shall be stained with two coats of stain (max. spread rate - 350 sq. ft./gallon).

B. Stain shall be applied in accordance with manufacturer's instructions.

C. Work shall be protected against spatters, stains, or soiling, and each type of finish shall be protected against similar defacement by other finish and shall be left clean.

D. Each coat of stain shall be evenly spread and allowed to dry before any subsequent coat is applied or rubbing done.

E. The finish work shall be free from runs and sags, defective brushing, and clogging of lines or angles.

3.4 TOUCHING UP

A. At the completion of all construction activities, all painted and finished work shall be touched up and restored where damaged or defaced, and the entire work left free from blemished.

3.5 FINISH

A. The completed bulletin board shall be installed at the location(s) indicated on the site plan or staked in the field to the line and grade established. When the completed structure is plumb it shall be backfilled in lifts not to exceed 6 inches, watered if necessary, and compacted to the density of the surrounding natural material. When backfilling is completed, the site shall be finish graded to match the surrounding natural grade and shall be cleaned up by removing all debris and unutilized materials.

END OF SECTION
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 101400 - SIGNS

PART 1 - GENERAL

1.1 This item shall consist of furnishing and installing signs as shown on the Drawings. The location for sign installations shall be as shown on the Drawings and as staked by the Contracting Officer in the field. The contractor shall furnish all posts, concrete, signs, and hardware required to complete the full installation.

1.2 SUBMITTAL

A. Sign List Submittal: The contractor shall submit a list of signs proposed for the project. The list shall include detailed drawings showing the size of the sign, size of letters, colors, materials, sign texts, and location for installation. The Contracting Officer shall approve the submitted list, prior to the Contractor ordering the signs.

1.3 METHOD OF MEASUREMENT

A. The quantity to be measured shall be the number of signs furnished, installed and accepted as shown in the Schedule of Items.

B. Double signs on single-post installation will be considered as one installation. Signs that require more than one post to be considered as one installation.

PART 2 - PRODUCTS

2.1 SIGN PANELS

A. General:

1. Sign panels shall be panels of one-piece construction.
2. Signs shall conform to current editions of the Manual of Uniform Traffic Control Devices (MUTCD) and the Forest Service Manual - EM 7100-15, Sign and Poster Guidelines for the Forest Service.

B. Sheeting

1. 100% heat activated retro-reflective sheeting material that conforms to AASHTO M 268 and ASTM D4956.
2. Sheeting shall be High Intensity Type III or Type IV.

C. HDO Plywood Panels:

1. Shall be fabricated using 100% heat activated retro-reflectorized material applied to ¾-inch thick 7-ply HDO plywood meeting the requirements of the current edition of the National Bureau of Standards PS 1.
2. Shall be edge tape with clear vinyl film.

3. Shall be furnished with predrilled holes for installation.

D. Aluminum Panels:

1. Shall be fabricated using 100% heat activated retro-reflectorized material.
2. Shall be furnished with predrilled holes for installation.
3. All sign sheets and plates shall meet the requirements of ASTM B 209, alloy 6061-T6, or 5052-H38 and shall be of the minimum thickness shown below.

Sign Width (inches)	Sheet Aluminum Thickness (inches)
Less than 8	0.022
8-12	0.040
13-19	0.063
20-30	0.080
31-48	0.100
over 48	0.125

2.2 POSTS

A. Wood Posts - 4”X 4” and 4”X6” posts shall be rough sawn standard and better hemlock fir or pine. All lumber shall be pressure treated using the “Empty Cell Process” as required by the American Wood Preservers Association (AWPA), with copper naphthenate solution. The copper naphthenate solution shall contain not less that 6% or more than 8% copper in the form of copper naphthenate, in petroleum oil, AWPA P9, conforming to AWPA P8 and C1 for oil-born preservatives.

B. Steel Posts: Steel posts shall meet the requirements of ASTM A 499, galvanized in accordance with AASHTO M 111. Minimum weight per foot will be as listed in the Schedule of Items. The posts shall have 7/16-inch holes drilled or punched, before galvanizing, along the centerline of the web. The punching or drilling should begin 1 inch from the top of the post, at 2-inch centers for the upper 5 feet of the post.

C. Aluminum Posts: Aluminum posts shall be standard shapes as SHOWN ON THE DRAWINGS and shall be aluminum alloy 6061-T6 or 6351-T5 meeting the requirements of ASTM B 221.

2.3 FASTENER BOLTS

A. Vandal-Proof Bolts and hardware shall be galvanized or cadmium plated steel. Bolts shall be 5/16” carriage bolts. Nuts installed with wood posts shall be NTPAFN fluted nuts. Nuts installed with tubular steel posts shall be vandal-proof tufnuts or approved equal. A known supplier is Intermountain Traffic Safety, West Valley City, Utah, phone (801) 972-6515.

2.4 CONCRETE

A. Concrete for installing sign posts shall conform to the requirement of Section 033000 or 033020.

2.5 SIGN BRACES

A. All sign braces shall be made of aluminum alloy 6061-T6 and shall be a minimum 1/4" thick.

B. Bolts shall be 3/8"X1" Galvanized steel w/ stainless steel and nylon washers for attaching brace to sign and 3/8"X3" Galvanized lag bolts with stainless steel and neoprene washers for attaching brace to post.

PART 3 - EXECUTION

3.1 POST SETTING

A. Post holes not larger than 18-inch diameter shall be excavated to a depth as shown on the drawings. Backfill shall be hand tamped around the wood posts so as to make the post solid and plumb. Any loose posts shall be removed and re-installed. Concrete shall be used to backfill tubular steel posts as shown on the drawings.

3.2 SIGN MOUNTING

A. Signs shall be mounted as shown on the drawings. Bolt holes shall be neatly drilled in the signs so as to prevent splintering and drilling through letters or delaminate sheathing. Sign face sheathing or coverings shall not be broken

3.3 GRADING AND CLEANUP

A. The area around the post shall now be graded to the desired contour. When the installation is completed, the general area shall be cleaned up by removing all debris and material not utilized.

END OF SECTION
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 101420 - SITE IDENTIFICATION SIGN

PART 1 - GENERAL

1.1 This item shall consist of fabricating and installing the Site Identification sign. Layout and graphics for Forest Service and the California Dept. of Transportation shall be supplied by the Government to the Contractor in a format that is compatible with the manufacturer.

1.2 METHOD OF MEASUREMENT

A. The quantity to be measured shall be the number of signs fabricated, installed and accepted. Payment shall include posts, sign bases, Forest Service shield, credit line and other logos as called for on the drawings.

1.3 REFERENCE SPECIFICATIONS - The publication listed below form a part of this specification to the extent referenced. The publication is referred to in the text by the basic designation only.

A. EM 7100-15 Standards for Forest Service Signs, Chapters 7, 8,10 and 14

1.4 QUALITY ASSURANCE

A. The Fabricator shall have sufficient covered shop space, tooling and equipment to properly fabricate, inspect and handle the signs. Raw materials shall be stored in a covered warehouse or similar cool, dry storage area so that it protects the raw materials from environmental factors.

B. The fabricator shall be regularly engaged in the design and manufacture of plastic signs and shall have at least 5 years experience. References with contacts shall be provided if requested by the Contracting Officer.

1.5 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 for work listed in the Schedule of Items.

PART 2 - PRODUCTS

2.1 REQUIREMENTS:

A. Sign design shall follow the procedures and methods, utilize the equations and formulas, and incorporate the factors of safety and allowable design stresses and strains

as set forth in ASTM D 4097, ASTM D 3299 and ASME RTP-1. Where design conflicts arise between the various standards, the most stringent design shall be used.

B. The design shall allow for the most severe combination of conditions which may include any or all of the following:

1. Superimposed loads such as those due to wind and seismic forces.
2. Loads applied during transportation and erection.
3. Thermal expansion and contraction.

C. Prior to construction, the Contractor shall submit a sample sign and Logo mock-up. This sample must include enough detail, including materials, layout, font, color, size and shape to show consistency with the drawings and be in accordance with EM 7100-15. The submittal shall be combined into a single, neatly organized, complete package and submitted to the Contracting Officer for review and approval. Fabrication of the signs shall not begin until the complete submittal package has been approved by the government.

D. Types of signs to be fabricated and installed include:

1. Single sided sign panel
2. Forest Service Logo
3. USDA Credit Plaque

E. A known manufacturer that meets this specification is Wood Products, 4890 Country Road 76, Parlin, CO 81239, Phone 970-641-1675.

2.2 MATERIALS

A. SUBSTRATE

1. The sign panel shall be constructed of High Density Polyethylene (HDPE) containing recycled plastic. The HDPE sheets consist of 1/8-inch top layer, a 1/2-inch middle core layer and a 1/8-inch bottom layer. The combination of layers shall provide a unified 3/4-inch thick panel free of any post manufacture jointing, unless requested. The surface of the front and back of the panel will be a matte finish.
2. Typical nominal material properties of the HDPE panel shall meet the following criteria:

    a. Density: 0.95 to 0.97 g/cc
    b. Tensile Yield: 3800 to 4800 psi
    c. Elongation: less than 600%
    d. Tensile Impact: 70-120 ft.lb./in.^{2}
    e. Hardness: 64 to 70 Shore D
    f. Flex Modulus: 200,000 to 225,000 psi

3. The HDPE sign panel shall include UV stabilizing materials to resist long-term degradation from light and ultraviolet radiation.

2.3 COLOR

A. HDPE panels shall be resistant to color degradation and fading. For HDPE colored materials not previously approved for use by the Forest Service, samples and color degradation test results shall be submitted for verification of the specified colors.

B. Color shall be Brown #20059 or Cream #23695, as shown on the Drawings.

2.4 LUMBER

A. Grades and species for all lumber members are specified on the drawings. All lumber above ground shall be painted with two coats of exterior grade paint, Forest Service brown approved by the Contract. Paint below grade lumber with a wood preservative approved by the Contracting Officer.

2.5 HARDWARE

A. All bolts, threaded rods, nuts and washers shall be galvanized or zinc-plated.

B. Olylog screws: 3/16 inch shank by 10 inches in length with 5/16 inch hex head, coated for corrosion resistance or approved equal.

PART 3 - EXECUTION

3.1 SIGN FABRICATION

A. Work shall be performed by a high speed, computer-controlled electric router with the sheets in a horizontal position so that the routed surfaces are uniform in depth and finish.

3.2 ROUTING LETTERS AND LOGO'S

A. Sign (not Logo's) shall be routed to a depth of 1/4" to 1/2" using Gothic type "D" letters. Do not go through material.

3.3 SIGN INSTALLATION

A. Sign locations will be approved on the ground by the Contracting Officer, prior to commencement of work. The longitudinal axis of the sign will be perpendicular to the centerline of the main road, plus or minus 5 degrees.

B. Base and sign supports shall be constructed plumb and at the angles show on the drawings.

C. Mount signs with zinc coated hardware. Paint bolt heads, washers, nuts and other hardware to match "Rust" powder coated finish.

D. Care shall be taken when drilling holes that locations avoid routed letters on signs and logos.

E. Sign base shall be fabricated as shown on the drawings.

END OF SECTION
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 129300 - SITE FURNISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Extent of each type of site furnishings is indicated as shown on the drawings.

B. Type of furnishings includes:

1. Expanded Metal Tables
2. Bike Repair Station and Pump

1.2 SUBMITTALS

A. Product Data: For each product specified.

1. Submit manufacturers data and installation instruction for each type of furnishings, including anchorage and accessory items.

1.3 MEASUREMENT AND PAYMENT

A. The quantity to be measured shall be the number of furnishings fabricated and accepted as Identified in the schedule of items.

PART 2 - PRODUCTS

2.1 EXPANDED METAL TABLES

A. Design Snow Load: All tables and benches shall be designed to withstand 500 pounds per square feet of snow load.

B. ADA Requirements: All tables shall meet the requirements of the "American with Disabilities Act."

C. Table Tops and Seats: Tabletops and seats shall be 3/4-inch opening, 9 gauge expanded metal covered with heat fused dark brown plastisol.

D. Legs: Table and bench legs shall be galvanized tubular steel with dark brown baked on polyester powder coating.

E. Concrete: Concrete for in-ground mounting shall conform to the requirements of Division 3 Section 15 Concrete For Minor Structures."

F. Anchor Bolts: Anchor bolts shall be as shown on the drawings.

G. 8-Foot Picnic Table with Surface Mounts: The table shall be Pilot Rock Model APT/P/CW-8VW as manufactured by R. J. Thomas Manufacturing Co., Inc., POB 946,

Cherokee, IA, 51012, phone no. (712) 225-5115 or 1-(800)-762-5002, or an approved equal.

2.2 PUBLIC BIKE STAND

A. Type and Style: Public work stand model number WBB3092622 will be from Saris Infrastructure, or an approved equal.

B. Dimensions (w*h*d): 8.5” x 55.5” x 21”

C. Material: Formed and TIG welded steel, cast aluminum.

D. Tool Tethering: Retractable stainless steel aircraft cable

E. Tools

1. Deluxe Public Work Stand tool set
2. Philips and standard screwdrivers
3. Steel core tire levers (qty. 2)
4. Headset/pedal wrench
5. 8/10mm cone wrench
6. 9/11mm cone wrench
7. Torx T-25 wrench
8. Hex key set

F. Installation Method: Surface mount

2.3 OUTDOOR BIKE PUMP

A. Type and Style: Bike pump model number WBB3092620 from Saris Infrastructure, or an approved equal.

B. Material: Outdoor stainless steel, steel braided air hose

C. Features: Stainless steel surface mount, 20lbs, and all metal performance pump head

D. Dimensions (w*h*d): 8” x 8” x 30”

PART 3 - EXECUTION

3.1 INTALLATION – EXPANDED METAL TABLES

A. Install expanded metal tables with surface mounting as recommended by manufacturer.

B. Surface Mounting: Locate the table on the unit slab as SHOWN ON THE DRAWINGS. Anchor the table with ½” x 5 ½” stainless steel anchor bolts as shown.

1. The seats and tabletop shall be attached to the posts using the manufacturers instructions.
2. The posts for seats and table top, when the concrete has been placed, shall be plumb with the tops of the tabletop and seats level at the desired elevation.

C. All surfaces of the table shall be masked and protected from damage, defacement, concrete splattering and spillage. The false work for supporting the tabletops and seats shall be subject to the approval of the CO. The footings shall cure for a minimum of 48 hours before the false work supporting the seats and tabletop is removed.

D. Completion of the Table and Benches: the Contractor shall remove All false work and masking. Any damage to the units shall be repaired or replaced at the Contractor's expense. All required hardware should be installed properly before acceptance of the tables.

E. Cleanup: When a unit is completed, the area shall be cleaned up of false work, debris, and material not utilized.

3.2 INTALLATION – PUBLIC WORK STATION

A. Install expanded public work station with surface mounting as recommended by manufacturer.

B. Surface Mounting: Locate the workstation on the unit slab as SHOWN ON THE DRAWINGS. Anchor the table with ½" x 5 ½" stainless steel anchor bolts as shown.

C. All surfaces of the workstation shall be masked and protected from damage, defacement, concrete splattering and spillage. The false work for supporting the tabletops and seats shall be subject to the approval of the CO. The footings shall cure for a minimum of 48 hours before the false work supporting the seats and tabletop is removed.

D. Completion of the Public Work Station: the Contractor shall remove All false work and masking. Any damage to the units shall be repaired or replaced at the Contractor's expense. All required hardware should be installed properly before acceptance of the tables.

E. Cleanup: When a unit is completed, the area shall be cleaned up of false work, debris, and material not utilized.

3.3 INTALLATION – OUTDOOR BIKE PUMP

A. Install bike pump with surface mounting as recommended by manufacturer.

B. All surfaces of the bike pump be masked and protected from damage, defacement, concrete splattering and spillage. The false work for supporting the tabletops and seats shall be subject to the approval of the CO. The footings shall cure for a minimum of 48 hours before the false work supporting the seats and tabletop is removed.

C. Completion of the Public Work Station and Bike Pump: the Contractor shall remove All false work and masking. Any damage to the units shall be repaired or replaced at the Contractor's expense. All required hardware should be installed properly before acceptance of the tables.

D. Cleanup: When installation is completed, the area shall be cleaned up of false work, debris, and material not utilized.

END OF SECTION 129300
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 136000 - PRE-MANUFACTURED PICNIC SHELTER

PART 1 - GENERAL

1.1 SUMMARY

A. This section consists of furnishing and installing pre-manufactured shelters of various sizes with concrete footings under each column.

B. Related Sections include the following:

1. Section 321204 “Crushed Aggregate Base or Surface Course”
2. Section 033000 “Cast-In-Place Concrete”

1.2 MEASUREMENT AND PAYMENT

A. The quantity to be measured shall be the number of shelters furnished, installed and accepted of size shown in the Schedule of Items including the concrete footings.

PART 2 - PRODUCTS

2.1 PRE-MANUFACTURED SHELTER

A. The contractor shall submit four (4) full sets of detailed drawings (floor plan, roof plan, elevations, and footing design) and design calculations for the proposed shelter design to the Contracting Officer (for Regional Engineer’s Design Approval) within two (2) weeks after the award of the contract. The drawings and design shall be stamped by a licensed Engineer in the State the structure will be installed, certifying the design meets the design requirements specified herein. The contractor shall not order or procure the pre-manufactured shelter prior to written approval of the structure by the Contracting Officer.

B. Size:

1. 16’x16’ with a minimum height of 7’-6”

C. Design to 2003 International Building Code (IBC)

D. Design Loading:

1. Roof Snow Load: minimum of 40 psf
2. Wind Load: minimum of 100 mph (exp.C)
3. Seismic: designed to IBC 2003 requirements
4. Misc: other loading as required by IBC 2003

E. Roof:

1. Hip Roof; Pitch 6:12

F. The shelter shall be a pre-manufactured, model numbers: POLIGON SQR-16, Square (SQR) metal hip roof (MR), 16'x 16' roof dripline and post span/ spacing 13' x 13' or approved equal with 4 anchor bolts at the base of each column for attachment to the top of the concrete anchors

1. A known distributor of this product is PlaySpace Designs at (p) 800-840-5410 or 801-274-0212, (f) 801-274-0214

2.2 MANUFACTURER REQUIREMENTS

A. The manufacturer of the shelter must be an experienced manufacturer prefabricated steel shelters offering a model of shelters specified or equal that specified. The manufacturer shall have been making steel framed pre-manufactured shelters for a minimum of 2 years and shall provide a list of three similar shelters constructed in the United States.

2.3 PRODUCT REQUIREMENTS

A. The shelter shall conform to the following specifications:

1. Structural framing: structural steel tube minimum ASTM A500 grade B or cold-formed box sections minimum ASTM A570 grade 55. "I" beams, tapered columns, open channels, or wood products shall not be accepted.
2. Compression ring: structural channel or welded plate minimum ASTM A36.
3. Fasteners: ASTM A325 high strength bolts and A563 high strength nuts, ASTM A36 anchor bolts, self-drilling screws, rivets.
4. Metal roofing: 24-gauge galvalume factory finished with Kynar 500 paint system. Ribs shall be 1-3/16" high, 12 inches on center. Panels shall be three feet wide, and angles shall be factory cut. Ribs shall run with the pitch of the roof for proper drainage. Contracting Officer shall approve color from the manufacturer's standard color chart.

    a. Metal roofing trim shall match the color of the roof and shall be formed from 26 gauge painted galvalume steel as follows:
    b. PANEL END CAPS shall be pre-bent to a "U" shape to fit over ridge end of roof panels. The inside of the "U" shall match the roof color.
    c. METAL RIDGE CAPS shall be preformed with a single central bend to match the roof pitch. They shall be hemmed on the sides.
    d. ROOF PEAK CAP shall be supplied on all buildings that do not include a cupola.
    e. "J" CHANNEL shall be shaped like a "J" with colored metal on the outside wrapped around 20 gauge galvanized steel core. "J" channel shall be applied all along the eave to strengthen and straighten the eave. Both colored metal and galvanized core shall have 7/16" weep holes 6" on center.
    f. EAVE SPLICE CHANNELS shall be provided to fit behind "J" channel butt joints to create strength at the joint and maintain a straight eave line.
    g. SPECIAL "J" CHANNEL CORNER TRIM shall be provided which fits over the main "J" channel to simplify final detailing of corners

2.4 Concrete shall conform to the requirements of Section 033000. “Cast-In-Place Concrete”

2.5 Crushed Aggregate Base shall installed at a 4-inch compacted depth and conform to the requirements of Section 321204.

2.6 Warranty – The manufacturer shall supply a written 5 year warranty.

PART 3 - EXECUTION

3.1 DELIVERY AND STORAGE

A. Unload materials with necessary equipment (no hand unloading), store covered out of weather, and keep out of direct sun. The pre-engineered package shall be shipped as a pre-cut and pre-fabricated package that shall include the structural frame members, roof material, fasteners, and trim as well as the installation instructions. The structure shall be shipped knocked down for minimum shipping charges.

3.2 SITE PREPARATION AND GRADING

A. It will be the Contractor's responsibility to provide rough and finish grading for the pad, and adding crushed aggregate base as necessary to bring the pad to a smooth uniform surface. Crushed aggregate shall be compacted with 3 passes of a mechanical compactor.

3.3 CONCRETE

A. Concrete footings and slab shall be in accordance with Section 033000. Anchors shall be of the size recommended by the manufacturer for the specified loads and for the soil type encountered.

3.4 FABRICATION AND ERECTION

A. The shelter shall be constructed in accordance with the manufacturer’s instructions and detailed drawings. Field labor will be kept to a minimum by pre-manufactured parts. No onsite welding shall be permitted.

B. All columns, trusses, beams, compression rings and tension members shall be factory welded assemblies with provisions for bolted connections. There will be no field welding permitted.

C. Factory welded connections shall be made by certified welders in accordance with AWS Specifications and be supervised by an AWS certified welding inspector.

D. Factory frame finish: Powder coated per the following procedure: The steel shall be prepared to specification SSPC – SP 10 (shot blasted to near white condition), removing oil residue, mil scale, weld spatter and slag, followed by a 3-stage mechanical wash and iron phosphate coating and a 2 – 5 mil coating of Super Durable Polyester TGIC

powder coat, cured to accomplish heat fusion. All material shall be inspected to insure 100% coating, intercoat adhesion, proper cure, film thickness and impact resistance. Contracting Officer shall approve color from the manufacturer's standard color chart.

3.5 FINISH GRADING

A. All surfaces and slopes shall be shaped to blend with the original ground line, mounded over or smoothed off, hand raked, and left in a uniform and neat condition. Surface drainage shall be diverted so that it will not enter into the area. See drawing for details.

3.6 CLEAN UP

A. After backfilling and grading has been completed, the disturbed area shall be finished to present as near a natural appearance as possible and cleaned up by removing all debris and materials not utilized. Cleanup shall include disposal of waste materials in accordance with Section 02100 "Waste Material Disposal". Stockpiled topsoil shall be smoothly distributed over disturbed area and hand raked to blend with ground line.

END OF SECTION 136000
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 311000 - CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 SUMMARY

A. This work shall consist of clearing, grubbing, trimming, removing, and disposing of or treatment of timber, construction slash, and debris. This work shall also include preservation of vegetation and objects designated to remain from injury or defacement.

1.2 RELATED SECTIONS

A. Section 024100 “Waste Material Disposal.”

1.3 DEFINITIONS

A. Areas to be Cleared and Grubbed - The limits of clearing and grubbing will be established by this specification, by other specification items, or on contract Drawings. The clearing and grubbing limits will normally coincide with the designated working limits; however, the Contracting Officer may also designate individual trees and snags outside the clearing limits for selective removal and disposal, or he may designate areas within the working limits where clearing and grubbing is not required or allowed within the provisions of this specification.

1. Grading Limits - Area that is to be excavated or covered with additional materials during construction.
2. Working Limits - Area consisting of the grading limits plus room for equipment to maneuver to perform the necessary clearing and grubbing. These limits, to be held to a minimum, will be designated for each project.
3. Clearing Limits - Area consisting of the working limits plus any additional area to operate a boom or other above-ground clearance requirement.

1.4 MEASUREMENT AND PAYMENT

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

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING.

A. All trees, brush, shrubs, stumps, roots, and other vegetative material and debris within the designated clearing limits, shall be cleared, grubbed, removed, and disposed of except the following condition:

1. Those items designated to remain by the Contract or Contracting Officer.
2. Undisturbed stumps outside the roadway, trailway, and parking area, provided they do not extend more than 12 inches above the original ground (measured from the uphill side) and are not closer than 2 feet from the edge of road or parking area, are not in the cut or fill slopes, and they do not interfere with the placement or compaction of embankments.

B. Clearing slash shall be treated in accordance with "Slash Treatment" paragraph below.

C. Trees shall be felled within the clearing limits, usually towards the center, so as to prevent damage to the trees that are to be left standing. In some cases, controlled felling, cutting of trees into sections from the top downward, or other means shall be used when required to prevent damage to property, structures, traffic, and trees/vegetation to remain.

D. Fire-dangerous dead trees or unstable live trees, designated by the Contracting Officer within the project area, shall be cut off not more than 12 inches above the uphill ground line and utilized or removed.

E. Branches on remaining trees or shrubs shall be trimmed to give a clear height of 14 feet above the roadbed unless otherwise shown on the Drawings. Tree limbs shall be trimmed as near flush with the trunk as practicable.

3.2 UTILIZATION OF TIMBER

A. Merchantable timber is timber that meets Utilization Standards. Utilization Standards shall be trees larger than 8-inches in diameter measured 12-inches above grade.

B. Utilization and Removal of Timber: Trees that meet "Merchantable Timber" standards shall be treated as follows:

1. Logs meeting utilization standards shall be limbed and decked at locations shown on the Drawings or approved by the Contracting Officer. Decking shall be done in such a manner that logs are piled parallel one to the other, can reasonably be removed by standard log loading equipment, will not damage standing trees, and will not roll. Decks shall be free of brush and soil. Title to all such timber cut from National Forest land shall remain with the Forest Service, U.S. Department of Agriculture, in accordance with its regular procedures, unless otherwise specified.
2. Removal from Government Land. Merchantable timber, designated for removal, shall become the property of the contractor without charge and removed from Government land. This timber shall not be exported from the United States nor used as substitution (as defined in 36 CFR 223 Subpart D) for timber from private lands exported by the contractor or an affiliate directly or indirectly.

3. Logs meeting utilization standards shall be limbed, cut into 16-inch to 36-inch lengths, and stacked in various locations throughout the recreation development. Logs stacked shall be stable and free of brush and soil.
4. Disposal as Unmerchantable Timber. Timber on this project is not considered merchantable and shall be disposed of in accordance with "Slash Treatment" paragraph below.

3.3 PIONEER

A. Pioneering operations shall be done in a manner that prevents undercutting of final excavation slopes, maintains materials within the road, trail, or parking limits, and controls runoff.

3.4 SLASH TREATMENT

A. Treatment of construction slash larger than 3-inches in diameter and 3-feet in length shall be accomplished by one or more of the following methods as Designated by the Contracting Officer:

1. Scattering: Construction slash shall be scattered outside the clearing limits without damaging trees. All logs shall be limbed and placed away from trees, positioned so they will not roll, and not be placed on top of one another. Stumps shall be removed and disposed of off site. Other construction slash shall be limbed and scattered to reduce slash concentrations.
2. Burying: Construction slash shall be buried at the locations shown on the Drawings and designated on the ground. Construction slash shall be matted down in layers and covered with at least 2 feet of rock and soil. The final surface shall be smoothed and sloped to drain.
3. Chipping: Construction slash up to at least 3 inches in diameter and longer than 3 feet shall be processed through a chipping machine. Chips shall be deposited on embankment slopes or outside the roadway to a loose depth not exceeding 6 inches. Minor amounts of chips may be permitted within the roadway if they are thoroughly mixed with soil and do not form a layer.
4. Piling and Burning: Construction slash shall be deposited in areas shown on the Drawings and designated on the ground. Piles shall be constructed so that burning does not damage standing trees. If burning is incomplete, the slash remaining shall be repiled and burned until pieces are reduced to less than 3 inches in diameter and 3 feet in length. These pieces shall then be scattered.
5. Decking Unmerchantable Material: Logs not meeting utilization standards and other material that exceeds 8-inches in diameter shall be decked in areas shown on the Drawings and approved by the Contracting Officer. Material shall be cut into lengths not to exceed 32 feet and all limbs removed. Decks shall be stable and free of brush and soil.
6. Stacking of Unmerchantable Material: Logs not meeting utilization standards and other material that exceeds 4-inches in diameter shall be limbed, cut into 16-inch to 36-inch lengths, and stacked in various locations throughout the recreation development. Log stacked shall be stable and free of brush and soil.

7. Removal: Construction slash shall be removed or hauled to locations shown on the Drawings and designated on the ground.
8. Piling: Construction slash shall be piled in areas shown on the Drawings and designated on the ground for later burning or disposal by others. Piles shall be placed and constructed so burning will not damage remaining trees. All stumps shall be reasonably free of dirt. Unmerchantable logs shall be cut into lengths less than 20 feet prior to placement in the pile.
9. Placing Slash on Embankment Slopes: Construction slash shall be placed on completed embankment slopes to reduce soil erosion where shown on the Drawings. Construction slash shall be placed as flat as practicable on the completed slope. Slash shall be placed from the toe of the embankment to a point at least 2 feet below subgrade elevation. Priority for the use of available slash shall be given to (1) through fills, (2) inside of curves, and (3) ditch relief outlets.

B. Construction slash less than 3 inches in diameter and 3 feet in length may be scattered within the clearing limits.

C. No construction slash shall be deposited in lakes, meadows, streams, or streambeds. Construction slash that interferes with drainage structures shall be removed immediately.

3.5 CLEARING OR CLEARING AND GRUBBING REQUIREMENTS FOR VARIOUS ITEMS:

A. Paths and Trails - The path and trail clearing limits shall be 3 feet on each side of the tread centerline and extend to a height of 8 feet above the tread. Shrubs normally growing less than 2 feet tall when mature shall be left undisturbed where they occur outside the cut and fill slope areas. All branches, except short shrubs, which extend into the travelway shall be removed by cutting them flush with the trunk of the tree or shrub.

B. Roadways and Parking Areas - On roadways and parking areas, the area to be grubbed shall be an area between the cut and/or fill stakes. The clearing area will normally be an additional 5 feet on each side of the grubbed area and shall extend to a height of 14 feet above the finished roadway surface.

C. Snow Play Areas - Clearing for the snow play areas will consist of the removal of trees, larger shrubs, and other objects as designated. No heavy construction equipment will be permitted on slopes steeper than 20 percent. Stumps and trees within the designated snow play areas are to be cut not to exceed 4 inches above ground level and stumps are not to be removed. Shrubs indicated for removal are to be cut off at ground level. All disturbed areas resulting from the clearing operation are to be smoothed and compacted.

D. Summer Play Areas - Trees and shrubs are to be removed from summer play area sites. Tree stumps may be left if cut within 4 inches of the finished ground surface.

E. Trenches for Water, Sewer, Electrical Lines, and other Underground Utilities - If no reference is made elsewhere, a clearing of **5** feet on each side of centerline will be allowed.

F. Buildings - Construction work shall disturb a minimum of the existing terrain and plant life adjacent to the building site. Only trees, shrubs, stumps, and major roots which interfere may be removed. When excavation reveals the major roots of a live and significant tree nearby, the Contractor shall not remove the tree unless it interferes with the construction and removal is authorized by Contracting Officer.

1. Comfort Stations, Pumphouse, and Sewage Lift Stations - Maximum clearing limits shall be confined to an area 20 feet outside the outside structure foundation wall on two sides and to an area 10 feet outside the outside structure foundation wall on the other two sides, unless otherwise shown on Drawings.
2. Offices, Homes, and Warehouses - Maximum clearing limits shall be confined to an area 50 feet outside the outside structure foundation wall on one side and to an area 15 feet outside the outside structure foundation wall on the other three sides, unless otherwise shown on the Drawings.
3. Bituminous-Surfaced Pads, Fire Areas, and Other Campground Items (Hydrants, Wastewater Sumps, Tent Sites, Pads at Individual Units, Trailer Dump Station, etc.) - Maximum clearing limits shall be confined to an area 5 feet outside the exterior sides of the completed unit on three sides. On the fourth side, sufficient space will be allowed to properly perform the work with equipment of sufficient size to do the work. Normally, the limits will be as indicated on the Drawings. Construction work shall disturb a minimum of the existing terrain and plant life adjacent to the site work. Branches of trees extending over the cleared area shall be trimmed to give a clear height of 12 feet above the cleared areas.

G. Wells: The clearing area shall be minimized, but shall be large enough for the well to be constructed safely. Provide an adequate area for the well drilling rig to operate.

H. On Site Wastewater Systems and Drainfields - for drainfields and absorption beds, clearing and grubbing limits shall be the entire area that contains the drainfield and/or absorption bed and to a minimum of 10 feet outside the edge of the drainfield or absorption bed. All stumps and large root balls shall be removed from the area.

I. Septic Tanks and Sewage Holding Tanks – Clearing and grubbing limits shall be a minimum of 5 feet outside the edge of the tank.

3.6 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to Section 023701 “Sediment and Erosion Control Measures.”

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.7 WASTE DISPOSAL

A. Debris and refuse shall be disposed of in accordance with Section 024100 “Waste Material Disposal”.

END OF SECTION 311000
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, sidewalks, lawns, and plantings.
2. Excavating and backfilling for buildings and structures.
3. Sub-surface drainage.
4. Excavating and backfilling for utility trenches.

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 either imported from off-site or excavated from designated locations at the site.

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

1. Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Contracting Officer. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work..
2. Bulk Excavation: Excavations more than 10 feet (3m) in width and pits more than 30 feet (9m) in either length or width.
3. 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.
4. 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. Fill: Soil materials used to raise existing grades.

E. 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.

F. 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.

G. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building.

1.3 SUBMITTALS

A. Contractor shall submit to the Contracting Officer for approval source of aggregates and backfill materials and certified sieve analysis. Materials from Government Sources are exempt from this requirement.

1.4 PROJECT CONDITIONS

A. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

1.5 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 may be processed and used for backfill if the Contractor can show compliance with the material specified herein to the satisfaction of the Contracting Officer. If excavated material is not sufficient to meet requirements, Contractor shall import needed material.

B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

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

D. 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.

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, sidewalks, pavements, 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.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

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 SUPPORT AND PROTECTION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation.

B. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and resisting soil and hydrostatic pressures and superimposed and construction loads.

C. The contractor shall meet State General Safety Orders and the provisions of the Occupational Safety and Health Administration (OSHA) pertaining to excavation support and protection, including 29 CFR 1926 Subpart P.

D. Walls of excavations 5 feet or more in depth shall be supported by shoring and bracing methods or the walls shall be sloped at one and a half to one.

E. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.

3.6 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. Provide adequate shoring and bracing as required by OSHA and other local governing regulations.

D. Excavations left open at the end of the working day shall be fenced to protect the public.

3.7 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

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.
2. Excavation for Underground Tanks, Basins, Pump Houses and Utility Boxes: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

3.8 EXCAVATION FOR WALKS AND PAVEMENTS

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

3.9 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. Proof roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Contracting Officer.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings 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 or utility pipe as directed by Contracting Officer.

3.11 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. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

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.

3.12 STRUCTURE BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Inspecting and testing underground utilities and storage tanks.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place and compact fills and backfills adjacent to structures in such a manner as to prevent wedging action or eccentric lodging upon or against the structures.

C. Place backfill in horizontal layers not more than 12 inches thick with proper moisture content for the required degree of compaction. Flooding or puddling is not allowed. Compact each layer as specified. Backfill layers under concrete flatwork shall be not more than 6 inches thick

D. Do not place backfill against any concrete footings or structure without prior permission of the Contracting Officer and in no case less than 7 days after placement of concrete.

E. Heavy equipment shall not be operated within four feet of any structure.

F. Provide for anticipated settlement and shrinkage of the backfill and for the finished grades required.

3.13 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under sidewalks, concrete slabs and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under utility buildings, use engineered fill or fill according to Section 133400 “Precast Concrete Utility Building.”
6. Under footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill 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.

3.15 COMPACTION OF BACKFILLS AND FILLS

A. The minimum degree of compaction required shall be a percent of the maximum laboratory density obtained by the standard proctor test AASHTO T99 or ASTM D698. The in-place field density shall be determined by AASHTTO T238 or ASTM D2922. The minimum compaction requirements are:

1. For Utility Trenches, see “Utility Trench Backfill” article above.

2. Under structures, water and septic tanks, utility boxes, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.
3. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 90 percent.
4. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.

3.16 GRADING

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

1. Provide a smooth transition between adjacent existing grades and new grades.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch (25 mm).
2. Walks: Plus or minus 1 inch (25 mm).
3. Pavements: Plus or minus 1/2 inch (13 mm).

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

D. Finishing Slopes: Finished slopes shall conform reasonably to the lines staked on the ground or shown on the drawings. The finished slope shall be left in a roughened condition to facilitate the establishment of vegetative growth. The finish associated with template and stringline or hand-raking methods will not be allowed.

3.17 AGGREGATE BASE COURSE [SUBBASE AND BASE COURSES]

A. Under pavements and walks, place subbase course on separation fabric according to fabric manufacturer’s written instructions and as follows:

B. Under pavements and walks, place subbase course on prepared subgrade and as follows:

1. Place base course material over subbase.
2. Subbase and base course compaction required shall be 95 percent of the maximum laboratory density obtained by the standard proctor test AASHTO T99 or ASTM D698. The in-place field density shall be determined by AASHTTO T238 or ASTM D2922.
3. Shape subbase and base to required crown elevations and cross-slope grades.
4. When thickness of compacted subbase or base course is 6 inches (150 mm) or less, place materials in a single layer.
5. When thickness of compacted subbase or base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

3.18 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified independent geotechnical engineering testing agency to perform field quality control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design-bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Contracting Officer.

D. Testing agency will test compaction of soils in place according to ASTM D 2922. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq ft (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.

E. When testing agency reports that subgrades, fills or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

F. 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.

G. The correction and retesting of unacceptable work shall be paid by the Contractor at no expense to the Government.

3.19 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specify tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Contracting Officer, reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.20 SURFACE FINISH

A. In unpaved areas all surfaces shall be restored to the original ground line or elevations shown on the drawings and left in a uniform and neat condition. Any stockpiled topsoil shall be smoothly distributed over disturbed areas to elevations shown on the drawings.

B. In paved areas, apply surface treatment as specified and shown on the drawings.

3.21 WASTE MATERIAL

A. According to Section 024100 “Waste Material Disposal.”

END OF SECTION 312000
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 312100 - PROJECT SITE PREPARATION AND GRADING

PART 1 - GENERAL

1.1 This Section includes the following:

A. Clearing, grubbing, sediment and erosion control measures shaping, compacting, excavating, and/or filling to the established sub grade as shown on the drawings, details and as staked. Such items covered include, but are not limited to construction of subgrade for roads, parking areas, campground spurs, pathways, concrete slabs, subsurface drainage structures, and grading around constructed features.

B. This section also includes the disposal of waste materials generated.

1.2 RELATED SECTIONS:

A. The following Sections contain requirements that relate to this Section:

1. Section 023701 “Sediment and Erosion Control Measures.”
2. Section 024100 “Waste Material Disposal” for the loading, handling, hauling, and placing of excess excavation material, and unsuitable excavation material.
3. Section 311000 “Clearing and Grubbing” for site clearing, grubbing, trimming, disposing of or treatment of timber, slash, and construction debris, and for protection of existing trees and plantings.
4. Section 312000 “Earthwork” for preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings, and for excavating and backfilling for buildings, structures, utility trenches, and buried mechanical and electrical utilities.
5. Section 312225 “Excavation and Embankment” for construction of roads, parking areas, spurs, pathways, and drainage features.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1. Standard Moisture Density Test, AASHTO T-99, Method C or D.
2. Density of Soil In-Place by the Sand-Cone Method, AASHTO T191
3. Density of Soil In-Place by the Drive Cylinder Method, AASHTO T204
4. Density of Soil In-Place by the Rubber-Balloon Method, AASHTO T205
5. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)), ASTM D698
6. Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, ASTM D1556
7. Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method, ASTM D2167

8. Standard Classification of Industrial Fluid Lubricants by Viscosity System, ASTM D2422

1.4 METHOD OF MEASUREMENT AND PAYMENT:

A. Project Site Preparation and Grading: Lump Sum for Project Site Preparation and Grading and shall include clearing and grubbing, sediment and erosion control, shaping, earthwork, and excavation and/or embankment (including compacting), and all other incidentals necessary to complete the work as shown on the drawing details and as staked. This item shall also include hauling excess excavation, boulders and clearing and grubbing waste to the borrow site.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 PREPARATION

A. Stripping Sod and Other Organic Materials: Sod, pine needles, and soil heavy in organic materials (topsoil) shall be stripped to mineral soil prior to any excavation or placement of fill material. Stripped material shall be stockpiled on site and placed on disturbed areas upon completion of grading operations. Excess stripped material shall be disposed of in accordance with Section 024100 “Waste Material Disposal”.

B. Clearing and Grubbing

1. All clearing and grubbing shall be performed in advance of beginning excavation and grading operations in accordance with Section 311000 “Clearing and Grubbing”.
2. Care shall also be taken to protect and preserve trees and plantings not marked for removal.
3. During all phases of construction the contractor shall confine all of his operations within the working limits as defined in Section 311000 “Clearing and Grubbing”.

C. Sediment and Erosion Control Measures: All sediment and erosion control measures shall be placed prior to any ground disturbance in accordance with Section 023701 “Sediment and Erosion Control Measures.”

3.2 GRADING

A. Graded areas shall be constructed of shallow cuts and fills using native excavated soil and/or select borrow. Some light excavation shall be performed to remove protruding boulders and surface irregularities and at other locations as staked by the Contracting Officer.

3.3 EARTHWORK

A. Shall be completed in accordance with Section 312000 "Earthwork" for the construction of subgrades for slabs-on-grade, family unit and group area pads, sidewalks, plantings, and for excavating and backfilling for buildings, structures, utility trenches, and buried mechanical and electrical utilities.

B. Shall be completed in accordance with Section 312225 "Excavation and Embankment" for construction of Roads, Parking Areas, Asphalt Paths, Campground Spurs, and Drainage Features.

3.4 CLEANUP

A. The Contractor shall confine his operation to that area within the staked fill or cut line of existing roadways, parking areas, paths, etc. No equipment shall be moved over, operated from, or be parked outside this staked fill or cut line, clearing limit, or existing roadway. No materials shall be moved over, stored, or obtained from outside the staked cut or fill lines except by written permission of the Contracting Officer. No rocks, stumps, limbs, debris, soil, or other material shall be left as a windrow or accumulation along the toe of fills, top of cuts, or adjacent areas.

END OF SECTION 312100
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 312225 - EXCAVATION & EMBANKMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This work consists of excavating material and constructing embankments. This work includes furnishing, hauling, stockpiling, placing, disposing, sloping, shaping, compacting, and finishing earthen and rocky material; drainage excavation; removal of slide material; and excavation and disposal of unsuitable material.

1.2 DEFINITION

A. Excavation - All material excavated from within the right-of-way or easement areas that is not included under other pay items listed in the Schedule of Items. Roadway excavation includes all material encountered regardless of its nature or characteristics.

B. Borrow or Select Borrow - Material used for embankment construction that is obtained from outside the roadway prism from sources shown on the Drawings. Additional sources of borrow excavation will be subject to approval in advance by the Contracting Officer.

C. Embankment Construction. Embankment construction consists of placing and compacting roadway or borrow excavation. This work includes:

1. Preparing foundation for embankment;
2. Constructing roadway embankments;
3. Benching for side-hill embankments;
4. Constructing dikes, ramps, mounds, and berms, and
5. Backfilling subexcavated areas, holes, pits, and other depressions.

D. Suitable Material - Granular material conforming to ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 24 inches in any dimension, debris, waste frozen materials, vegetation, and other deleterious matter.

E. Unsuitable Material - ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

1.3 SUMBITTALS AND QUALITY CONTROL

A. Density Tests results in “Embankment Placing Methods” paragraph in Part 3.

B. Testing frequency shall be as indicated below. Repeat tests shall be conducted in any areas where test results indicate noncompliance with specification requirements. All tests shall be conducted under the direction of a registered engineer or certified testing laboratory.

Type of Test	Frequency
Moisture-Density Relationship	1 for each soil type encountered
Density of Soil In-Place	1 for each 5000 square feet of subgrade and 1 per 1000 linear feet of embankment per 24 inches depth

1.4 MEASUREMENT AND PAYMENT

A. There will be no separate measurement or payment for work in this section. Payment will be included at the contract unit price for other items shown on the Schedule of Items see "Project Site Preparation and Grading". Measurement and payment under those separate items shall include:

1. Roadway excavation.
2. Rock and unsuitable material below the required grade and unsuitable material beneath embankment areas.
3. Outlet (Furrow) ditches outside the roadway.
4. Topsoil and other material removed and stockpiled as directed.
5. Borrow material used in the work and generated from other areas on the project.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 CLEARING & GRUBBING

A. Clearing and Grubbing shall be completed in accordance with specification Section 311000 "Clearing and Grubbing".

B. Clearing and grubbing shall be accomplished before excavation or embankment placement begins. Pioneering of roads, slash disposal, and grubbing of stumps may proceed concurrently with clearing and grubbing operation when approved by the Contracting Officer. Excavation and placement operations shall be conducted so slash material to be treated will not be incorporated in the roadway.

3.2 ROADWAY EXCAVATION AND EMBANKMENT SURFACE PREPARATION

A. General: Do not disturb material and vegetation outside the construction limits. Incorporate only suitable material into embankments. At the end of each day's operations, shape to drain and compact the work area to a uniform cross-section. Eliminate all ruts and low spots that could hold water.

B. Rock Cuts: Excavate rock cuts to 6 inches below subgrade within the roadbed limits. Backfill to subgrade with suitable material.

C. Earth Cuts: Scarify earth cuts to 6 inches below subgrade within the roadbed limits.

D. Embankments Surface Preparation: Remove topsoil and break up the ground surface to a minimum of 6 inches by plowing or scarifying.

E. All material shall be compacted according to "Embankment Placing Methods" paragraph in Part 3.

3.3 PIONEERING

A. Pioneering operations for the top of excavation slopes, toe of embankments, or pioneer road construction shall prevent undercutting of the final excavation slope, depositing of materials outside of the roadway limits, and any restriction of drainage.

3.4 UTILIZATION OF EXCAVATED MATERIALS

A. All suitable, excavated material shall be used in the construction of embankments, subgrades, shoulders, slopes, bedding, and backfill for structures and for other purposes as shown on the Drawings.

1. Excess Excavation:

    a. Designed excess excavation shall be disposed of as shown on the Drawings.

2. Rock for Slope Protection:

    a. Excavated rock suitable for protection of embankments may be conserved and used in lieu of a DESIGNATED materials source.

3. Conserving Material:

    a. Material encountered in the excavation, suitable for cushion, road finishing, or other purposes, may be conserved and utilized instead of materials from DESIGNATED sources. Excessively wet material that is otherwise suitable for embankment shall be field drained and dried before placement.

4. Excavation of Unsuitable Material:

    a. Unsuitable material shall be excavated and disposed of as shown on the Drawings or on site as directed by the Contracting Officer (CO). Excavated areas shall be backfilled with suitable material when necessary to complete the work. Frozen material shall not be placed in embankments. Rocks that are too large to be incorporated into the embankment shall be broken for incorporation into the embankment, maneuvered to the face of the embankment and embedded so that they will not roll.

5. Conservation of Topsoil:

    a. When shown on the Drawings, suitable topsoil shall be removed, transported, and deposited in the DESIGNATED stockpile areas.

3.5 DRAINAGE EXCAVATION

A. Drainage excavation shall include construction of side ditches, minor channel changes, inlet and outlet ditches, furrow ditches, ditches constructed along the road but beyond the roadway limits, and other minor earth drainage structures as shown on the Drawings. Excavated material shall be utilized in accordance with "Utilization of Excavated Materials" paragraph above.

3.6 FINISHING ROADBED

A. For roads receiving aggregate base or surface course, only rocks that do not protrude above the subgrade more than one-third of the depth of the base or surface course, or 3 inches, whichever is less, may remain in place.

B. For unsurfaced roads, unless otherwise shown on the Drawings, the top 4 inches below the finished road surface shall not contain rocks larger than 4 inches in greatest dimension. Oversize material shall be removed, reduced to acceptable size, or covered by importing suitable material approved by the Contracting Officer.

C. The subgrade shall be visibly moist during shaping and dressing. Low sections, holes, cracks, or depressions shall be brought to grade with suitable material approved by the Contracting Officer. Final compaction of the subgrade shall meet the requirements of the embankment placing method specified.

3.7 SNOW REMOVAL

A. Snow or ice shall not be incorporated in the embankment. Snow shall be removed in advance of the work and deposited beyond the roadway limits in a manner that will not cause resource damage or waste material.

3.8 FINISHING SLOPES

A. Finished slopes shall conform reasonably to the lines staked on the ground or shown on the Drawings. The finished slope shall be left in a roughened condition to facilitate the establishment of vegetative growth. The finish associated with template and stringline or hand-raking methods will not be allowed. Loose rock, loose debris, and other loose material, each of which is larger than 6 inches in diameter, shall be removed from the slope unless otherwise shown on the Drawings.

B. The tops of excavations, excluding areas of solid rock, shall be blended with the adjacent terrain by rounding where shown on the Drawings. Decomposed rock that may be cut without blasting or ripping shall be rounded. Earth overlying rock shall be rounded above the rock.

C. All rock excavations that require blasting shall be formed with controlled blasting techniques unless otherwise shown on the Drawings. Controlled blasting is defined as the controlled usage of explosives and blasting accessories in appropriately aligned and spaced drill holes for the purpose of producing a free surface or shear plane in the rock excavation slopes and of minimizing landscape damage, adjacent ground vibration, and overbreak. Presplitting is not intended unless shown on the Drawings.

D. Unless directed otherwise by the Contracting Officer, the contractor shall drill, blast, and excavate short test sections (not to yield in excess of 1,000 cubic yards) to determine the controlled blasting method, hole spacing, and charge best suited to the material encountered.

3.9 OVERBUILDING & LANDSCAPE & STREAM PROTECTION

A. Unless otherwise agreed to by the Contracting Officer, excavation or embankment material shall be confined within the roadway limits to avoid overbuilding and to protect the landscape and streams.

3.10 SUBGRADE TREATMENTS

A. Subgrade treatment shall consist of soil modification by admixing aggregates, placing geotextiles, fiber mat, wood corduroy, rock blanket, or other similar materials. The construction and material requirements for the type of subgrade treatment will be shown on the Drawings.

3.11 EARTH BERMS

A. Permanent earth berms shall be constructed along the shoulder of the traveled way at locations shown on the Drawings. Material used in the construction of berms shall be well graded with no rocks having a dimension greater than one-fourth the height of the berm.

B. Acceptable material for the berm may be windrowed as the roadbed is constructed. When the local material is not acceptable, material shall be imported from approved sources. Material used for berm construction shall contain no frozen material, roots, sod, or other deleterious material. Material shall not be wasted over the embankment slope.

C. Compaction shall be accomplished by operating the spreading equipment over the full section of the berm.

3.12 EMBANKMENT PLACING METHODS

A. All Methods: When an embankment is to be placed across swampy ground and removal of unsuitable material or subgrade treatment is not required, the lower part of the embankment shall be constructed in a single layer to the minimum depth necessary to support construction equipment.

B. Specific Methods: All embankments shall be placed by Method 4 unless otherwise noted.

1. Method 1. Side Casting and End Dumping: Embankment may be placed by side casting and end dumping. Where material containing a large amount of rock is used to construct embankments, working smaller rocks and fines in with the larger rocks and fines to fill the voids shall provide a solid embankment.

2. Method 2. Layer Placement: Surfaces steeper than a ratio of 3 horizontal to 1 vertical (3:1) upon which embankment is to be placed, shall be roughened or stepped to provide permanent bonding of new and old materials.

    a. Embankment shall be layer placed, except over rock surfaces, in which case material may be placed by end dumping to the minimum depth needed for operation of spreading equipment. Each embankment layer shall be leveled and smoothed before placement of subsequent layers. Hauling and spreading equipment shall be operated uniformly over the full width of each layer.
    b. Suitable material shall be placed in layers no more than 12 inches thick, except when the material contains rock more than 9 inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. No layer shall exceed 24 inches before compaction.
    c. Placing individual rocks or boulders greater than 24 inches will be permitted provided the embankment would accommodate them. Such rocks and boulders shall be at least 6 inches below subgrade. They shall be carefully distributed and the voids filled with finer material to form a dense and compacted mass.
    d. Where material containing large amounts of rock is used to construct embankments, the layers may be of sufficient thickness to accommodate the material involved. A solid embankment with adequate compaction shall be constructed by working smaller rock and fines in with the larger rocks to fill the voids and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment is constructed.
    e. Material shall be at moisture content suitable to obtain a mass that will not visibly deflect under the load of the hauling and spreading equipment. Excessively wet material shall be handled in accordance with Subsection 3.3.1.3.

3. Method 3. Layer Placement (Roller Compaction): Embankments shall be placed as specified in Method 2. Placement shall be in horizontal layers not exceeding 12 inches prior to compaction except when the material contains rock more than 9 inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. Compaction equipment shall be operated over the full width of each layer until visible deformation of the layer ceases or in the case of the sheepfoot roller, the roller "walks out" of the layer. At least three complete passes shall be made.

    a. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The compacting units may be of any type, provided they are capable of compacting each lift of material as specified and meet the minimum requirements contained herein. Minimum requirements for rollers are as follows:

        1) Tamping or sheepsfoot rollers shall meet the following minimum requirements:

a) Diameter - 40"
b) Completely filled with liquid.

2) Grid rollers shall be capable of exerting a force of 250 pounds per inch of width of roller drum.
3) Steel-wheel rollers, other than vibratory, shall be capable of exerting a force of not less than 250 pounds per inch of width of the compression roll or rolls.
4) Vibratory steel-wheel rollers shall have a minimum weight of 6 tons. The compactor shall be equipped with amplitude and frequency controls and specifically designed to compact the material on which it is used.
5) Pneumatic-tire rollers shall have smooth tread tires of equal size that provide a uniform compacting pressure for the full width of the roller and shall meet the following minimum requirements:
6) Towed rollers:

a) Ballast density shall exceed 100 pounds per cubic foot;
b) Volume of ballast shall exceed 7 cubic feet per tire;
c) Tire pressure shall exceed 45 pounds per square inch

7) Self propelled rollers: Shall exert a force that exceeds 200 pounds per linear inch of rolling width.

4. Method 4. Controlled Compaction: Embankments shall be placed as specified in Method 2, except earth embankments shall be placed in horizontal layers not exceeding 12 inches (loose measure) and compacted. Material shall be at moisture content suitable for attaining the required compaction. Embankments and the top 1-foot of excavation sections shall be compacted to at least 95 percent of the maximum density as determined by AASHTO T 99, Method C or D.

a. The density of the embankment material will be determined during the progress of the work in accordance with AASHTO T 191, T 205 or T 238; T 217, T 239, or T 255. Corrections for coarse particles will be made in accordance with AASHTO T 99, Note 7.
b. Density requirements will not apply to portions of rock embankments that cannot be tested in accordance with approved methods. When this condition exists, compaction shall be provided by working smaller rocks and fines in with the larger rocks to fill the voids and by operating equipment over the embankment materials.

5. Method 5. Controlled Compaction Using Density Control Strips. The embankment placement requirements for Method 4 shall apply for this method except that compaction shall be performed as shown below:

a. To determine target density, a control strip shall be constructed at the beginning of work on each type of material to be compacted. Each control strip, constructed to acceptable density and surface tolerances, shall remain in place and become a section of the completed roadway. Unacceptable

control strips shall be corrected or removed and replaced at the contractor's expense. A control strip shall have an area of approximately 400 square yards and shall be of the same depth specified for the construction of the course that it represents.

b. The materials used in the construction of the control strip shall meet the specification requirements. They shall be furnished from the same source and shall be of the same type and moisture content used in the remainder of the course represented by the control strip.

c. The base upon which a control strip is to be constructed will be approved by the Contracting Officer before placing control strip material.

d. The equipment used in the construction of the control strip will be approved by the Contracting Officer and shall be of the same type and weight as that to be used on the remainder of the course represented by the control strip.

e. Compaction of control strips shall commence immediately after the course has been placed to the specified thickness and shall be continuous and uniform over the entire surface. Compaction of the control strip shall be continued until no discernable increase in density can be obtained by additional compactive effort.

f. Upon completion of the compaction, the mean density of the control strip will be determined by averaging the results of 10 nuclear density tests taken at randomly selected sites within the control strip. The mean density of the control strip shall be the target density for the remainder of the course that it represents.

g. If the mean density of the control strip is less than 95 percent of the maximum density as determined in the laboratory compacted specimens, the Contracting Officer may request the construction of another control strip. The test procedure used to establish the maximum density will be shown on the Drawings.

h. A new control strip may also be requested by the Engineer or by the contractor when:

i. A change in the material or job mix formula is made.

j. Ten days of production have been accepted without construction of a new control strip.

k. There is reason to believe that a control strip density is not representative of the material being placed.

l. The specified course shall be compacted to at least 95 percent of the target density. A portable nuclear moisture-density test device in accordance with AASHTO T 238 and T 239 will test density.

m. Where portions of rock embankment are constructed that cannot be tested in accordance with approved methods, each layer shall be rolled full width with the same number of passes as the adjacent embankment containing material represented by a control strip.

6. Method 6. Special Project Controlled Compaction: Embankments shall be placed and compacted to at least 90 percent of the maximum density determined by AASHTO T 180, Method C or D, except that compaction of not less than 95 percent of AASHTO T 180, Method C or D, shall be obtained for a minimum

depth of 1 foot below subgrade for the width of the roadbed in both excavation and embankment sections.

a. The density will be determined during the work in accordance with AASHTO T 191, T 205 or T 238; T 217, T 239 or T 255. Corrections for coarse particles will be made in accordance with AASHTO T 99, Note 7.

3.13 CONSTRUCTION TOLERANCES

A. The tolerance class shall be "C" for roads, spurs and parking areas and "E" for all pathways. Roadway ditches shall be constructed to flow in the direction shown on the Drawings.

B. Deviations shall be uniform in the direction of change for a distance of 200 feet or more along the project centerline.

TOLERANCE CLASS **

Item	A	B	C	D	E	F	G	H	I	J
Roadbed Width (Ft)	+0.5	+0.5	+1	+1	+1	+1	+1	+1.5	+1	+2
Subgrade Elevation (Ft)	±0.1	±0.2	±0.2	±0.5	±0.5	±1	±1	±1.5	±2	±3
Centerline Alignment (Ft)	0.2	0.2	0.5	0.5	1	1	1	1.5	2	3
Slopes, Excavation and Embankment (Percent Slope)*	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10

**Maximum allowable deviation from construction stakes and drawings.

*Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

END OF SECTION 312225
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 321204 - CRUSHED AGGREGATE BASE OR SURFACE COURSE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes furnishing, hauling and placing one or more courses of aggregate base or surface course material on roadways, campground spurs, parking areas, concrete pads, sidewalks and pathways. In addition, may include furnishing, hauling, and placing crushed aggregate for bedding and backfill.

1.2 SUBMITTALS

A. Aggregate source, gradation, and material properties.

1. Submit target values within the gradation ranges shown in Table 321204-1 and /or 321204-2 for the required grading. After reviewing the Contractor's proposed target values the CO will determine the final values for the gradation and notify the Contractor in writing.

1.3 MEASUREMENT AND PAYMENT

A. Crushed Aggregate: Number of Cubic Yards of material supplied and installed measured in place to the lines and grades shown on the Drawings. Crushed aggregate shall be used for the construction of roadways, campground spurs, parking areas, concrete pads, sidewalks, pathways and other items as shown on the Drawings.

B. No adjustment in a contract unit price will be made for variations in quantity due to differences in the specific gravity or moisture content.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Furnish aggregate Subbase, Base, or Surface Courses meeting the gradation ranges shown in Table 321204-1 and Table 321204-2. Aggregate grade selection shall be as shown on the Drawings and in the Schedule of Items.

B. Materials shall be obtained from an approved source. Furnish aggregates that consist of hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel meeting the appropriate gradation and conforming to the following:

1. Los Angeles abrasion, AASHTO T 96 …...……..……... 40% max
2. Sodium sulfate soundness loss (five cycles), AASHTO T 104 …….. 12% max

3. Durability index, AASHTO T 210 ……. 35 min
4. Fractured faces, ASTM D 5821 (Subbase or Base)..... 50% min
5. Fractured faces, ASTM D 5821 (Surface Course)……. 75% min
6. Free from organic matter and lumps or balls of clay.

C. Obtain the aggregate gradation by crushing, screening, and blending processes as necessary.

2.2 AGGREGATE GRADATION

Table 321204-1, Crushed Aggregate Grading Requirements for Subbase and Base.

Percent Passing (AASHTO T27 and T11)					
Sieve	Grading A (Subbase)	Grading B (Subbase)	Grading C (Base)	Grading D (Base)	Grading E (Base)
2 1/2 -inch	100				
2-inch	97-100	100	100		
1-1/2-inch		97-100			
1-inch	65-79 (6)		80-100 (6)	100	
3/4-inch			60-94 (6)	86-100 (6)	100
1/2-inch	45-59 (7)				
3/8-inch			40-69 (6)	51-82 (6)	62-90 (6)
No. 4	28-42 (6)	40-60 (8)	31-54 (6)	36-64 (6)	36-74 (6)
No. 40	9-17 (4)			12-26 (4)	12-26 (4)
No. 200	4-8 (3)	4-12 (4)	4-7 (3)	4-7 (3)	4-7 (3)

() The value in the parentheses is the allowable deviation (+ / -) from the target values. Liquid Limit, AASHTO T89 = 25 max. Plastic Limit, AASHTO T-90 = nonplastic.

Table 321204-2, Crushed Aggregate Grading Requirements for Surface Course.

Percent Passing (AASHTO T27and T11)		
Sieve	Grading F (Surface Course)	Grading G (Surface Course)
1-1/2-inch	100	
1-inch	97-100	100
3/4-inch	76-89 (6)	97-100
1/2-inch		
3/8-inch	56-68 (6)	70-80 (6)
No. 4	43-53 (7)	51-63 (7)
No. 8		
No. 16	23-32 (6)	28-39 (6)
No. 40	15-23 (5)	19-27 (5)
No. 200	10-16 (4)	10-20

() The value in the parentheses is the allowable deviation (+ / -) from the target values. Liquid Limit, AASHTO T 89 = 35 max, Plastic Index, AASHTO T90 = 2 to 9 if percent passing the No. 200 sieve is less than 12% and less than 2 if the percent passing the No. 200 sieve is greater than 12%.

If the plasticity index (PI) is greater than 0, the TV range for the No. 200 sieve size is 8-12 (4).

PART 3 - EXECUTION

3.1 GENERAL

A. Verify that subgrade is dry and in suitable condition, locate areas that are unstable or that require further compaction.

B. Proceed with aggregate placement only after unsatisfactory conditions have been corrected and subgrade is approved in writing by the Contracting Officer (CO).

3.2 PREPARATION OF SUBGRADE

A. The subgrade shall be prepared in accordance with requirements of other specifications sections.

B. The subgrade shall conform to the lines and grades shown on the Drawings. Suitable material shall be utilized in the preparation of the subgrade. When embankment or fill is necessary, subgrade shall be placed in compacted layers not exceeding 6 inches. Unless specified otherwise, subgrade shall be compacted to 95 percent of AASHTO T 99, method C or D.

C. Suitable material for subgrade shall be granular material or fine compatible soil free of excess moisture, muck, frozen lumps, roots, sod, and other deleterious material. Remove all rock particles and hard earth clods larger than 3 inches in the longest dimension.

3.3 MIXING AND SPREADING

A. Mix the aggregate and adjust the moisture content to obtain uniform moisture. Spread and shape the mixture on the prepared surface in a uniform layer not to exceed 6 inches in compacted thickness.

B. Route hauling equipment uniformly over the full width of the surface to minimize rutting or uneven compaction.

3.4 COMPACTING

A. Compact each layer of aggregate full width. Compact each layer to a density of at least 95 percent of the maximum density as determined by AASHTO T 99 method C or D.

B. Testing shall be at intervals specified in tables shown in Section 014100 “Quality Control.”

3.5 SURFACE AND CONSTRUCTION TOLERANCES

A. Shape the surface to the required template and as staked. Surface shall be graded and shaped smooth to within ½-inch in 10 feet.

B. Maintain the aggregate course to the correct lines, grade, and cross-section by blading, watering, and rolling until placement of the next course.

C. Upon completion of full placement and after haul trucks have completed their haul across section of the road, the road shall be finish bladed, watered, and rolled.

D. Aggregate shall be placed as shown on the drawings and as staked. Tolerance for thickness of aggregate shall be +/– ½-inch and for width shall be + 1-foot.

3.6 ACCEPTANCE

A. Aggregate shall be accepted following placement when shown to meet material quality, gradation, compaction requirements, required depth and width, and finish blading.

END OF SECTION 321204
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 322622 - PRECAST CONCRETE CURB STOPS

PART 1 - GENERAL

1.1 SUMMARY

A. This item shall consist of furnishing and installing pre-cast concrete curb sections in accordance with these specifications and details shown on drawings in conformity with the typical layout and dimensions to the grade established.

1.2 MEASUREMENT AND PAYMENT

A. Curb Stop: Payment will be made for each pre-cast concrete curb stop of size and shape shown on drawings (including concrete, reinforcement, delivery, labor, and anchor pins) installed and accepted and as listed in the Schedule of Items.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE CURB STOPS

A. Precast Curb Stops: The precast concrete curb stops shall be the size and shape as shown on the drawings. The concrete shall be reinforced as shown on the drawings and shall be 4,000 psi (28 day), 6.5 bag mix, with 6 percent entrained air.

B. Before any of the precast sections are placed in the work, the Contractor shall furnish to the Contracting Officer a “certificate confirming compliance for reinforcement and strength” issued by the Pre-cast manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

A. The Forest Service shall have the right to inspect the precast curb stops either at the precast plant or after delivery. Units delivered to the project site shall be rejected if they have spalls, surface hairline cracks exceeding 12 inches in any single square foot area, or any cracks exceeding 1/16 inch width. All curb stops that are damaged through improper handling or placing shall be rejected.

3.2 BEDDING

A. When curbing is to be installed on a bituminous surfaced area, the curb stops shall be set on top of the surfacing and no bedding will be required.

B. When curbing is to be installed on a crushed aggregate or native surfaced area, the base on which the curb stops are to set shall be compacted by a minimum of three passes

with a vibratory compactor to a firm, even surface. All soft or unsuitable material shall be removed and replaced with material suitable to the Contracting Officer.

3.3 PLACING AND ANCHORING

A. The pre-cast curb stops shall be placed or set as illustrated on the drawings or as directed by the Contracting Officer. This may be in a continuous line or as cords of a curve with or without openings between. They shall, when set in final location, set solidly on the bedding or surfacing.

B. When lifting wires have been cast in the bottom of the sections, they shall be removed. The wires may be removed by cutting reasonably flush so that they do not interfere with the section setting solidly.

C. The pre-cast sections shall be anchored in place by driving steel pins or dowels flush with the top through the two holes provided. These pins shall be 3/4 inch round or No. 6 deformed reinforcing steel, 24 inches long.

3.4 CLEANUP

A. When the installation of the curb stops has been completed, the area shall be cleaned up by removing all debris and material not utilized.

END OF SECTION 322622
August 2024

USDA FOREST SERVICE, R4
CLIFFROSE TRAILHEAD

SECTION 323151 - FENCE

PART 1 - GENERAL

1.1 This item shall consist of a post and rail fence and gates constructed in accordance with these specifications and the details and dimensions shown on the drawings at the locations designated.

1.2 MEASUREMENT AND PAYMENT

A. The quantity to be measured shall be the number of linear feet of "Buck Pole Fence" as measured along the centerline of the fence. Measurement of gates shall be the number installed.

PART 2 - PRODUCTS

2.1 FENCE RAILS

A. The fence rails shall be sound, treated lumber, free from rot, disease, or insects. Fence rails shall be 2 inch by 6 inch from a private or commercial source.

2.2 POSTS

A. The buck posts shall be sound, treated, free from rot, disease, or insects. Minimum diameters shall be 6 inches for the fence rails and 8 inches for the gate posts. Material shall be obtained from a commercial or private source.

2.3 MISCELLANEOUS METAL FASTENERS

A. Strap iron, bolts, spikes, eye bolts, chain and dowels shall be provided as shown on the drawings and shall have approval of the Contracting Officer before being used in the work.

PART 3 - EXECUTION

3.1 CLEARING

A. Clearing and grading are not allowed and disturbance of the ground cover shall be kept to a minimum. In general, the fence shall be erected on undisturbed natural ground and may deviate from the line as staked to negotiate trees and obstacles. Such deviations must have prior approval of the Contracting Officer.

3.2 CLEANUP

A. When the fence has been installed, the general area shall be cleaned up to present a finished appearance. All debris and material not utilized shall be removed.

END OF SECTION
August 2024