TECHNICAL SPECIFICATIONS

INDEX TO

TECHNICAL SPECIFICATIONS

MALLARDS REST FAS ROAD REALIGNMENT

FWP# 7213231

SECTION 01010 - SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Owner and Contractor Responsibilities

B. Contractor use of site and premises.

C. Scope of Work

1.2 Owner and Contractor Responsibilities

A. Owners Responsibilities:

1. Staking of road centerline, elevation reference and daylight line.

B. Contractors Responsibilities:

1. Quality control of work.

2. Coordination with FWP Engineer Jacob Mangum

1.3 CONTRACTOR USE OF SITE

A. Limit use of site to allow:

1. Site will be closed during construction.

2. Coordinate with FWP for site closure. The contractor will be given a 30-day period for the completion of the project.

1.3 SCOPE OF WORK

A. Project Objective:

The objective of this project is to close the existing approach, and then realign, grade, and surface the access road.

B. Scope of Work:

Work includes the following but is not limited to the general description contained herein:

BASE BID ITEMS:

1. **Mobilization** – All mobilization of equipment, administrative costs, and establishment of BMP's.
2. **Excavation** – All excavation, wasting of excess material, site clearing, and rough grading work associated with the access road.
3. **36" Culvert & Flared End Sections** - All work and materials required to place a 36" corrugated metal pipe culvert with flared end sections.
4. **3" (-) Base Course** – All work and material required to place 6" of approved 3" minus base course material on the access road. Quantities shown on the Bid Form are compacted in place volumes.
5. **1 1/2" (-) Crushed Top Surfacing** - All work and material required to place 4" of approved 1 1/2" minus crushed surfacing material on access road. Quantities shown on the Bid Form are compacted in place volumes.
6. **Fence Removal** - All work and material required to remove the designated fencing as quantified in the proposal.
7. **Fence Installation** - All work and material required to install 4-wire barbed fence, corners, and brace panels in the locations marked by the owner.
8. **4 Wire Gate** - All work and material required to install 4-wire 16' barbed gate.
9. **Pipe Gate Transfer** - All work and material required to remove and relocate the existing pipe gate to the new location.
10. **Sign Transfer** - All work and material required to remove and relocate the existing signs to the new approach location.
11. **Barrier Rock** - All work and material required to place the barrier rock to close the existing approach. To be placed outside the highway clear zone.
12. **Revegetation** - All work and material required to reclaim impacted areas, spread topsoil, and reseed.

C. CONTRACTS: All work shall be done under one general contract.

END OF SECTION

SECTION 01019 - CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Application for Payment

B. Change procedures

C. Project Staking

D. Environmental Considerations

1.2 RELATED SECTIONS

A. Section 01025 - Measurement and Payment.

B. Section 01400 - Quality Control

1.3 APPLICATIONS FOR PAYMENT

A. Submit 1 copy of each application on Department Fish, Wildlife and Parks Form 101.

B. Content and Format: Utilize Schedule of Values on proposal form for listing items in Application for Payment.

C. Payment Period: 30 days.

1.4 CHANGE ORDER PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by State of Montana, General Conditions of the Contract.

B. The Engineer may issue a Change Directive, which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within 5 days.

C. The Contractor may propose changes by submitting a request for change to the Engineer describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.

D. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units, which are not pre-determined, execute Work under a Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

1.5 PROJECT STAKING

A. Construction staking provided by the owner

1. the road centerline stationing, reference elevations, and daylight line will be staked by the FWP Engineer.

2. If owners staking is destroyed through careless actions of the Contractor, the staking may be replaced by the owner and the cost of replacement deducted from the Contractor's contract.

B. Construction staking provided by the Contractor

1. All staking desired by the Contractor in addition to that noted above shall be provided by the Contractor.

1.6 ENVIRONMENTAL CONSIDERATIONS

A. The Contractor shall use best management practices to prevent silt, soil and debris from entering the water. This may include straw, gravel or fabric. Temporary dikes to divert rainwater may be used, provided they are removed, and the gravel or soil returned to the original condition. Exposed soil may require straw or similar cover to minimize erosion caused by rain. Other appropriate methods may be used at the Contractors' discretion or as directed by the owner.

B. Equipment used in or near water shall not leak fluids. It shall be power washed before use on the site and examined by the engineer.

C. All material removed from the site will be disposed of in a safe and legal manner.

END OF SECTION

SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Measurement and payment criteria applicable to the Work performed under a unit price payment method.

B. Defect assessment and non-payment for rejected work.

1.2 AUTHORITY

A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the individual specification section shall govern.

B. Take all measurements and compute quantities. The Engineer will verify measurements and quantities.

C. Assist by providing necessary equipment, workers, and survey personnel as required.

1.3 UNIT QUANTITIES SPECIFIED

A. Unit price quantities and measurements indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment. Lump sum bid item quantities will not be measured. Payment for these lump sum bid items will be per the bid form.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.

1.4 MEASUREMENT OF QUANTITIES

A. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

B. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.5 PAYMENT

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

B. Final payment for Work governed by unit prices will be made based on the actual measurements and quantities accepted by the Architect/Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

1.6 DEFECT ASSESSMENT

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

B. If, in the opinion of the Engineer it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work will be repaired to the instructions of the Montana Department of Fish, Wildlife and Parks Engineer and the unit sum/price will be adjusted to a new sum/price at the discretion of the Montana Department of Fish, Wildlife and Parks Project Engineer.

2. The defective work will not be repaired. The Project Engineer will adjust the unit sum/price of the work to reflect the degree of defectiveness and subsequent serviceability.

C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.

D. The authority of the Montana Department of Fish, Wildlife and Park Project Engineer to assess the defect and identify payment adjustment, is final.

1.7 NON-PAYMENT FOR REJECTED PRODUCTS

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

END SECTION

SECTION 01029 - UTILITIES WITHIN WORK AREAS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Utilities within work areas.

B. Contractor's responsibilities.

1.2 UTILITIES WITHIN WORK AREAS

A. The contractor shall be responsible for determining the location of any utilities in the project area.

B. The contractor shall be responsible for working safely around any utilities that are located within the project area.

1.3 CONTRACTOR RESPONSIBILITIES

A. Notification: The Contractor shall contact, in writing, all public and private utility companies that may have utilities that may be encountered during excavation. The notification shall include the following information:

1. The nature of the work the Contractor will be performing.

2. The time, date, and location the Contractor will be performing work that may conflict with the utility.

3. The nature of work the utility will be required to perform such as moving a power pole, supporting a pole or underground cable, etc.

4. Requests for field location and identification of utilities.

B. Overhead Utilities: The Contractor shall use extreme caution to avoid a conflict, contact, or damage to overhead utilities such as power lines, telephone lines, television lines, poles, or other appurtenances during construction of this project.

END OF SECTION

SECTION 01039 - COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination.

B. Alteration project procedures.

C. Preconstruction conference.

1.2 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion.

C. After Owner occupancy of site, owner will coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

D. Contractor will coordinate all work activities with the Montana Department of Fish, Wildlife and Parks Engineer Jacob Mangum.

1.3 PRECONSTRUCTION CONFERENCE

A. Engineer will schedule a conference after Notice of Award is issued.

B. Attendance Required: Engineer, Contractor and the Regional Fish, Wildlife and Parks representative when possible.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.
   5. Designation of personnel representing the parties in Contract, and the Engineer.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
   7. Scheduling.

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Product data.

E. Samples.

F. Manufacturers' instructions.

G. Manufacturers' certificates.

H. Construction photographs.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal to Project Manager no less than 5 days before product installation.

B. Apply Contractor's stamp, signature or initial certifying that review and verification of Products submitted, is in accordance with the requirements of the Work and Contract Documents.

C. Schedule submittals to expedite the Project.

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

E. Revise and resubmit submittals as required, identify all changes made since previous submittal.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule within 15 days after date established in Notice to Proceed for Project Manager's review.

1.3 PROPOSED PRODUCTS LIST

A. Within 5 days after date of Notice to Proceed, submit complete list of major products/aggregates proposed for use, with name of manufacturer/supplier, trade name, and model number of each product.

B. 5 days prior to installation of surfacing aggregate materials, submit aggregate laboratory test analysis for the aggregate along with the name of the supplier.

C. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

1.6 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.

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

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.7 SUBMITTALS LIST

A. Aggregate Materials

B. Fencing Materials

C. Culvert

END OF SECTION

SECTION 01400 - QUALITY CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

A. This section describes the Contractor quality control testing requirements.

1.2 REFERENCES

A. The following ASTM publication is a part of this specification.

1. ASTM E329 Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. Be responsible for quality control tests and inspections to control contractor production and construction processes. Include in the Contractor quality control system an internal organization, plans, and procedures to produce the specified end product. Assure the system covers all construction operations, both on-site and off-site, and is keyed to the construction sequence. Quality control testing frequency is at Contractor discretion, except where tests are specifically required in the technical specifications for individual products.

PART 4 - MEASUREMENT AND PAYMENT

4.1 PAYMENT FOR TESTING

A. Pay for all quality control testing as outlined in Subsection 3.1 above. All initial aggregate quality tests are quality control tests are at Contractor expense. Testing costs are incidental to the work and to be included in the unit price bid for the respective item.

4.2 RETESTING

A. Quality assurance re-testing due to failing initial tests will be performed by the Owner or the Owner’s quality assurance testing agency, and the re-test costs deducted from the contract amount for the affected bid item.

END OF SECTION

SECTION 01560 - TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Weed Control.

B. Water Control.

C. Dust Control.

D. Erosion and Sediment Control

E. Pollution Control

F. Traffic Control

1.2 RELATED SECTIONS

A. Section 01010 - Summary of Work

B. Section 01039 - Coordination and Meetings

1.3 WEED CONTROL

A. Seed and reclaim disturbed areas as soon as possible.

B. Thoroughly clean equipment before bringing on site and notify Engineer for inspection.

1.4 WATER CONTROL

A. Grade site to drain away from natural water bodies. Maintain excavations free of water.

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

1.5 DUST CONTROL

A. Contractor shall grade and compact materials as soon as possible after being placed.

1.6 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

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

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

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

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

1.7 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.8 TRAFFIC CONTROL

A. Provide all temporary signing, personnel and traffic control devises as required by federal, state and local regulations.

END OF SECTION

SECTION 01600 - MATERIAL AND EQUIPMENT

PART I GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Substitutions.

1.2 PRODUCTS

A. Products: Means new material, components, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

1.3 TRANSPORTATION AND HANDLING

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

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

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

1.4 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

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

C. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

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

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

1.5 SUBSTITUTIONS

A. Engineer will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

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

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

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

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

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

F. Substitution Submittal Procedure:

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

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.

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

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

1.2 CLOSEOUT PROCEDURES

A. Notify the Engineer within 5 days of Work completion that Work is complete in accordance with Contract Documents and ready for Project Manager's final inspection.

B. Provide submittals to Engineer that are required by governing or other authorities or Owner.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due. Include Certificate of Substantial Completion, Affidavit on Behalf of the Contractor, Consent of Surety Company to Final Payment and As-built drawings and specifications.

D. Owner will occupy all portions of the site.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean equipment and fixtures to a sanitary condition.

C. Clean site, rake clean landscaped areas, leave all disturbed areas relatively smooth with no wheel tracks, ridges or ruts.

1.4 PROJECT RECORD DOCUMENTS

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

1. Contract Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other Modifications to the Contract.

5. Reviewed shop drawings, product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

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

1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Field changes of dimension and detail.

3. Details not on original Contract drawings.

4. Product substitutions or alternates utilized.

5. Changes made by Addenda and Modifications.

F. Submit documents to Engineer with claim for final Application for Payment.

1.5 WARRANTIES

A. All work shall be warranted free from defect for a period of one year from final inspection date.

END OF SECTION

SECTION 02110 - SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Remove surface debris.

B. Clear only areas designated for construction of plant life and grass.

C. Tree and shrub removal.

D Topsoil excavation.

E. Measurement and Payment

1.2 REGULATORY REQUIREMENTS

A. Conform to State and County codes for disposal of debris and burning debris on site.

B. Coordinate clearing Work with utility companies.

PART II EXECUTION

1.1 PROTECTION

A. Locate, identify, and protect utilities that remain, from damage.

B. Protect trees, plant growth, and features designated to remain, as final landscaping.

1.2 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove root system of woody plants to a depth of 24 inches below finished grade.

C. Clear undergrowth and deadwood, without disturbing subsoil.

1.3 REMOVAL

A. Remove extra top soil, rock, and extracted plant life to designated area.

B. Dispose of any additional material according to local regulations.

1.4 TOPSOIL EXCAVATION

A. Excavate and stockpile topsoil from all areas that are to receive fill or further excavation.

B. Stockpile location to be approved by Engineer.

1.5 MEASUREMENT AND PAYMENT

A. The work described in Section 02110 will be incidental to the Excavation.

END OF SECTION

SECTION 02207 - AGGREGATE MATERIALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. References

B. Submittals

C. Aggregate materials and engineering fabric

D. Source quality control

E. Stockpiling

F. Stockpile clean up

1.2 RELATED SECTIONS

A. Section 02211 - Rough Grading.

B. Section 02231 - Aggregate Courses.

1.3 REFERENCES

A. AASHTO - M147 - Materials for Aggregate and Soil-Aggregate.

B. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

C. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb. (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

D. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

E. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.4 SUBMITTALS

A. Submit laboratory test results for each type of aggregate material 5 days prior to installation, for Project Manager approval.

1. Each aggregate material used as a base or surfacing material shall have as a minimum the following laboratory tests completed:

I. Sieve Analysis

II. Proctor
III. Atterberg Limit Test (crushed top surfacing only)

B. Materials Source: Submit name of imported materials suppliers. Provide materials from same source throughout the work. Change of source requires retesting at the Contractor's expense.

C. Change of source requires Engineer's approval.

PART 2 PRODUCTS

2.1 AGGREGATE MATERIALS AND ENGINEERING FABRIC

A. Pit run base course, 3" (-) free of shale, clay, friable material and debris; graded in accordance with AASHTO T-11 and T-27, within the following limits:

TABLE OF GRADUATIONS
Percentage of Weights Passing Square Mesh Sieves

	Grade 1
3 Inch Sieve	100%
No. 4 Sieve	25-60%
No. 200 Sieve	2-10%

1. Material shall be evenly graded.
2. 5% oversized material is permitted.

B. Crushed Top Surfacing; free of silt, lumps of clay, loam, friable or soluble materials, and organic matter; graded in accordance with ANSI/ASTM C136; within the following limits:

TABLE OF GRADUATIONS
Percentage by Weights Passing Square Mesh Sieves

Passing	% Passing
1 1/2"	100 %
3/4"	
1/2"	
3/8"	
#4	40% - 70%
#10	25% - 55%
#16	
#30	
#50	
#100	
#200	5% - 12%

The aggregate for all grades, including added binder or filler, shall meet the following supplemental requirements.

(1) Dust Ration. The portion passing the No. 200 Sieve shall not be greater than 2/3 of the portion passing the No. 40 Sieve.

(2) The liquid limit for that portion of the fine aggregate passing a No. 40 Sieve shall not exceed 25 and the plasticity index (PI) shall be less than six, as determined by AASHTO T-89 and T-90.

(3) No intermediate sizes for cover aggregate, or for other purposes, shall be removed from the material in the course of production unless authorized in writing by the Architect/Engineer.

(4) The material shall meet all the requirements of this section when it arrives on the project site. Windrow mixing of different materials to obtain the specified material will not be allowed. If bentonite is to be added, it shall be done in a method approved by the Engineer.

(5) At least 50% by weight of the aggregate retained on the No. 4 sieve must have at least one mechanically fractured face.

2.2 SOURCE QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01019.

B. Tests and analysis of aggregate material will be performed in accordance with AASHTO T-11 and T-27 and as specified in this Section.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. The FEMA approved pits for Park County for material are listed below:

1. Arthun - DEQ #1805 – T2N, R9E, Sec 6 - 45.95599, -110.66385
2. Mission - DEQ#1070 – T1S, R11E, Sec 31 - 45.7042, -110.411
3. Durgan Gravel Pit - DEQ# 1165 - T4S,R9E, Sec 2- 45.5156, -110.5768
4. Pierce Site - DEQ# 2323 – T6S, R8E, Sec 10 - 45.3246, -110.7244
5. Fisher Sand and Gravel - DEQ# 1268 - T2S, R10E, Sec 8 and 9- 45.6736, -110.5039

PART 3 EXECUTION

3.1 STOCKPILING

A. Stockpile materials on site at locations approved by Engineer.

B. Separate differing materials with dividers or stockpile apart to prevent mixing.

C. Stockpile in sufficient quantities to meet project schedule and requirements.

D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

A. Remove stockpile, leave area in a clean, neat condition reseed as necessary. Grade site surface to prevent freestanding surface water.

3.3 MEASUREMENT AND PAYMENT

A. All testing other than the compaction testing will be incidental to the associated material.

END OF SECTION

SECTION 02211 - ROUGH GRADING

PART 1 GENERAL

1.1 SECTION INCLUDE

A. Removal of topsoil and subsoil.

B. Excavating, grading, filling and rough contouring the site for parking area and boat ramp construction.

C. Measurement and Payment

1.2 RELATED SECTIONS

B. Section 02110 - Site Clearing

C. Section 02207 - Aggregate Materials.

1.3 REFERENCES

A. AASHTO T180 - Moisture-Density Relations of Soils using a 10-lb (4.54 kg) Rammer and an 18-in. (457 mm) Drop.

B. ASTM D6938 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

PART 2 EXECUTION

2.1 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Notify utility companies to locate buried utilities.

D. Locate, identify, and protect utilities that remain from damage.

2.3 FILLING

A. Fill areas to contours and elevations with unfrozen materials.

B. Place fill material in no greater than 8” lifts on continuous layers and compact. See Section 02231.

C. Maintain optimum moisture content of fill materials to attain required compaction density.

D. Make grade changes gradual. Blend slope into level areas.

2.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed as necessary by the Engineer.

B. Compaction testing will be performed in accordance with ASTM D6938. Compaction testing interval shall be per each lift (not to exceed 8") and every 250 ' lineal feet of road length.

C. Placement of base aggregate and subsequent road surfacing shall not commence until Engineer has been notified and has had 48 hours to inspect rough grading.

2.4 MEASUREMENT AND PAYMENT

A. The Rough Grading described in Section 02211 shall be included under Excavation Bid Item #2 on the Bid Form.

END OF SECTION

SECTION 02231 - AGGREGATE COURSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate courses.

1.2 RELATED SECTIONS

A. Section 01025 - Measurement and Payment: Requirements applicable to lump sum.

1.3 REFERENCES

A. AASHTO T180 - Moisture-Density Relations of Soils using a 10lb (4.54 kg) Rammer and an 18 in. (457mm) Drop.

B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

C. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

PART 2 PRODUCTS

2.1 MATERIALS

A. 1 1/2 inch minus Crushed Top Surfacing (CTS): As specified in Section 02207.

B. 3 inch minus crushed base course: As specified in Section 02207.

PART 3 EXECUTION

3.1 AGGREGATE PLACEMENT

A. Spread material over prepared substrate to a total compacted thickness indicated for each material. A vibratory roller is suggested for compaction.

B. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content. Compact aggregate materials and sub-grade to minimum 95 percent of maximum density.

C. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.2 TOLERANCES

A. Flatness: Maximum variation of 1/10 foot in 10 feet measured along existing slope.

B. Scheduled Compacted Thickness: Within 1/4 inch of designated thickness.

3.3 FIELD QUALITY CONTROL

A. Contractor will be responsible for field quality control. FWP Engineer will inspect all work and notify the contractor if additional compaction testing will be required.

B. Compaction testing will be performed in accordance with ASTM D2922.

C. If tests indicate Work does not meet specified requirements, recompact and retest or at Engineer's discretion, remove Work, replace and retest.

3.4 MEASUREMENT AND PAYMENT

A. All material and labor described in this section shall be bid and compensated under the associated material as listed on the bid form.

END OF SECTION

SECTION 02241 - BARRIER ROCKS

PART 1 GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing and placing barrier rocks at designated areas on the project drawings or as directed by the Engineer.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 GENERAL

A. Furnish hard, durable, angular barrier rock that is resistant to weathering and water action and free of organic or other unsuitable material. Do not use shale, rock with shale seams, or other fissured rock that may break into smaller pieces in the process of handling and placing.

B. Furnish barrier rocks that approximately measure 8 cubic feet (2.5 – 3.5 feet in nominal diameter as measured on the long axis). Embed barrier rocks 1/3 of the diameter below finished or existing grade. Backfill around embedded barrier rocks by tamping with hand tools and/or mechanical equipment. Space barrier rocks at 5 feet clearance as measured from edge to edge.

C. Install barrier rocks according to the project drawings or as directed by the Engineer.

PART 4 MEASUREMENT AND PAYMENT

4.1 PAYMENT

A. Barrier rock placement will be measured and paid for by the each (EACH).

END OF SECTION

SECTION 02725 - DRAINAGE CULVERTS

PART 1 GENERAL

1.1 DESCRIPTION

A. Furnish and install all drainage culverts and other appurtenant structures as specified in the Contract and this section. Pipe strength classifications are specified on the plans, listed in the Contract Documents or herein.

1.2 CERTIFICATION BY MANUFACTURER

A. Furnish a manufacturer's certification on all pipe, certifying that the pipe and fittings meet the contract requirements.

1.3 REFERENCES

AASHTO M 36 Corrugated Steel Pipe, Metallic-Coated, For Sewers and Drains

AASHTO M218 Steel Sheet, Zinc-Coated (Galvanized), for Corrugated Steel Pipe

AASHTO M245 Corrugated Steel Pipe, Polymer-Precoated, For Sewers and Drains

AASHTO M274 Steel Sheet, Aluminum-Coated (Type-2) for Corrugated Steel Pipe

AASHTO M294 Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

ASTM C361 Reinforced Concrete Low-Head Pressure Pipe

ASTM C76 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

ASTM C443 Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets

ASTM C506 Reinforced Concrete Arch Culvert, Storm Drain and Sewer Pipe

ASTM C507 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe

ASTM C655 Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe

ASTM C665 Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

ASTM A761 Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches

ASTM C789 Precast Reinforced Concrete Box Sections for Culverts. Storm Drains and Sewers [Metric]

ASTM C850 Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with less than 2 ft of Cover Subjected to Highway Loads

PART 2 PRODUCTS

2.1 GENERAL

A. Furnish all culvert piping as specified in the Contract Documents and meeting the materials and testing requirements of this Section. Furnish the pipe sizes and strength classifications shown in the Contract documents.

B. References to ASTM, ANSI or AASHTO designation, means the latest revision at the time of call for bids.

C. Assure all pipe is clearly marked with type, class and/or thickness as applicable. Assure lettering is legible and permanent under normal handling and storage conditions.

D. Furnish the joint type, class, thickness designation, casting, lining, marking, testing, etc. as specified.

E. Culverts shall not require headwalls, cutoff walls or end treatments unless noted in the plans or bid sheets.

2.2 PIPE MATERIALS

A. Concrete Pipe

1. Furnish reinforced concrete culvert pipe meeting ASTM C76, C506, C507 or C655. Use round reinforced pipe having O-ring rubber gasket joints meeting ASTM C443 with the O-ring gasket confined in the pipe tongue groove.

B. Corrugated Metal Pipe

1. Furnish corrugated metal pipe meeting ASTM A760 (AASHTO M36). Connections must be made with minimum coupling band width of 10- 1/2”. When specified by the Engineer, materials shall meet the following standards:

   ASTM A760 (AASHTO M36) Specifications for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains

   ASTM A762 (AASHTO M245) Specifications for Corrugated Steel Pipe, Polymer Pre-coated for Sewers and Drains

   ASTM A742 (AASHTO M246) Specifications for Steel Sheet, Metallic-Coated and Polymer Pre- coated for Corrugated Steel Pipe

ASTM A929 (AASHTO M274) Specifications for Steel Sheet Metallic-Coated by the Hot Dip Process for Corrugated Steel Pipe

C. HDPE

D. An Owner may select other materials as appropriate for applications where an Engineer has reviewed the circumstances and provided specifications for installation. When specified by an Engineer, materials shall meet the following standards. Refer to:

ASTM A761 Corrugated Steel Structural Plate, Zinc Coated, for Field- Bottled Pipe, Pipe-Arches, and Arches

ASTM C789 Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers [Metric]

ASTM C850 Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with less than 2 ft of Cover Subjected to Highway Loadings

1. Furnish HDPE Pipe with a corrugated exterior and a smooth interior waterway. pipe must be made from virgin polyethylene (PE) compounds with dimensions and markings to conform to AASHTO M252, M294 and MP7. Pipe joints must meet ASTM E1417 and ASTM D3212 standards for watertight joints.

AASHTO M252 Corrugated Polyethylene Drainage Pipe

AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60- in.) Diameter

ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

ASTM E1417 Liquid Penetration Testing

ASTM D3212 Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

PART 3 EXECUTION

3.1 PIPE INSTALLATION

A. Excavation

1. Excavate and backfill culverts in accordance with manufacturers specifications and Standard Drawings No. 02725-1 and 02725-2 (MDT). Excavate to permit removal, jointing, and backfilling of pipe. Construct and maintain the excavations to prevent personal injuries, damage to foundations, structures, pole lines, or other facilities. Pile and maintain all excavated material to meet OSHA requirements and with minimum inconvenience to the public. Do not excavate below the specified depth, unless approved by the Engineer. When excavation is complete, request approval by the

Engineer as to the character and suitability of the foundation material. The foundation shall provide a firm foundation of uniform density throughout its length and width.

B. Bedding

1. Place un-compacted bedding material over the foundation in a layer of uniform thickness. For pipe with diameters of 12 to 54 inches, the bedding thickness is 4 inches. For pipe diameters larger than 54 inches, the bedding thickness is 6 inches. For belled joints, recess the bedding to receive the joints. Place the culvert on un-compacted bedding layer. The bedding shall extend 18 inches beyond each side of the culvert unless otherwise noted on the plans. Furnish a well graded, free draining material free of excess moisture, muck, frozen lumps, roots, sod, or other deleterious material conforming to the following:

-Maximum particle size: 1/2 inch or half the corrugation depth, whichever is smaller
-Soil classification: AASHTO M 145 A-1, A-2-4, A-2-5, or A-3

C. Backfill

1. Use equipment and methods for backfilling and compacting that do not distort, misalign, or damage the pipe. Place backfill in horizontal layers that, when compacted, do not exceed 6 inches in depth. Firmly tamp the backfill under the pipe haunches. Bring backfill up evenly on all sides of the structure, and extend each layer to the limits of the excavation or to natural ground. Backfill with soils conforming to the following unless otherwise noted on the plans:

For all structures and pipes other than plastic pipe:
-Maximum particle size: 3 inches
-Soil classification: AASHTO M 145 A-1, A-2, or A-3

For plastic pipe:
-Maximum particle size: 1½ inches
-Soil classification: AASHTO M 145 A-1, A-2-4, A-2-5, or A-3

2. Bedding material and backfill around and over culverts shall be compacted to 95% of maximum laboratory dry density, ASTM D690 for all culverts installed in roadway embankments, unless specified otherwise by Engineer.

D. Responsibility for Materials

1. Be responsible for all material furnished. Replace all material found defective in manufacture or damaged in handling after delivery by the manufacturer. This includes furnishing all material and labor required for the replacement of installed material discovered defective before final acceptance of the work or during the guarantee period.

2. Be responsible for the safe storage of material for the work until it has been incorporated in the completed project.

E. Handling of Pipe

1. Deliver and distribute all Contractor furnished pipe. Load and unload pipe, fittings and accessories by lifting with hoists or skidding so as to avoid shock or damage. Do not drop the materials. Do not skid or roll pipe handled on skidways against pipe already on the ground.

2. In distributing the material at the work site, unload each piece opposite or near the place where it is to be laid in the trench. Keep the pipe interior and other accessories free from dirt and foreign matter at all times.

3. Handle pipe to prevent coating or lining damage. Repair or replace all coating or lining damage in a manner satisfactory to the Engineer.

F. Laying Pipe.

1. Lay and maintain all pipe to the specified lines and grades with fittings, at the specified locations.

2. Use tools and equipment meeting Engineer approval for the safe and convenient prosecution of the work. Carefully lower all pipe and fittings into the trench preventing damage to pipe materials and protective coatings and linings. Do not dump or drop materials into the trench.

3. Exercise care to prevent foreign material from entering the pipe as it is installed. When pipe laying is not in progress, close the open ends of pipe using a plug or other means approved by the Engineer. Remove and clean all sand, gravel, concrete and cement grout that has entered the lines during construction.

G. Tolerances

1. Install pipe within 1/2-inch (13 mm) of the specified alignment and within 1/4-inch (6 mm) of the specified grade for pipe 15-inch (38 cm) in diameter and smaller and 1/2-inch (13 mm) of specified grade for pipe larger than 15-inch (38 cm) diameter. These tolerances apply to any point along the entire pipe length.

3.2 TESTS

A. Visual Inspection

1. Inspect culverts for line, grade and roundness. Repair or replace culverts that are out of round, excessively deflected, or not installed to line and grade requirements.

B. Joints

1. All joints shall be silt tight joints to prevent infiltration and exfiltration of soil and water.

PART 4 MEASUREMENT AND PAYMENT

4.1 GENERAL

A. The following are pay items for the work covered under this section. Payment for these items is full compensation for providing all materials, tools, labor and equipment necessary to complete the item and all incidental work related thereto, whether specifically mentioned herein or not.

4.2 CULVERTS

A. Measurement of culvert piping is by lineal foot (meters) of the various sizes and classes along the centerline of pipe for the length of pipe installed, including flared ends. Payment for culvert piping is made at the contract unit price bid per lineal foot (meters), which includes furnishing and installing pipe, including any specials or flared end sections, trench excavation and backfill, and all other work necessary or incidental for completion of the item.

4.3 GENERAL

A. The contract bid prices are full payment for all labor, materials, tools and other incidentals as maybe required to complete the items of work in the Contract.

END OF SECTION

SECTION 02810 - FENCING

PART 1 GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing, erection, and placement of new fencing per the drawings and specifications.

PART 2 PRODUCTS

2.1 GENERAL

A. Barbed wire shall be zinc-coated, steel barbed wire meeting the requirements of ASTM A-121. Breaking strength of strand wire shall be not less than 950 pounds. Barbs shall be uniformly spaced from 4 to 5 inches apart. Minimum weight of zinc coating shall be Class I. Wire shall consist of two twisted strands of 12 1/2 gage strands. "Red Brand" and “OK Brand Premium” are examples of wire that meet ASTM A-121. Wire breaking strength and coating certification shall be provided to the Project Manager.

B. Barbless wire shall be two smooth twisted strands of 12 ½ gage wire: zinc coated steel meeting requirements of ASTM A-121 or equal. Breaking strength of a strand of wire shall be not less than 950 pounds, minimum weight of zinc coating shall be Class I.

C. Woven wire shall have metallic coating Type Z, Class 1 and be No. 12 ½ Grade 60, or, have metallic coating Type Z, Class 3 and be No 14 Grade 125. All woven wire shall meet or exceed the requirements of ASTM A116.

D. Brace panel wire shall be barbless, smooth 9 gage soft wire meeting requirements of ASTM A-641. It will be used for constructing braces and panels, tying to anchors, etc.

E. Staples. Wire staples of the barbed U-shaped type shall be used to fasten the wire fencing to the wooden posts. They shall be not less than 9 gage galvanized, 1-3/4 inches long.

F. Nails. Shall be 40 d common galvanized.

G. Fence clips shall be not lighter than 12 1/2 gage, galvanized. They shall be used to fasten the wire to metal posts.

H. Where designated, stays shall be 30” long twisted wire fence specifically manufactured for use as fence stays and made from #9 gage galvanized smooth wire.

I . Metal Posts. Metal posts shall meet the requirements of ASTM A-702 and be American manufactured. Painting shall be in accordance with good manufacturing practice. Same paint pattern shall be used throughout project site requiring installation of new metal posts. Posts shall be 5 1/2 feet long. The metal shall be good commercial quality steel

with maximum carbon content of 0.82%. Posts shall be Tee, H, channel, or U-bar section and shall have corrugations, knobs, notches, holes, or studs so placed and constructed as to engage a substantial number of fence line wires in proper position.

Each line post shall have a steel anchor plate weighing not less than 0.67 pounds, tapered to facilitate driving and securely fastened in such a position that its top edge will be two to three inches below ground when the post is driven to the prescribed depth. Post shall weigh 1.33 lbs. per L.F. of post.

J. Wood Posts and Brace Rail. Posts and brace rail shall be made from western larch, lodgepole pine, ponderosa pine, or douglas-fir. They shall have the bark removed, be well seasoned, sound, and straight-grained. They shall be finished round. Panel posts shall be 5 inch minimum diameter and 7 feet in length. Line posts shall be 4 inch minimum diameter and 7 feet in length, or as specified in the project drawings. All posts shall be treated with a solution conforming to AWPA standards. Penetration shall be at least 1/2 inch. Post shall be fully treated. Posts that are to be driven shall be tapered and treated. Brace rail shall be a minimum 4-inch diameter by 8 feet long, or as specified in the project drawings. All brace rail shall be fully treated conforming to AWPA standards. Certification of AWPA treatment shall be provided to the Project Manager.

K. Wood Rails. Wooden rails shall be made from western larch, lodgepole pine, ponderosa pine, or douglas-fir. They shall have the bark removed, be well seasoned, sound, and straight-grained. They shall be finished half round. Wood rails shall be 4 1/2 inch minimum diameter and 8 feet in length. All rails shall be treated with a solution conforming to AWPA standards. Penetration shall be at least 1/2 inch. All wood rail shall be fully treated conforming to AWPA standards. Certification of AWPA treatment shall be provided to the Project Manager. Fasten rails to posts with 5" *Ledgerlock* screws, or approved equal.

L. Brace Panels. Shall be placed at corners, endpoints and when run exceeds 30 rods – then shall be placed to split the difference when appropriate. Brace panels shall be constructed as depicted in drawings and shall provide for strong anchorage points and shall aligned with fenceline within a tolerance of 2 degrees.

M. Gates and Single Panels. Vehicle and pedestrian gates shall by 16'-18' wide and 4' wide, respectfully, and shall be located in the field by the Engineer. Post and brace rail shall be the same as specified for line fence panels and corners.

Where designated, wire gates shall have 4 strands of barbwire with 2 wood stays. Stays shall be 3/4" x 1 1/2" wood. Each gate shall have a new single panel on each side of wire gate and a mechanical over-center gate closer.

Where designated, install pre-fabricated panel gates (various lengths) as shown on the project drawings. Panel gates shall be brown or green in color. Provide galvanized chain long enough to wrap around gate and adjacent brace panel for locking closure.

N. Stream Crossings. Stream crossings shall be minimum 20' wide and located 4' minimum on each side of the top of streambank. Post and brace rail shall be the same

as specified for line fence panels and corners. Stream crossings shall have 5 strands of smooth wire with a minim of 6 metal stays. Stays shall be 30" long twisted wire fence specifically manufactured for use as fence stays and made from #9 gage galvanized smooth wire.

Extend stays to bottom wire attached to posts, creating a hinge point to pass debris. Thread bottom wires of stream crossing though 1.5" diameter PVC pipe between stays. Bottom wire to be 1 ft above water elevation.

Each stream crossing shall have a new single panel and mechanical over-center closure on each side.

O. Deadmen anchors shall be used at grade depressions. They shall consist of 10 gage mild steel of 12-inch diameter. A No. 5 rebar shall be welded in the center and a loop formed in the other end to accept the tie wire. Rebar length shall be 30 inches after the loop is formed. Other anchor types may be accepted upon approval of the Engineer. Duckbill anchors are also approved.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

A. "Clearing" shall consist of the falling of trees greater than 3 inches diameter breast height (dhb), delimbing them, and cutting into six-foot sections. Clearing shall also include the disposal of stumps, brush, windfalls, limbs, sticks, piles of sawdust, rubbish, debris, vegetation, and other objectionable material occurring within the clearing limits or which interfere with excavation or embankment.

B. "Grubbing" shall consist of the removal from the ground and the disposal of roots, stumps, together with duff, matter, roots, and debris from the grubbing limits.

C. Construction methods for clearing and grubbing operations are as follows:

(1) No stumps or roots shall remain more than 4 inches above the ground along the fence line.

(2) Low hanging branches and unsound or unsightly branches on trees or shrubs designated to remain shall be removed as directed. Branches of trees extending over the fence line shall be trimmed to give a clear height of 8 feet above the ground along the fence line. Width of clearing for fence line shall be 4 feet.

3.2 FENCE INSTALLATION

A. Post holes and excavations for footings and anchors shall be excavated on the lines established by the Engineer to the depths and cross-sections shown on the standard drawings. Wooden posts may be driven when so prepared and any damaged posts shall be repaired or rejected. Post shall be plumb when set.

B. All posthole filling and backfilling work shall be in six-inch layers and each layer shall be solidly tamped and compacted as it is placed.

C. Posts that are cut or trimmed for any valid reason shall be given two coats of preservative material approved by the Engineer. Braces shall be securely nailed to terminal and brace posts. Brace to post joint shall be coped or notched. No square to round joint accepted.

D. Deadmen or anchors will be used at grade depressions or other places where the vertical space from the ground to the bottom fence wire has exceeded the design value within a one rod distance.

E. Brace panels shall be installed at angle points, corners, gates, or wherever a break in the terrain occurs. However, in no case shall brace panels be more than 30 rods apart. See Table 1 for brace panel installation requirements. One strand of brace wire will be used in accordance to standard drawing. Brace wire shall be tight when twisted. Barbwire fence wire shall be tied off at each brace.

Table 1. Brace Panel Installation Requirements

Panel Type	No. of Panels	Location Applications	
		Horizontal	Vertical
Single	1	In Line, Each side of gates	Constant Grade
Double	2	Angle points < 90°	Grade Breaks < 45°
Corner	4	90° Corners	Grade Breaks > 45°

F. All posts shall be plumb and solidly set in place after backfilling or driving has been completed.

G. Stretching by a motor vehicle will not be permitted; the power must be by or through a mechanical stretcher or device designed for such use.

H. Fence line shall be straight and square between corner points.

I. Fence clips shall be bent all the way around fence wire.

J. Tension shall be applied in accordance with wire manufacturer's recommendations.

K. Fence wire shall be wrapped around terminal posts and fastened to itself with at least four turns. Fence wire, in general, shall be placed on the side of the post opposite the site but on curves shall be placed so the force is against the post. At grade depressions and alignment angles, where stresses tending to pull posts from the ground are created, the wire fence shall be snubbed or guyed at the critical points by brace wire attached to each horizontal line of fence wire and the end of the combined strands being firmly attached to a "deadman" buried not less than two feet in the ground, or to an approved "anchor" at a point which will serve best to resist the pull of the wire fence. "Deadmen" also may be fastened to posts. Fence wire and brace wire shall be installed without nicks or significant abrasions. Nicks or abrasions that may lead to pre-mature wire breaks shall be rejected by the Project Manager and replaced at no cost by the Contractor.

L. U-shaped staples shall be driven diagonally across the wood grain so that both points do not enter between the same grain. In depressions where wire up-lift occurs, staples shall be sloped slightly upward, against the pull of the wire. On level ground and over knolls, staples shall be sloped slightly downward. Wire shall be stapled tightly at corner, end, and pull posts. In no case shall staples be driven so tight as to damage the wire.

M. A cross-fence, not the property of the Owner, shall not be fastened to the Owner's fence but shall be terminated, in a workmanlike manner, adjacent thereto.

N. Upon completion, the fence shall be true to line and grade; all posts shall be vertical and firm and all wire shall be taut and the completed fence shall be completely acceptable in all respects; no openings shall be left that will permit stock or other large animals to pass through the fence.

O. Weed Control: All equipment used during construction shall be thoroughly washed both inside, outside, underneath, pickup boxes, trailer's, trucks, etc. before entrance to the project area. Vehicles used to commute to and from job site shall be kept clean as not to transport weed seed to project area. This cost shall be subsidiary to the project and considered incidental thereto and no payment shall be made for it.

PART 4 MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT

A. All types of fence will be measured by the linear foot complete in place, on its actual alignment, inclusive of brace panels and corners. The measurement will be made on the fence line along the ground, from end post to end post, including wing fences to structures, the intent being to measure the actual length of fence in place. If it is necessary, in crossing depressions, to install a double section of fence, vertically, this extra section will be measured for payment.

B. Gates will be measured on a per each basis, including 2 single panels.

C. Deadmen anchors, stream crossings, tree anchor, braces, and any line clearing required shall be subsidiary to the fence and considered incidental thereto.

4.2 BASIS OF PAYMENT

A. All types of fence shall be paid for per lineal foot basis, measured as specified above.

B. Gates will be paid for on a unit price per each basis.

END OF SECTION

SECTION 02910 - REVEGETATION

PART 1 GENERAL

1.1 DESCRIPTION

A. This work also includes conserving, placing, and finishing topsoil placement at designated areas on the project drawings or as directed by the Engineer.

PART 2 PRODUCTS

2.1 SEED

A. Utilize the following seed mix for all areas to be seeded.

Seed Name	% Pure Live Seed	Lbs. Per Acre
Western Wheatgrass (substitute Thickspike for sandy soils)	30%	*
Streambank Wheatgrass	20%	*
Hard Fescue (substitute Green Needlegrass for silty and clay soils)	20%	*
Slender Wheatgrass	15%	*
Green Needlegrass	10% - 15%	*
-others-	±10%	*

* Drilled Rate = 8 lbs/acre, Broadcast and Hydroseed Rate = 16 lbs/acre

2.2 TOPSOIL

A. Utilize all salvaged topsoil conserved from clearing and grubbing operations to cover excavation and embankment slopes prior to fertilizing, seeding, or mulching.

2.4 FERTILIZER

A. When broadcast seeding, apply the fertilizer separately. When drill seeding, do not apply seed and fertilizer in a single mixture. The fertilizer must be applied separately, either broadcast before seed application, or surface banded during seeding.

PART 4 MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Revegetation will be measured and paid by the Acre including all labor, equipment, materials and incidentals required for the completion of the work.

B. Placing conserved topsoil will not be measured for payment and is considered incidental to other work items in this Contract.

END OF SECTION

SECTION 02930 - SIGNING

PART 1 GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing and placement and/or removal and reset of signs and sign posts at designated areas on the project drawings or as directed by the Engineer. This work also consists of the mounting and complete installation of FWP supplied signing at designated areas on the project drawings or as directed by the Engineer.

PART 2 PRODUCTS

2.1 WOOD POSTS

D. Furnish posts from dry no. 1 grade Douglas fir, southern or Ponderosa pine, hemlock, spruce, or western larch conforming to AASHTO M 168. Treat the posts with water-borne preservative ACA, ACZA, or CCA according to AWPA Standard C14 except the minimum preservative retention is 0.40 pounds per cubic foot.

2.2 HARDWARE

a. Furnish galvanized steel or aluminum alloy material for lag screws, washers, clip angles, wood screws, shear plates, U-bolts, clamps, bolts, nuts, and other fasteners.

PART 3 EXECUTION

3.1 GENERAL

A. Sign locations may be changed to fit field conditions as approved by the Engineer. Determine sign support lengths measured from the top of the sign to bottom of the footing. Backfill signs supports and post by tamping with hand tools and/or mechanical equipment. Install sign supports according to the project drawings or as directed by the Engineer.

PART 4 MEASUREMENT AND PAYMENT

4.1 PAYMENT

B. Sign post and panel installation (FWP supplied sign panels) will be measured and paid for by the each (EACH).

END OF SECTION