SECTION 00950

STANDARD MODIFICATIONS to MPWSS (7th EDITION)

SM-00001 GENERAL

These Standard Modifications apply changes, deletions, and additions to the Montana Public Works Standard Specifications Seventh Edition, April 2021, referred to as the MPWSS. Each Section of the MPWSS that has been modified is listed in the Table of Contents of Section 00950 Standard Modifications to MPWSS. The entire Section from the MPWS has not been rewritten for these modifications. Instead, modifications are indicted for a specific subsection, paragraph, sentence or drawing.

Where a Standard Modification to MPWSS does not exist for a particular Section of MPWSS it shall be assumed the work is to be completed in accordance with the appropriate MPWSS Section. When a Standard Modification to MPWSS does exist the requirements of that modification supersede the related MPWSS requirement. Where paragraphs are specifically deleted or modified, or new paragraphs added, all other parts of the MPWSS will remain in effect unless otherwise modified by the Project Manual in accordance with the order of governance as specified in "Summary of Work".

Forms included in the Project Manual will be used in lieu of similarly titled forms in the MPWSS. Where Technical Specifications follow these Modifications in later Divisions of the Project Manual, those Specifications replace same numbered specifications in the MPWSS.

Delete Part 4: MEASUREMENT AND PAYMENT in all sections of the MPWSS. Payment for an item will only be made if that item is listed as a Bid Item in Section 00400: Bid Form. If an item is listed as a Bid Item, administrative and procedural requirements will be listed in the Measurement and Payment. If an item is not listed as a Bid Item, the item is not required or is considered an incidental cost to other Bid Items.

SM-01010 SUMMARY OF WORK

Delete Section 01010.1.2.D and replace with the following:

D. The various portions of the Contract documents, of which these specifications are a part, are essential parts of the Agreement, and a requirement occurring in one is as binding as though occurring in all. All portions are intended to be complementary and to describe and provide for complete work as referenced in Article 3, General Conditions. Unless specifically noted otherwise, in the case of discrepancy, the following precedence will govern.

1. Permits from Town/City/County Departments and other agencies as may be required by law, which will govern over;
2. Change Orders, which will govern over;
3. Executed Agreement, which will govern over;
4. Addenda, which will govern over;
5. Special Provisions, which will govern over;
6. Divisions 1 through Division 16 Technical Specifications, which will govern over;
7. Funding Agency Special Provisions for Montana Public Facility Projects, which will govern over;
8. Standard Modifications to the Montana Public Works Standard Specifications, which will govern over;

9. Supplementary Conditions to the General Conditions, which will govern over;
10. General Conditions, which will govern over;
11. Drawings, which will govern over;
12. Contractor's Bid, which will govern over;
13. Montana Public Works Standard Specifications Seventh Edition, April 2021, which will govern over;
14. Montana Department of Transportation Standard Specifications for Road and Bridge Construction, which will govern over;
15. Reference Specifications, which will govern over;

With reference to Drawings, the order of precedence is as follows:

1. Addenda/Change Order Drawings govern over any other Drawings.
2. Figures govern over scaled dimensions.
3. Contract Detail Drawings govern over Contract General Drawings.
4. Contract Drawings govern over Standard Drawings.

SM-01041 PROJECT COORDINATION

Delete Section 01041 in its entirety.

SM-01050 FIELD ENGINEERING

Delete Section 01050 in its entirety and replace with Section 01050: Field Engineering contained in the Project Manual.

SM-01300 SUBMITTALS

Delete Section 01300 in its entirety and replace with Section 01300: SUBMITTALS contained in the Project Manual.

SM-01400 CONTRACTOR QUALITY CONTROL AND OWNER QUALITY ASSURANCE

Delete Section 01400 in its entirety and replace with Section 01400: Quality Control and Quality Assurance contained in the Project Manual.

SM-01500 CONSTRUCTION AND TEMPORARY FACILITIES

If Section 01500: CONSTRUCTION AND TEMPORARY FACILITIES is contained in the Project Manual, delete MPWSS Section 01500 in its entirety and replace with Section 01500: CONSTRUCTION AND TEMPORARY FACILITIES contained in the Project Manual. If Section

01500: CONSTRUCTION AND TEMPORARY FACILITIES is not contained in the Project Manual, refer to MPWSS Section 01500.

SM-01700 CONTRACT CLOSEOUT

Delete Section 01700 in its entirety and replace with Section 01700: CONTRACT CLOSEOUT contained in the Project Manual.

SM-02110 GEOTEXTILES

Add the following to Section 02110.1.2.B:

ASTM D4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
ASTM D5199	Standard Test Method for Measuring Nominal Thickness of Geosynthetics
ASTM D6241	Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

Add the following to Section 02110.2.1:

C. Material shall be rot proof and resistant to soil, chemicals, acids, and alkalis within a pH range of 3 to 12. Unless otherwise specified, fabric shall be **nonwoven,** non-biodegradable, and not attacked by mold or mildew.

Add the following to Section 02110.2.4.B

2. At a minimum separation fabric shall have the following properties:

	Units	Test Method
Grab Elongation	≥ 50	ASTM D-4632
Grab Strength	250 lbs.	ASTM D-4632
Trapezoidal Tear Strength	100 lbs.	ASTM D-4533
CBR Puncture Strength	700 lbs.	ASTM D-6241
Apparent Opening Size	#100	ASTM D-4751
Permittivity	≥ 0.80 sec^{-1}	ASTM D-4491
Ultraviolet Stability	≥70% after 500 hrs. exposure	ASTM D-4355

3. Separation fabric shall be “Mirafi 1100 N” or equal.

Delete Section 02110.3.2.C and replace with the following:

C. The geotextile material shall be protected from the sun until ready to be placed. Prior to placing the material, the prepared subgrade shall be clear of foreign objects such as branches, broken concrete and pavement, clods of dirt, etc. Place the geotextile smooth and free of tension, stress, or wrinkles. Fold and cut the geotextile to conform to curves. Overlap in the direction of

construction. The geotextile shall be unrolled from the roll longitudinally with the road and provided with an eighteen-inch minimum overlap transversely and longitudinally. Do not place longitudinal overlaps below anticipated wheel loads. Hold the geotextile in place with pins, staples, or piles of cover material. Placement shall be in accordance with manufacturer's installation requirements. Material shall not lie uncovered for greater than 24 hours.

Replace Section 02110 – Part 4 with the following:

PART 4 – MEASUREMENT AND PAYMENT

4.1 GENERAL

A. All geotextiles will be measured by the square yard (square meter) on a plane parallel to the ground surface, excluding overlaps. The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay item that is shown in the bid schedule.

B. Payment indicated to include complete compensation for all labor, equipment, materials and incidentals required for the completion of the work.

4.2 SEPARATION FABRICS

A. Fabric is measured and paid per square yard of surface covered, complete in place. No allowance is made for additional fabric required for overlap joints.

B. Payment is made under:

1. Separation Fabric - Per Square Yard

SM-02230 STREET EXCAVATION, BACKFILL, AND COMPACTION

Delete Section 02230.1.3.A.2 and replace with the following.

A. Field Density Testing

2. In-place field density tests for quality assurance are at Contractor expense meeting AASHTO T310 (ASTM D6938) Nuclear Densometer Methods.

Delete Section 02230.1.3.B.1 and replace with the following.

B. Laboratory Maximum Density and Optimum Moisture

2. Submit to the Engineer laboratory maximum-density and optimum moisture content results for soils and/or aggregates.

Replace Section 02230 – Part 4 with the following:

PART 4 – MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. EXCAVATION AND EMBANKMENT – LUMP SUM BASIS

1. Excavation and Embankment are measured and paid for by the lump sum. Payment will be made at the contract Lump Sum price and shall include the following items: furnishing all labor, materials, equipment, tools and incidentals necessary to accomplish all clearing, grubbing, topsoil stripping and stockpiling, hauling, disposal, excavation, placement of fill material, grading, watering, compaction, testing and re-spreading of salvaged topsoil.

2. Payment is made under:

   a. Excavation and Embankment – Per Lump Sum

B. IMPORTED BORROW – LUMP SUM BASIS

1. Imported Borrow is measured and paid for per lump sum. Payment will be made at the contract lump sum price and shall include the following items: furnishing all labor, materials, equipment, tools and incidentals necessary to accomplish all loading, hauling, placement of material in fills/embankments, grading, watering, compaction, testing and re-spreading of salvaged topsoil. This work includes importing and placing 100 cubic yards of material at road Station 2+44 to block off access to the old two-track road.

2. Payment is made under:

   a. Imported Borrow – Per Lump Sum

SM-02234 SUB BASE COURSE

Delete Section 02234.1.3.A.2 and replace with the following:

2. In-place field density tests for quality assurance are at Contractor expense meeting AASHTO T310 (ASTM D6938) Nuclear Densometer Methods.

Delete Section 02234.2.1.A and replace with the following:

A. Furnish sub-base material meeting the applicable aggregate quality requirements. No blended or recycled asphaltic concrete will be allowed.

Add the following to Section 02234.2.4:

E. Furnish ballast material that meets the gradation below.

TABLE OF GRADATIONS

PERCENTAGES BY WEIGHT PASSING SQUARE MESH SIEVES

Passing	2-1/2”
2-1/2 Inch	100
2 Inch	90-100
1-1/2 Inch	60-90
1 Inch	10-35
¾ Inch	0-10
3/8 Inch	0-3

Add the following to Section 02234.3.1:

B. Place separation geotextile fabric between compacted subgrade and sub-base course as shown on plans or as directed by the Engineer. Separation geotextile fabric shall conform to all applicable portions of Section 02110, GEOTEXTILE, meeting the property requirements for Separation Geotextile Fabric.

Replace Section 02234.3.3.A with the following:

A. Furnish watering and rolling to obtain a minimum field density of 95 percent of the maximum dry density at optimum water content $\pm$ 3 percent in accordance to AASHTO T99 or ASTM 698. No separate compensation is made for rolling and watering the sub-base course other than the sub-base course bid item or items listed on the contract documents.

Replace Section 02234 – Part 4 with the following:

PART 4 – MEASUREMENT AND PAYMENT

4.1 CUBIC YARD BASIS: SUB-BASE COURSE

A. This item is measured and paid for by the cubic yards of uncrushed or crushed sub base course of the specified gradation, complete in place at the contract unit price, which constitutes full compensation for furnishing, loading, hauling, spreading, blending, shaping, watering, compacting and testing the sub base material, and for all tools, labor, equipment and incidentals necessary to complete this item.

B. Payment is made under:

1. 3" Minus Sub Base Course - per cubic yard

4.2 CUBIC YARD BASIS: BALLAST

A. This item is measured and paid for by the cubic yards of ballast of the specified gradation for the boat ramp, complete in place, at the contract unit price bid for 2-1/2"

Minus Ballast, which constitutes full compensation for furnishing, loading, hauling, spreading, shaping and compacting the ballast material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. 2-1/2" Minus Ballast - per cubic yard

SM-02235 CRUSHED BASE COURSE

Delete Section 02235.1.3.A.2 and replace with the following:

2. In-place field density tests for quality assurance are at Contractor expense meeting AASHTO T310 (ASTM D6938) Nuclear Densometer Methods.

Delete Section 02235.2.1.A and replace with the following:

A. Furnish base course material meeting the applicable aggregate quality requirements. No blended or recycled asphaltic concrete will be allowed.

Delete Section 02235.2.2.A and replace with the following:

A. Consists of both fine and coarse fragments of crushed stone or crushed gravel, and/or natural gravel, and when approved, blended with sand, finely crushed stone, crusher screenings, or other similar materials.

Delete Section 02235.3.3.C and replace with the following:

C. Provide the watering and rolling required to place and compact crushed base course aggregate to a firm even surface at minimum 95 percent of the maximum dry density at optimum water content $\pm$ 3 percent in accordance to AASHTO T99 or ASTM 698, over the compacted subgrade to the finished grade. No separate compensation is made for rolling and watering the base course other than the base course bid item or items listed on the contract documents.

Replace Section 02235 – Part 4 with the following:

PART 4 – MEASUREMENT AND PAYMENT

4.1 CUBIC YARD BASIS: CRUSHED BASE COURSE

A. This item is measured and paid for by the cubic yards of crushed base course of the gradations specified in the Contract documents, complete in place, at the contract unit price bid for ¾" Minus Crushed Base Course". Price and payment is full compensation for furnishing, crushing, loading, hauling, spreading, shaping, watering, compacting and testing the base course material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. 3/4" Minus Crushed Base Course - Per Cubic Yard

SM-02529 CONCRETE SIDEWALKS, DRIVEWAYS, APPROACHES, CURB TURN FILLETS, VALLEY GUTTERS, AND MISCELLANEOUS NEW CONCRETE CONSTRUCTION

Delete Section 02529.2.4.A and replace with the following:

A. Furnish crushed base course material meeting applicable requirements of Section 02235, CRUSHED BASE COURSE, and meeting the gradation requirement for ¾" minus material.

Delete Section 02529.3.2.B and replace it with the following:

B. Place and compact gravel base material below concrete surfacing to the thicknesses shown on the plans to a firm, even surface.

Replace Section 02529 – Part 4 with the following:

PART 4 – MEASUREMENT AND PAYMENT

4.1 4" REINFORCED CONCRETE SURFACING

A. This item is measured and paid for by the square foot at the unit price bid. Price and payment is full compensation for all material, excavation, backfill, compaction, form work, steel reinforcement, joints, curing of concrete, testing, equipment, tools and labor, and for the performance of all work and incidentals necessary to complete this item. Base course below concrete surfacing will be measured and paid for separately.

B. Payment is made under;
1. 4" Reinforced Concrete Surfacing – Per Square Foot

4.2 6" REINFORCED CONCRETE SURFACING

A. This item is measured and paid for by the square foot at the unit price bid. Price and payment is full compensation for all material, excavation, backfill, compaction, form work, steel reinforcement, joints, joint sealant, curing of concrete, testing, equipment, tools and labor, and for the performance of all work and incidentals necessary to complete this item. Base course below concrete surfacing will be measured and paid for separately.

B. Payment is made under;
1. 6" Reinforced Concrete Surfacing – Per Square Foot

SM-02725 DRAINAGE CULVERTS

Add the following to Section 02725.2.2:

D. Polyvinyl Chloride (PVC) Pipe

1. Furnish PVC pipe produced by a continuous extrusion process employing a prime grade of unplasticized polyvinyl chloride. Assure the grade used is highly resistant to hydrogen sulfide, sulfuric acid, gasoline, oil, detergents and other chemicals found in sewage and industrial wastes. Assure the material meets "Rigid Polyvinyl Chloride Compounds", ASTM D1784 and ASTM D1785 requirements. Assure the pipe has selfextinguishing flammability characteristics. Assure the pipe meets ASTM D3034, "Standard Specifications for Polyvinyl Chloride Sewer Pipe and Fittings", that is Schedule 80 PVC.

Replace Section 02725 – Part 4 with the following:

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

B. Payment for culvert pipe shall be made under:

1. 6" Schedule 80 PVC Culvert – Per Lineal Foot
2. 18" HDPE Culvert w/ FETS – Per Lineal Foot
3. 24" HDPE Culvert w/ FETS – Per Lineal Foot

SM-03210 REINFORCING STEEL

Delete Section 03210.2.1.A and replace with the following.

A. Furnish the specified deformed reinforcement steel meeting ASTM A615, (AASHTO M31) or ASTM A705, Grade 60. If epoxy-coated reinforcement steel is specified on the plans or special provisions supply from a CRSI certified epoxy-coated reinforcement steel manufacturer.

Delete Section 03210.3.3.G and replace with the following.

G. Follow the minimum concrete protective covering for reinforcement below, unless noted otherwise on the Drawings.

SM-03310 STRUCTURAL CONCRETE

Delete Section 03310.3.6.A. and replace with the following.

A. All concrete must be tested by an ACI Grade I or equivalent certified testing technician. Unless otherwise specified, the Contractor shall be responsible for all acceptance testing during the on-site placement of the concrete.

Delete Section 03310.3.6.A.2.a and replace with the following.

a. During each day's pour, check the consistency of the concrete by slump test. Also perform a slump test each time a test cylinder is made. Assure slump tests meet ASTM C143 "Method of Test for the Slump of Portland Cement Concrete."

Delete Section 03310.3.6.A.3.a and replace with the following.

a. During each strength test, check the air content by either ASTM C231 "Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C173 "Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method", or ASTM C138 "Method of Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete."

Delete Section 03310.3.6.A.4.h and replace with the following.

h. When concrete fails to meet the requirements above or when tests of field cured cylinders indicate deficiencies in protection and curing, the Contractor may order tests on the hardened concrete in accordance with ACI-301 for that portion of the structure where the questionable concrete has been placed. In the event the load or core tests also indicate that the structure is unsatisfactory, make all modifications as directed by the Engineer to make the structure sound.

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering.

B. Related Sections include the following:
   1. Division 1 Section "Submittals" for submitting surveys.
   2. Division 1 Section "Contract Closeout" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels.
   2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   3. Inform installers of lines and levels to which they must comply.
   4. Check the location, level and plumb, of every major element as the Work progresses.
   5. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
   6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.2 FIELD ENGINEERING

A. Identification: Owner and Engineer will identify existing benchmarks, control points, and property corners to the best of his knowledge. The Contractor will have the ultimate responsibility to locate, recognize and preserve all of these that are encountered.

B. Retain a licensed land surveyor, at the Contractor's expense, to replace any survey corners, property pins, or highway right-of-way monuments removed or damaged during construction.

C. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

D. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

PART 4 - MEASUREMENT AND PAYMENT (Not Used)

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting all submittals, including but not limited to, Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

B. Related Sections include the following:
   1. Division 1 Section "Quality Control and Quality Assurance" for submitting test and inspection reports and Delegated-Design Submittals.
   2. Division 1 Section “Contract Closeout” for submitting final pay applications and O&M Manual

C. Submittals are categorized into two types: Action Submittals and Informational Submittals, as follows:
   1. Action Submittals: Written and graphic information submitted by the Contractor that requires Engineer’s responsive action. The following are examples of action submittals:
      a. Shop drawings
      b. Product data
      c. Samples
      d. Operation and Maintenance Manuals
      e. Site Usage Plan (Contractor’s staging – including trailer sitting and material laydown area)
      f. Payment application
      g. Other requirements found within the technical specifications

D. Informational Submittal: Information submitted by the Contractor that does not require the Engineer’s responsive action. Submittals may be rejected for not complying with requirements. The following are examples of informational submittals:
   1. Shop Drawing Schedule
   2. Progress Schedule
   3. Schedule of Submittals
   4. Statement of Qualifications
   5. Construction Photography and Videography
   6. Work Plans
   7. Traffic Plans

8. Outage Requests
9. Proposed Testing Procedures
10. Test Records and Reports
11. Vendor Training Outlines/Plans
12. Test and Start-Up Reports
13. Certifications
14. Design Data
15. Manufacturer(s) Instructions
16. Record Drawings
17. Record Shop Drawings
18. Submittals required by laws, regulations and governing agencies
19. Warranties, Insurance and Bonds
20. Contract Close-Out Documents
21. Material Data Safety Sheets
22. Other requirements found within the technical specifications

1.3 RELATED WORK

A. Additional requirements may be specified in the General Conditions for the Contract.

B. Additional submittal requirements may be specified in the respective technical Specification Sections.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Engineer for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities in accordance with the General Conditions.

C. Submittals Schedule: Submit per the General Conditions

D. Direct Transmittal from Contractor: Engineer will not accept submittals from anyone but the Contractor.

E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal.
1. Initial Review: Allow 21 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Allow 21 days for processing each resubmittal.
3. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

F. Contractor's Responsibilities

1. All submittals shall be clearly identified as follows:
    a. Date of Submission
    b. Project Number
    c. Submittal Number
    d. Project Name
    e. Contractor Identification
        1) Contractor
        2) Supplier
        3) Manufacturer
        4) Manufacturer or supplier representative
    f. Identification of Product
    g. Reference to Contract Drawing
    h. Reference to Specification Number, Page, and Paragraph
    i. Reference to applicable standards, such as AWWA, ASTM, ASHTO, etc
    j. Indication of Contractor's approval
    k. Contractor's Certification statement
    l. Identification of deviations or variances from the Contract Documents, if any
    m. Reference to previous submittal (for resubmittals)
    n. Made in America (when required by the Contract Documents)
2. Submittals shall be clear and legible, and of sufficient size for legibility and clarity of the presented data
3. Submittal Log. Maintain a log of all submittals. The submittal log shall be kept accurate and up to date. Provide the submittal log to the Engineer, if requested by the Owner or Engineer. This log should include the following items (as applicable):
    a. Description
    b. Submittal Number
    c. Date transmitted to the Engineer
    d. Date returned to Contractor (from Engineer)
    e. Status of Submittal (Reviewed/Reviewed and Noted/etc)
    f. Date of Resubmittal to Engineer and Return from Engineer (if applicable and repeat as necessary)
    g. Distribution to subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as required.
    h. Date material released for fabrication
    i. Projected (or actual) delivery date
4. Numbering System: Utilize the following submittal identification numbering system:
    a. The first five digits shall be the applicable Specification Section Number.
    b. The next three digits shall be the sequential number of each separate item or drawing submitted under each Specification Section, in the chronological order submitted, starting at 1.
    c. The last character shall be the letter R followed by a digit, if a resubmittal is required, starting with 1 and continuing with sequential numbers. A typical submittal number would be as follows:
        a) 03300-3-R2
        b) 03300 = Specification section for Concrete.
        c) 3 = the third different submittal under this Section.

d) R2 = the third submission (second resubmission) of that particular submittal.

5. Variances
   a. Notify the Engineer in writing, at the time of submittal, of any variations or deviations in the submittals from the requirements of the Contract Documents per the General Conditions.
   b. Notify the Engineer in writing, at the time of re-submittal (resubmission), of all variations or deviations from previous submission of that particular shop drawing, except those deviations which are the specific result of prior comments from the Engineer.
6. Contractor's Certification
   a. Each submittal shall have affixed to it the following Certification Statement:
      1) "Certification Statement: By this statement, I hereby represent that I have met the requirements of subsection 7.16.A of the General Conditions, satisfied the Contractor's obligations under the Contract Documents with respect to Contractor's review of submittals, and that (enter company name) approves the submittal."
   b. Each submittal shall bear the above Certification Statement on the cover sheet.
   c. Each certification statement shall be signed and dated by the individual that reviewed and approved the information prior to submitting the documents to the Engineer.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.

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

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
   1. Number of Copies: Submit five hard copies (paper) of each submittal, unless otherwise indicated. Engineer will return two copies. Mark up and retain one returned copy as a Project Record Document.
   2. Electronic Submittal: Contractor may, at their option, provide Action Submittals in an electronic format provided the following conditions are met:
      a. The submittal contains no pages or sheets larger than 24 x 36 inches
      b. The entire submittal is included in a single file.
      c. Electronic files are PDF format (with printing enabled).

B. 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. Shop work manufacturing instructions.
      g. Templates and patterns.
      h. Schedules.
      i. Design calculations.
      j. Compliance with specified standards.
      k. Notation of coordination requirements.
      l. Notation of dimensions established by field measurement.
   2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
   3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (610 by 915 mm).

C. 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. Standard color charts.
      e. Manufacturer's catalog cuts.
      f. Wiring diagrams showing factory-installed wiring.
      g. Printed performance curves.
      h. Operational range diagrams.
      i. Mill reports.
      j. Standard product operating and maintenance manuals.
      k. Compliance with recognized trade association standards.
      l. Compliance with recognized testing agency standards.
      m. Application of testing agency labels and seals.
      n. Notation of coordination requirements.

D. Samples: Furnish samples required by the Contract Documents for the Engineer’s approval. Samples shall be delivered to the Engineer as specified or directed. Unless specified otherwise, provide at least two samples of each required item. Materials or equipment for which samples are required shall not be used in the work unless and until approved by Engineer.
   1. Preparation: Include the following information, as applicable:

a. Physical examples of the work
b. Small cuts or containers of materials
c. Complete units of repetitively used products
d. Color/texture/patterns swatches
e. Specimens for coordination of visual effects, graphic symbols, and other specified units of work

E. Operation and Maintenance Manuals
1. Submit in assembled manuals as specified in Division 1 Section "Contract Closeout". Such manuals shall include detailed instructions for Owner personnel on safe operation procedures, controls, start-up, shut-down, emergency procedures, storage, protection, lubrication, testing, trouble-shooting, adjustments, repair procedures, and other maintenance requirements.

F. Site Usage Plan
1. Submit a proposed site staging plan, including but not limited to the location of office trailers, storage trailers and material laydown. Such plan shall be a graphic presentation (drawing) of the proposed locations; and, shall include on-site traffic modifications, and temporary utilities, as may be applicable.

G. Schedule of Values
1. On projects consisting of lump sums (in whole or in part) submit a proposed schedule of values providing a breakdown of lump sum items in to reasonably small components –generally disaggregated by building, area, and/or discipline. The purpose of the schedule of values is for processing partial payment applications. If requested by the Engineer, provide sufficient substantiation for all or some items as necessary to determine the proposed schedule of values is a reasonable representation of the true cost breakdown of the Work. The schedule of values shall not be unbalanced to achieve early payment or over-payment in excess of the value of work or any other mis-distribution of the costs. If, in the opinion of the Engineer, the schedule of values is unbalanced, Contractor shall reallocate components to achieve a balanced schedule acceptable to Engineer.

H. Payment Application
1. If an application form is included in the Contract Documents, use that form unless otherwise approved by the Engineer and Owner. If an application form is not included in the Contract Documents, Contractor may purpose a form for approval.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Engineer will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. 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 Division 1 Section "Quality Control and Quality Assurance."
4. Electronic Submittal: Contractor may, at their option, provide Action Submittals in an electronic format provided the following conditions are met:
    a. The submittal contains no pages or sheets larger than 24 x 36 inches
    b. The entire submittal is included in a single file.
    c. Electronic files are PDF format (with printing enabled).

B. Shop Drawing Schedule
1. Prepare and submit a schedule indicating when shop drawings are required to be submitted to support the as-planned construction schedule. The submittal schedule shall allow sufficient time for preparation and submittal, review and response, and fabrication and delivery to support the construction schedule.

C. Progress Schedule
1. Prepare and submit construction schedules and monthly status reports as specified.

D. Schedule of Submittals
1. Prepare and submit schedule of submittals as specified in the General Conditions.

E. Statements of Qualifications
1. Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.

F. Construction Photography and Videography
1. Provide periodic construction photographs and videography as specified – including but not limited to preconstruction photographs and/or video, monthly progress photos and/or video and post-construction photographs and/or video.

G. Work Plans
1. Prepare and submit copies of all work plans needed to demonstrate to the Owner that Contractor has adequately thought-out the means and methods of construction and their interface with existing facilities. Work plans and follow-up preparatory meetings shall be conducted for all major work items. All parties involved in the construction of that work item shall attend preparatory meeting.

H. Traffic Plans
1. Prepare traffic plans where and when required by the Contract Documents and local ordinances or regulations. If Contractor is not already knowledgeable about local ordinances and regulations regarding traffic requirements, become familiar with such requirements and include all costs for preparation and submittal of traffic management plan, as specified. In addition, unless a supplemental payment provision is provided in the bid form, include the cost of all police attendance, when required.

I. Outage Requests
1. Provide sufficient notification of any outages required (electrical, flow process, etc.) as may be required to tie-in new work into the existing facilities. Unless

specified otherwise elsewhere, a minimum of seven calendar days notice shall be provided.

J. Proposed Testing Procedures
   1. Prepare and submit testing procedures proposed to perform testing required by the various technical specifications.

K. Test Records and Reports
   1. Provide copies of all test records and reports as specified in the various technical specifications.
   2. 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.
   3. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
   4. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
   5. 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.
   6. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
   7. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
      a. Name, address, and telephone number of factory-authorized service representative making report.
      b. Statement on condition of substrates and their acceptability for installation of product.
      c. Statement that products at Project site comply with requirements.
      d. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
      e. Results of operational and other tests and a statement of whether observed performance complies with requirements.
      f. Statement whether conditions, products, and installation will affect warranty.
      g. Other required items indicated in individual Specification Sections.

L. Vendor Training Outlines/Plans
   1. At least two weeks before scheduled training of Owner's personnel, provide lesson plans for vendor training in accordance with the specification for O&M manuals.

M. Test and Start-up Reports
   1. Manufacturer(s) shall perform all pre-start-up installation inspection, calibrations, alignments, and performance testing as specified in the respective technical specifications. Provide copies of all such test and start-up reports.

N. Certifications
   1. Provide various certifications as required by the technical specifications. Such certifications shall be signed by an officer (of the firm) or other individual authorized to sign documents of behalf of that entity.
   2. Certifications may include, but are not limited to:
      a. Welding certifications and welders qualifications
      b. Certifications of Installation, Testing and Training for all equipment
      c. Material Testing reports furnished by an independent testing firm
      d. Certifications from manufacturer(s) for specified factory testing
      e. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
      f. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
      g. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
      h. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.

O. Design Data
   1. Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

P. Manufacturer(s) Instructions
   1. 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. Include the following, as applicable:
      a. Preparation of substrates.
      b. Required substrate tolerances.
      c. Sequence of installation or erection.
      d. Required installation tolerances.
      e. Required adjustments.
      f. Recommendations for cleaning and protection.

Q. Record Drawings
1. No later than Substantial Completion, submit a record of all changes during construction not already incorporated into drawings – in accordance with Division 1 Contract Closeout.

R. Record Shop Drawings
1. Before final payment is made, furnish one set of record shop drawings to the Engineer. These record shop drawings shall be in conformance with the approved documents and should show any field conditions which may affect their accuracy.

S. Submittals required by laws, regulations and governing agencies
1. Prepare and submit all documentation required by state or local law, regulation or government agency directly to the applicable agency. This includes, but is not limited to, notifications, reports, certifications, certified payroll (for projects subject to wage requirements) and other documentation required to satisfy all requirements. Provide to Engineer one hard copy or electronic copy of each submittal made in accordance with this paragraph.

T. Warranties, Insurance Certificates and Bonds
1. Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
2. Assemble a booklet or binder of all warranties and bonds as specified in the various technical specifications and in accordance with the Division 1 Contract Closeout. Provide two originals to the Engineer.

U. Contract Close-Out Documents
1. Submit documentation as indicated in Division 1 Contract Closeout.

V. Material Safety Data Sheets
1. Submit information directly to Owner. If submitted to Engineer, Engineer will not review this information but will return it with no action taken.

W. Other requirements of the technical Specification Sections
1. Comply with all other requirements of the technical specification sections.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work or other related Sections, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required). Coordinate with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities.

B. Before submission to the Engineer, review shop drawings as follows:

1. Make corrections and add field measurements, as required
2. Use any color for its notations except red (reserved for the Engineer's notations) and black (to be able to distinguish notations on black and white documents)
3. Include Contractor's Certification statement
4. Provide field measurements (as needed)
5. Coordinate with other submittals
6. Indicate relationships to other features of the work
7. Highlight information applicable to the work and/or delete information not applicable to the work

3.2 ENGINEER'S ACTION

A. General: Engineer will not review submittals that do not bear required certification statement, signature, and date of the responsible person and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
   1. "Reviewed" – This code is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
   2. "Reviewed and Noted" –This code is assigned when a confirmation of notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
   3. "Revise and Resubmit" –This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the entire package. This resubmittal is to address all comments, omissions and non-conforming items that were noted.

C. Informational Submittals: Engineer will review each submittal and will not return it, or will reject and return it if it does not comply with requirements.

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

END OF SECTION

SECTION 01400

QUALITY CONTROL AND QUALITY ASSURANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Documents including, but not limited to Drawings and Special Provisions, General and Supplementary Conditions, other Division 1 through 16 Specification Sections, and Appendices to the Contract Documents, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Engineer.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Reports: Prepare and submit certified written reports that 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 and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Ambient conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and reinspecting.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

F. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
   1. Contractor responsibilities include the following:
      a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
      b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

G. Control of Installation
   1. Monitor quality control over suppliers, products, services, site conditions, and workmanship, to produce Work of specified quality.
   2. Comply with manufacturers' instructions, including each step in sequence.
   3. Examine the areas and conditions where Work is to be performed and notify the Owner of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Owner.
   4. Request clarification from Engineer should manufacturers' instructions conflict with Contract Documents. The clarification shall be received prior to proceeding.
   5. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
   6. Work shall be performed by persons qualified to produce workmanship of specified quality.

1.6 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency or Engineer to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
   2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
   1. Contractor shall, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Contractor shall, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
5. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field-curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01450

MOBILIZATION/DEMOBILZIATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This item shall consist of the preparatory work and operations necessary and performed by the Contractor for the movement of personnel, equipment, supplies, and incidentals to and from the work site. The work includes those actions necessary for obtaining necessary permits required for mobilization; for the establishment of all offices and facilities necessary to work on the project; for premiums on contract bonds; for insurance for the contract; and for other work on the various items on the project site. Mobilization costs for subcontracted work shall be considered to be included.

B. Contractor's cost for administration, bonding, insurance, and site documents shall be included in mobilization and shall not be paid as a separate item.

C. All equipment moved to the project sites shall be in good mechanical condition and free of fuel, oil, lubrication, or other fluid leaks. The Contractor shall immediately remove any equipment potentially or actually discharging environmentally damaging fluids.

D. All equipment moved to the project sites shall be thoroughly cleaned before it is brought to the sites to prevent the introduction of weed seeds. Equipment removed from the sites may not be returned to the sites again until it is thoroughly cleaned again.

E. Vessels and equipment collecting and transporting water from open water sources shall be cleaned to prevent transport of aquatic invasive species and in compliance with MCA 80-7-1012.

PART 2 - RODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. There will be no direct measurement of this item.

4.2 PAYMENT

B. Partial payments for mobilization/demobilization will be made based on the lump sum bid price as follows:

- 25% of the amount bid for mobilization/demobilization when the Contractor has moved on-site and begun construction activities.
- 50% of the amount bid for mobilization/demobilization when 25% of the contract amount (exclusive of mobilization/demobilization) has been completed.

- 75% of the amount bid for mobilization/demobilization when 50% of the contract amount (exclusive of mobilization/demobilization) has been completed.
- 100% of the amount bid for mobilization/demobilization when 75% of the contract amount (exclusive of mobilization/demobilization) has been completed.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Inspection procedures.
   2. Project record documents.
   3. Final cleaning.

B. Related Sections include the following:
   1. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
   2. Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for products of those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following or list items below that are incomplete in request. Also refer to the General Conditions for additional submittals and procedures for Substantial Completion.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise Owner of pending insurance changeover requirements in accordance with the General Conditions.
   3. Submit specific warranties, Performance bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and/or similar final record information.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Submit test/adjust/balance records.
8. Terminate and remove temporary facilities from Project site, construction tools, and similar elements.
9. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
10. Complete final cleaning requirements, including touchup painting.
11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Following the submittal of the preliminary documents described above, inspection of the Work shall be completed in accordance with the General Conditions.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment.
2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit evidence that bonds shall be in effect until one year after the date when final payment becomes due or until completion of the correction period specified, whichever is later.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of areas in sequential order.
2. Organize items applying to each area by major element.
3. Include the following information at the top of each page:
    a. Project name.
    b. Date.
    c. Name of Engineer.
    d. Name of Contractor.
    e. Page number.

1.6 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Maintain Record Documents in accordance with the General Conditions.

B. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, Subcontractor, or similar entity, to prepare the marked-up Record Prints. Record Prints shall, at a minimum, meet the following requirements:
   1. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
   2. Accurately record information in an understandable drawing technique.
   3. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
   4. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
   5. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
   6. Mark important additional information that was either shown schematically or omitted from original Drawings.
   7. Note Work Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
   8. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

C. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 2 - EXECUTION

2.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
      a. Clean project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste

material, litter, broken pipe, sheeting, worn-out parts, rejected materials, concrete, asphalt and other foreign substances.

b. Remove excess piles of gravel or soil deposited throughout project.
c. Final grade in unpaved, graveled, and un-graveled areas with a motor grader.
d. Remove all loose rocks, boulders, and coarse gravel pushed into a berm by final grading.
e. Restore surface drainage to original condition unless otherwise detailed in the project plans and specifications.
f. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
g. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
h. Remove tools, construction equipment, machinery, and surplus material from Project site.
i. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
j. Remove labels that are not permanent.
k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
l. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
m. Replace parts subject to unusual operating conditions.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

SECTION 02241

BARRIER ROCKS

PART 1 - GENERAL

1.1 DESCRIPTION

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

PART 2 - PRODUCTS

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, 6 cubic feet minimum (2.5 – 3.5 feet in nominal diameter as measured on the long axis).

PART 3 - EXECUTION

3.1 GENERAL

A. Backfill around embedded barrier rocks by tamping with hand tools and/or mechanical equipment. Space barrier rocks at 12 feet clearance as measured from edge to edge.

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

PART 4 MEASUREMENT AND PAYMENT

4.1 BARRIER ROCKS

A. Barrier rocks will be measured and paid for by each (EACH). Payment will be made at the contract unit price for furnishing all labor, materials, equipment and all other incidentals required to complete the item. The work include furnishing, hauling and placement of rocks; subgrade preparation, earthwork to depress ½ of the rocks below grade and backfilling around the bottoms of the rocks.

B. Payment is made under:

1. Barrier Rock – Per Each

END OF SECTION

SECTION 02824

FENCING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing and constructing fencing consisting of barbed wire or a combination of barbed wire and smooth wire (farm fence), and gates as shown on the Drawings.

1.2 SUBMITTALS

A. The Contractor shall provide Manufacturer's product data on all materials used. This includes, but is not limited to, wire, fasteners, post type and material, post treatment, and installation requirements.

PART 2 - MATERIALS

2.1 FENCE MATERIAL

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. Install all wire on non-FWP owned parcel side of posts.

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. Brace panel wire shall be barbless, smooth 9 gage soft wire meeting requirements of ASTM A-641 or two twisted strands of 12 1/2 gage strands. It will be used for constructing braces and panels, tying to anchors, etc.

D. Use minimum 9-gauge "U" shaped staples, 1-3/4 inches long unless otherwise specified.

E. Use Minimum 12 1/2 –gauge galvanized tie wire. Commercial galvanized fasteners supplied with the wire may be used if approved by the Engineer.

2.2 POSTS

A. Metal tee posts shall be Chicago Steel or equivalent.

B. Provide wooden posts from well seasoned, sound, and straight grained Western Larch, Lodgepole Pine, Ponderosa Pine, or Douglas Fir. All wooden line posts shall be 4-inches in diameter and all corner, brace, pull, end, and gate posts shall be 5-inches in diameter. Taper round posts to be driven from 8-inches to 12-inches up from the bottom to a 1-inch diameter point. Taper the post tops to a round top with a minimum 3-inch diameter for line posts and 4-inch diameter for corner, brace, pull, end, and gate posts. Perform all tapering before treatment.

Provide 8 foot wooden posts for corner, end, gate, pull, braces and brace rails. Provide 7 foot wooden posts for all line posts.

Treat the posts with a minimum 5 percent by weight pentachlorophenol solution or chromated copper arsenate (CCA) Type B or C, or Ammoniacal Copper Arsenate (ACA) conforming to AWPA Standards. Assure the treatment penetrates the wood at least 1/2-inch.

2.3 GATES

A. At the locations shown on the drawings the contractor shall erect farm fence gates. Farm fence gates shall consist of three (3) strands of barb wire and one (1) strand of smooth wire (bottom) placed between two (2) 3-inch diameter wooden posts. Gate posts shall be placed with a 16.5-foot opening and the farm fence gate shall be fit to the opening between the gate posts. All materials used shall meet the requirements listed above.

2.4 MISCELLANEOUS

A. Furnish deadman and anchor(s) meeting the requirements shown on the details.

B. Bolts, nuts, fittings, hinges, and all other metal parts used shall be galvanized in meeting the specified ASTM specifications.

PART 3 - INSTALLATION

3.1 FENCE PREPARATION

A. Fence preparation consists of removal of vegetative and ground surface obstacles prior to actual fence installation. For fence preparation, clear only those portions of brush, shrubs and vegetation interfering with the fence installation. Cut off, trim or mow interfering vegetation without exposing bare soil in, or adjacent to, streams, stream banks, natural drainages or wetlands. Dispose of the resulting debris, slash, branches, etc. in accordance with contract documents. Avoid or minimize injury or damage to remaining vegetation. Do not grub, excavate, grade, or disturb the soil surface, unless in direct conflict with fence wire.

3.2 POSTS AND BRACES

A. Excavate post holes, footing excavations, and anchors as shown in the drawings. Posts may be driven or excavated and backfilled in six-inch lifts and solidly tamped and compacted, plumb within 1/2-inch at the top, and aligned within one inch of alignment. Embedment shall be sufficient to provide 48 inches of posts exposed with tops in a

uniform vertical alignment. Bottoms of posts shall not be cut. Repair or replace all damaged posts at Contractor expense. Treat cut or trimmed areas on posts and braces with three applications of a copper naphthenate solution containing a minimum of 2 percent copper metal or with chromated copper arsenate (CCA) meeting AWPA M4 requirements.

Securely nail braces to terminal and brace posts.

3.3 FENCE WIRE

A. After the posts, braces, and footings are set, place the barbed wire or smooth wire, stretch it tightly, and fasten to the posts. Apply tension following the wire manufacturer's recommendations with a mechanical or other approved wire stretcher. Stretching by motor vehicle will not be permitted.

Fence wire shall be wrapped around terminal posts and fastened to itself with at least four turns. Wire shall be placed on the side of the post opposite the site. U-shaped staples shall be driven diagonally across the wood grain so both points do not enter the same grain. Staples on line posts shall be driven snug to permit movement of wire. Staples on all other posts shall be driven tight without damaging the wire.

Place "deadman" as shown in the drawings at grade depressions, alignment angles, and other places where stresses might pull posts from the ground or out of alignment.

Install one metal line post in each 500-foot wood post fence run and in smaller runs between gate post ends for lightening protection. Install one wood post in each 100-foot metal post fence run.

3.4 LOCATION

A. The fence will be placed on the alignment shown in the drawings.

3.5 ENTRANCE GATES

A. The Contractor shall provide openings for all gates at the size and locations shown on the drawings. The Contractor shall install the gates true and plumb.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. The following items are the 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.

Removal of fencing shall be incidental work related thereto.

Fences shall be measured in place from outside to outside of end posts or corner posts and

shall be the length of fence actually constructed, except for the space occupied by the gates.

Payment for fence shall be made under:

1. 4-Wire Farm Fence - Per Lineal Foot

Gates shall be measured in units for each gate installed and accepted.

Payment for gates shall be made under:

1. Barbed Wire Gate - Per Each

Pedestrian Accesses shall be measured in units for each access opening installed and accepted.

Payment for gates shall be made under:

1. Pedestrian Access - Per Each

END OF SECTION

SECTION 02910

SEEDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes ground surface preparation, furnishing and planting seed.

1.2 DEFFINITIONS

A. Pure live seed (PLS) content: Weight of seed times percent purity times percent germination.

1.3 SUBMITTALS

Submit the following in accordance with Section 01300 - Submittals.

A. Seeding plan:
   1. Qualifying experience for person responsible for supervision of seeding, for approval.
   2. Names, addresses, and telephone numbers of references.
   3. Equipment.

B. Seed Certifications:
   1. Seed mix.
   2. Name and address of seed suppliers.
   3. Origin of seed.
   4. Percent purity and germination.
   5. Prohibited and restricted weed seed content.

1.4 DELIVERY STORAGE AND HANDLING

A. Seed containers:
   1. Sealed, or by an alternate method approved by the Engineer.
   2. Labeled:
      a. Identify seed origin on label.
         1) Intrastate shipping: In accordance with Montana State Seed Laws and Regulations.
         2) Interstate shipping: In accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act.

PART 2 - PRODUCTS

2.1 SEED

A. Weed seeds classified by Montana Department of Agriculture:
   1. Prohibited noxious weeds: None
   2. Restricted weeds: 0.5 percent maximum, by weight.

B. Seed mixture for disturbed natural areas:
   1. Purity, minimum: 85 percent.
   2. Germination, minimum: 85 percent.
      a. Germination test: Less than 1 year old at time of seeding.
   3. Western wheatgrass and Wyoming big sagebrush must be included in the mix. Thickspike wheatgrass or Montana wheatgrass may be substituted only when western wheatgrass is unavailable. The combination of seed must include all growth forms (grasses, forbes, and shrubs). The percent of each species is the maximum percent of the total mix. For example on a clayey site the various grasses listed make up 80% of the total seed mix, therefore individually western wheatgrass may account for no more than 25% of the total seed mix. The seed mixture shall be planted in amounts specified at a rate of 30-50 small seeds plus 20-25 medium seeds plus 15-20 large seeds per square foot; totaling 65 to 95 live seeds per square foot, or 2,831,400 to 4,138,200 live seeds per acre.
   4. See attached Bureau of Land Management seed mix tables.

PART 3 - EXECUTION

3.1 SEEDED PREPARATION

A. Complete prior to seeding or placing rolled erosion control blanket.

B. Reserved topsoil: The Contractor shall strip and stockpile all topsoil to a depth of 4 to 6 inches prior to earthwork operations and stockpile at a pre-determined location.

C. Spread reserved topsoil evenly to a depth of 4 inches upon completion of earthwork operations.

D. Remove stiff clods, lumps, roots, litter, stones, and other foreign material greater than 4 inches in size from the surface. Dispose of removed materials offsite.

E. Fill or smooth topsoil surface to remove rills, gullies and depressions.

F. Protect prepared topsoil surfaces from erosion and washouts. Repair damaged surfaces as required.

G. Scarify or harrow and rake topsoil to minimum depth of three inches no more than two days prior to seeding.

3.2 SEEDING

A. Apply seed mixture at rate specified in Seed Mixture table.

B. Seed only between October 15 and April 30 of each year. Seeding dates outside of this timeframe must be approved by the Engineer in writing and will require supplemental irrigation.

C. Do not seed when the ambient temperature is below 38 degrees F.

D. Do not seed when ground is snow covered.

E. Do not seed when wind velocities prevent uniform application of materials or would drift materials.

3.3 DRILL SEEDING

A. Drill seeding is required where equipment access is possible.

B. Sow seed using a force feed drill having a grass seed attachment, except on slopes steeper than 3:1 for on areas too small to be seeded with a force feed drill.

C. The drill seed equipment shall have a depth regulator to ensure proper depth of planting.

D. The seed holder shall not allow smaller/heavier seed to settle to the bottom of the holder, which results in those seeds being planted first.

3.4 BROADCAST SEEDING

A. Mechanical broadcasting:
   1. Equipment:
      a. Centrifugal type.
      b. Pull type similar to fertilizer spreader.
   2. Designed and regulated to apply seed uniformly at proper rate per acre.
   3. The pounds per acre of seed shall be doubled when using broadcast methods.

B. Hand Broadcasting:
   1. By hand broadcaster.
   2. By hand.
   3. Uniformly applied.
   4. The pounds per acre of seed shall be doubled when using broadcast methods.

C. When hand broadcasting, cover seed with soil to a depth of ¼ to ½ inch immediately after broadcasting.
   1. Use hand rake or float.
   2. Do not use log chain or similar device.

3.5 WEED CONTROL

A. Noxious Weeds: During the construction duration, the contractor is responsible for killing noxious weeds that emerge in areas disturbed under the project. After construction is complete, the Owner will be responsible for noxious weed control.

PART 4 – MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Seeding will be measured and paid for by the acre for all labor, equipment, materials and incidentals required for the completion of the work, including seedbed preparation and seeding. Topsoil stripping, salvage and re-spreading is paid for under Excavation and Embankment.

Payment is made under:

1. Seeding – Per Acre

END OF SECTION

BLM SEED MIX TABLES

To calculate total amount of Pure Live Seed needed per acre for each species:
[(Pounds of Pure Live Seed/acre) x (percent of mix)] / [(Germination rate) x (Purity of seed)]

Add totals for each species to be planted and multiply by the number of acres to be seeded to determine the amount of seed necessary for the proposed project area.

Silty, Loamy, Silty-steep Seed mix
Grasses: 80% of total mix (Choose at least 4, one of which must be western wheatgrass)**:**

Common Name	Scientific Name	Percent of Total Mix
Big bluestem	*Andropogon gerardii*	up to 5%
Blue grama	*Bouteloua gracilis*	up to 5%
Bluebunch wheatgrass	*Pseudoroegneria spicata*	up to 20%
Green needlegrass	*Nassella viridula*	up to 20%
Little bluestem	*Schizachyrium scoparium*	up to 5%
Needle-and-thread	*Hesperostipa comata*	up to 20%
Needleleaf sedge	*Carex duriuscula*	up to 5%
Plains muhly	*Muhlenbergia cuspidata*	up to 5%
Plains reedgrass	*Calamagrostis montanensis*	up to 5%
Prairie junegrass	*Koeleria macrantha*	up to 10%
Sandberg's bluegrass	*Poa secunda*	up to 10%
Sideoats grama	*Bouteloua curtipendula*	up to 5%
Threadleaf sedge	*Carex filifolia*	up to 5%
Western wheatgrass	***Pascopyrum smithii***	**up to 20%**

Forbs: 15% of total mix (Choose at least 4, two of which are nitrogen fixers*):

Common Name	Species of Seed	Percent of Total Mix
American vetch	*Vicia americana**	up to 5%
Desert biscuitroot	*Lomatium foeniculaceum*	up to 5%
Black Sampson	*Echinacea angustifolia*	up to 5%
Blanket flower	*Gaillardia aristata*	up to 5%
Buckwheat spp.	*Eriogonum spp.*	up to 5%
Dotted gayfeather	*Liatris punctata*	up to 5%
Milkvetch spp	*Astragalus spp.**	up to 5%
Hood's phlox	*Phlox hoodii*	up to 5%
Penstemon spp.	*penstemon spp.*	up to 5%
Purple prairie clover	*Dalea purpurea**	up to 5%
Scarlet globemallow	*Sphaeralcea coccinea*	up to 5%
Silvreleaf scurfpea	*Psoralea argophylla**	up to 5%

Shrubs: 5% of total mix (Choose at least 2, one of which is Wyoming big sagebrush):

Common Name	Species of Seed	Percent of Total Mix
Prairie rose	*Rosa woodsii*	up to 5%
Silver sagebrush	*Artemisia cana*	up to 5%
Wyoming big sage	***Artemisia tridentata var. wyomingensis***	**up to 5%**
Yucca	*Yucca glauca*	up to 5%

SECTION 03401

PRECAST CONCRETE VAULT LATRINES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This specification covers the construction and delivery of precast concrete vault unisex latrines for general public use. These latrines shall meet the minimum requirements, material specifications and design criteria listed in this document.

1.2 GENERAL

A. The building shall be provided complete, ready for service with all doors, vents, and appurtenances as indicated in the drawings and this specification.

1.3 CODES, PERMITS, AND COMPLIANCE

A. The building shall conform to all requirements of the current editions of the International Building Code (IBC), and all other codes, standards and ordinances applicable to work. In event of conflicts between these specifications and applicable codes or standards, the codes and standards shall govern.

1.4 SPECIFICATIONS

ASTM C33	Concrete Aggregates
ASTM C39	Method of Test for Compressive Strength of Cylindrical Concrete Specimens
ASTM C143	Method of Test for Slump of Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C192	Method of Making and Curing Test Specimens in the Laboratory
ACI 1211.1	Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete
PCI MNL 116	Quality Control for Plants and Production of Precast Prestressed Concrete Products
AWS D1.1	Structural Welding Code

1.5 SUBMITTALS

A. After the bids are opened, the apparent low bidder will be required to submit a document that demonstrates that the buildings meet the listed salient requirements of these specifications. At a minimum, the submittal shall consist of the following categories:
   1. Stamped and engineered drawings with gross dimensions
   2. Concrete mix design(s)

3. Interior and exterior paint for concrete and steel
4. Caulking
5. Toilet riser
6. Grab bars
7. Toilet paper dispensers
8. Steel doors and frames
9. Door hinges
10. Lockset
11. Door louver
12. Doorstop
13. Double coat hook
14. Door sweep
15. Windows
16. Vault clean out cover
17. Vault size and coating
18. Exhaust pipe
19. Windscreen
20. Signage

B. Submit the number of bound copies specified in Section 01300 - Submittals to the Engineer for review and approval.

C. After contract award, the Provider shall submit a quality control plan that will detail, at a minimum, detailed plans, concrete mix design, concrete forming and placement, steel placement and welding, paint application, powder coat application, final assembly and handling and transport procedures and recommended maintenance practices. List all standards and testing that will be performed. Copies of test results shall be submitted to the Engineer.
   1. The recommended maintenance practices manual shall contain, at a minimum, the following items.
      a. General information on maintenance practices and intervals,
      b. Sources for replacement parts,
      c. Care and cleaning of painted surfaces,
      d. Paint and caulk repair,
      e. Concrete crack repair,
      f. Tools and techniques for repair/replacement for vandal proof hardware.

1.6 MANUFACTURER CRITERIA

A. The building manufacturer shall meet the following requirements at a minimum:
   1. Manufacturing plant must be PCI certified at the time of the bid.
   2. Provider must not have defaulted on any contract within the last five years.
   3. Provider must provide stamped engineered drawings and calculations prior to acceptance.

1.7 DESIGN CRITERIA

A. Design criteria are to ensure that the building not only will withstand the forces of nature listed below but to provide protection from vandalism and other unforeseen hazards.

1. Roof Snow Load
   a. The building shall withstand a snow load of 250 pounds per square foot.
2. Wind Load
   a. The building shall withstand the effects of 120 mile per hour wind load (fastest mile) or 180 mph (3 second-gust) Exposure C.
3. Earthquake
   a. The building shall withstand the effects of a seismic design Category E earthquake.
4. Additional Design Standards
   a. The building shall be an all-concrete design with a double-pitched roof over an entry alcove, an enclosed toilet room and exterior vent stack and vault clean-out. Entry alcove shall have concrete partial height windscreens on two sides. Walls shall have a minimum 4” thickness, floor shall have a minimum 5” thickness, roof shall have a minimum 4 ½” thickness and slope shall be 3:12 minimum.
   b. Toilet room shall have one window constructed of translucent polycarbonate in a painted steel frame. Bottom sill of window shall be at approximately 6’ above finished floor. Top sill of window shall match roof slope.
   c. Minimum vault capacity shall be 1000 gallons.
   d. The building must be designed to meet the current requirements of the Americans with Disabilities Act as of the date of these specifications; including the sixty-inch turning diameter inside toilet room.
   e. The building shall incorporate all design aspects of Sweet melling Technology as outlined by Briar Cook for the U.S. Forest Service. ("In Depth Design and Maintenance Manual for Vault Toilets" -July 1991 - Publication No. 9123 1601)
   f. The building shall have a one-piece, full length and width vault unit to support the building, screen area and snow loads evenly. The building shall have a one piece prestressed floor unit with a 250 psf load capacity to withstand transportation and freeze/thaw stresses. Each toilet room may be served by individual vaults.
5. Tolerances
   a. Tolerances shall be within the limits as dictated by the PCI Quality Control and Assurance Manual.

1.8 WARRANTY

A. A one year manufacturer's warranty is required against defects and workmanship for all components of the building. In addition all concrete components shall carry a warranty of 20 years. The warranty period shall begin on the date of substantial completion.

PART 2 - PRODUCTS

2.1 GENERAL

A. Concrete: The concrete mix design shall be designed to ACI 211.1 to produce concrete of good workability.

Mix #7.25 R - 1 cubic yard

cement 681 lbs.
water 232 lbs. (27.8 gal.)
w/c=.34
Course aggregate (SSD) 1,800 lbs.
Fine aggregate (SSD) 1,196 lbs.
Water Reducing Agent 34 oz. MB 322N
Air Entraining Agent 6 oz. MB AE-90 (4-7%)
Ave. 28 day strength 5,500 psi

1. Cement shall be low alkali type I-II or type III conforming to ASTM C-150.
2. Coarse aggregates used in the concrete mix design shall conform to ASTM C33 with the designated size of coarse aggregate #67.
3. Minimum water/cement ratio shall not exceed 0.40. Slump will not exceed 5" with normal water reducing agent or 7” with super plasticizer.
4. Air-entrained admixtures shall conform to ASTM C260. Water reducing admixtures shall conform to ASTM C494, Type A. Plasticizing admixtures shall conform to ASTMC 1017. Other admixtures will not be used without Engineer approval.

B. Colored Concrete

1. Color additive shall conform to ASTM C979. A 6-inch x 12-inch x 2-inch color sample shall be made available for Owner approval.
2. The following shall contain colored concrete throughout:
   a. Toilet building roof panels
   b. Building walls
   c. Screen panels
   d. The sample brand and type of color additive shall be used throughout the manufacturing process.
   e. All ingredients shall be weighed and the mixing operation shall be adequate to ensure uniform dispersion of the color.

C. Cold Weather Concrete

1. Cold weather concrete placement shall be in accordance with ACI 306.
2. Concrete shall not be placed if ambient temperature is expected to be below 35 degrees Fahrenheit during the curing period unless heat is readily available to maintain the surface temperature of the concrete at least 45 degrees F.
3. Materials containing frost or lumps of frozen materials shall not be used.

D. Hot Weather Concrete

1. The temperature of the concrete shall not exceed 80 degrees Fahrenheit at the time of placement and when the ambient temperature reaches 90 degrees Fahrenheit, the concrete shall be protected with moist covering.

E. Concrete Reinforcement
1. All reinforcing steel shall conform to ASTM A615. All welded wire fabric shall conform to ASTM Al85.
2. All reinforcement shall be new, free of dirt, oil, paint, grease, loose mill scale and loose or thick rust when placed.
3. Details not shown on drawings or specified will be to ACI 318.
4. Steel reinforcement shall be centered in the cross-sectional area of the walls and shall have at least 1-inch of cover on the under surface of the floor and roof.
5. The maximum allowable variation for center-center spacing of reinforcing steel shall be 1/2-inch.
6. Full lengths of reinforcing steel shall be used when possible.
7. Reinforcing bars shall be bent cold.
8. Diagonal reinforcement shall be placed around all openings.

F. Sealers and Curing Compounds
1. Curing compounds, if used, shall be colorless, complying with ASTM C309, type I or I-D.
2. Weatherproofing sealer for exterior of building shall be clear, low gloss, water based acrylic sealer (Dayton-Superior J-24 or approved equal).

G. Caulking, Grout, Adhesive and Sealer
1. All caulking shall remain flexible and non-sag at temperatures from -40 to 194 degrees Fahrenheit.
2. Interior and exterior joints shall be caulked with a paintable polyurethane sealant
3. Epoxy concrete adhesive shall be two component rigid, non-sag gel adhesive for bonding to dry or damp surfaces, moisture insensitive.
4. Grout shall be non-shrink and shall be painted to match the color of surrounding concrete as closely as possible.

H. Paint
1. All paints and materials shall conform to all Federal specifications or be similar "top-of-the-line-components". Paints shall not contain more than .06% by weight of lead.
2. Type of paints for buildings:
    a. Inside concrete surfaces
        1) Interior floors shall have two available options:
            a) A two-part water based epoxy (AQUA TILE by INSL-X or approved equal). The color shall be gray.
            b) A clear seal (Everclear by Euclid Chemicals or approved equal).
        2) Interior walls and ceilings shall be a modified acrylic, water repellent penetrating stain. The color shall be white followed by a clear anti-graffiti coating (Sherwin-Williams 1K Siloxane or approved equal).
    b. Metal surfaces both inside and out
        1) Primer and enamel (Mirrorlac DP85XX by DEVOE / GLIDDEN or approved equal)
    c. Exterior concrete surfaces
        1) Exterior slab shall be clear sealer.

2) Exterior walls and roof shall be a pure acrylic water repellent penetrating stain in the same color as the walls or roof followed by a clear anti-graffiti coating (Sherwin-Williams 1K Siloxane or approved equal).

I. Grab bars

1. Grab bars shall be 18 gauge, type 304 stainless steel with 1-1/2" clearance. Grab bars shall each be able to withstand 300 pounds of loading.
2. In addition to back wall and side wall grab bars compliant with the current ADAAG, a vertical grab bar 18 inches minimum in length shall be mounted with the bottom of the bar located between 39 inches and 41 inches above the floor, and with the center line of the bar located between 39 inches and 41 inches from the rear wall bar (to meet the 2003 Edition of the ICC/ANSI A117.1, 604.5.1, current accessibility code adopted by the State of Montana, Department of Labor and Industry, Business Standards Division, Building Codes).

J. Toilet Paper Dispenser

1. Dispenser shall be constructed of 1/4" thick, type 304 stainless steel. Dispenser shall be capable of holding three (3) standard rolls of toilet paper. Toilet paper holder fastening system shall be able to withstand 300 pound top loading.
2. 2 dispensers shall be installed, one above the other, and shall be compliant with the current ADAAG.
3. Mounting screws shall be stainless steel ¼”-20 security hex drive button head screws to prevent removal and vandalism.

K. Toilet Riser

1. Toilet riser shall have a smooth surface, meet current ADA standards, with heavy duty open-front seat and lid, and shall have high impact resistance at extremely cold temperatures.

L. Steel Doors

1. Doors shall be flush panel type 1-3/4-inch thick, minimum 16 gauge prime coated steel panels level 3 Extra Heavy-duty.
2. Door frames shall be knockdown or welded type, single rabbet, minimum 16-gauge prime coated steel, prepared opening, bolted frame, width to suit wall thickness. Three (3) rubber door silencers will be provided on latch side of frame.
3. Doors shall include a slide bar (National 151-118 Series B-832 or approved equal) with a 3/8 inch hole drilled in the bar for a standard pad lock. Slide bar shall be mounted on the exterior with ¼ inch steel pop rivets approximately 6 feet above finished floor.

M. Door Hinges

1. Door hinges shall be 3 per door stainless steel 4-1/2-inch x 4-1/2-inch, adjustable tension, automatic-closing for each door (Stanley 2060R4.5”x4.5” 26D or approved equal).

N. Lockset

1. Lockset will meet ANSI AI 56.2 Series 4000, Grade 1 cylindrical lockset for exterior doors (Schlage ND40S Rhodes Privacy 626 or approved equal).
2. Lever handle, both inside and out.

3. Either handle operates latch unless outside handle is locked by inside push-button.
4. Push-button shall automatically release when inside lever handle is turned or door is closed.
5. Emergency slot on exterior so door can be unlocked from the outside with a coin, screwdriver, etc.
6. Inside lever always active.
7. U.S. 26D finish

O. Deadbolt
1. Cylindrical deadbolt shall be provided as additional optional item (at additional cost)
2. Deadbolt shall be a Lori Lockset standard model with a double cylinder, 2 ¾" backset, and US26D finish. The cylinder shall be a standard 1 1/8" Schlage mortise cylinder with compression ring and 626 finish.

P. Door Louvers
1. Door louver shall be fixed, inverted split Y, non-vision, 18 gauge cold rolled steel with a factory prime coat equal to FDLS series fastened to door with 3/16" aluminum pop rivets.

Q. Doorstop
1. Door stop shall have a cast metal base, U.S. 26D finish with gray rubber 2-3/8" diameter bumper with a 1" projection.

R. Double Coat Hook
1. Coat hooks shall be constructed of solid brass with a brushed chrome finish. Hooks shall be side by side "ram horn" style, installed on interior wall with tamper resistant mounting hardware, with minimal projection for safety.

S. Door Sweep
1. Door sweep shall be provided at the bottom of door and shall be an adjustable brush type fastened to door with 3/16" aluminum pop rivets.

T. Signage
1. Exterior signage
   a. Signs shall have raised pictograms letters and Braille, to meet ADA requirements, to denote Unisex and Accessibility.
   b. Sign colors and symbols shall be coordinated with the Owner.
   c. Sign location shall have a ¾" minimum recessed wall area with beveled edges and the sign shall be mounted with tamper proof mechanical fasteners to resist vandalism. Alternative methods for mounting may be proposed, and shall be evaluated based on resistance to tampering, theft and vandalism.
2. Interior signage
   a. Interior sign shall read, "Please do not place trash in the toilet. It is extremely difficult and expensive to remove. Thank you."
   b. Sign colors and symbols shall be coordinated with Owner.
   c. Sign location shall have a ¾" minimum recessed wall area with beveled edges and the sign shall be mounted with tamper proof mechanical fasteners to resist vandalism. Alternative methods for mounting may be

proposed, and will be evaluated based on resistance to tampering, theft and vandalism.

U. Windows and Vault Cleanout Cover
1. Windows and cleanout cover frames shall be constructed from steel.
2. Window glazing shall be 1/4" thick translucent pebble finished LEXAN polycarbonate.
3. Plate for vault cleanout cover shall be 1/4" thick diamond plate steel. Lid shall be configured so that it can be locked with a padlock. Lid shall be designed to resist surface runoff penetration into the vault. A neoprene gasket shall be provided around the entire perimeter of the lid to provide an airtight seal.

V. Vault Liner
1. Vaults shall be warranted against leaks or other failures for a period of 7 years.

W. Vent Stack
1. Vent stack to be a minimum 12 inches in diameter and a minimum of 3 feet higher than the roof peak.
2. Vent stack screen to be installed (Poo Poo Screen as supplied by Teton Raptor Center in Wilson, WY or approved equal).

X. Solar Light
1. Provide a solar powered light package for each latrine.
2. The light shall be installed inside the latrine and shall be motion activated.
3. Provide the necessary solar panel, luminaire, wiring, motion detector, electrical boxes and mounting hardware.

PART 3 - BUILDING MANUFACTURING

3.1 GENERAL

A. Mixing and Delivery of Concrete
1. Mixing and delivery of concrete shall be in accordance with ASTM C94, section 10.6 through 10.9 with the following additions.
a. Aggregate and water shall be adjusted to compensate for differences in the saturated surface-dry conditions.
b. Concrete shall be discharged as soon as possible after mixing is complete. This time shall not exceed 30 minutes.

B. Placing and Consolidating Concrete
1. Concrete shall be consolidated by the use of mechanical vibrators. Vibrators shall be sufficient to accomplish compaction but not to the point that segregation occurs.

C. Finishing Concrete
1. Interior floor and exterior slabs shall be floated and troweled until all marks are removed. A light broom finish shall be applied to the exterior slab for a non-slip finish.

2. All exterior building walls and exterior screen walls shall be a barnwood texture, unless otherwise specified.
3. All exterior surfaces of the roof panels shall be cast to simulate a cedar shake roof, unless otherwise specified. The underside of the overhang shall have a smooth finish.

D. Cracks and Patching
1. Cracks in concrete components which are judged to affect the structural integrity of the building will be rejected.
2. Small holes, depressions and air voids shall be patched with a suitable material. The patch shall match the color, finish and texture of the surrounding surface.
3. Patching shall not be allowed on defective areas if the structural integrity of the building is affected.

E. Curing and Hardening Concrete
1. Concrete surfaces shall not be allowed to dry out from exposure to hot, dry weather during initial curing period.
2. Curing compounds shall not be used on interior walls as they will prevent paint adhesion.

PART 4 - FINISHING AND FABRICATION

4.1 GENERAL

A. Structural Joints
1. All welding shall be by Certified Welders only (in accordance with AWS D1.1).
2. Wall components shall be joined together with 2 welded plate pairs at each joint. Weld plates shall be anchored into the concrete panels and welded together with a continuous weld.
3. Walls and roof shall be joined with weld plates, 2-1/2" x 5", at each building corner.
4. The joint between the floor slab and walls shall be joined with a grout mixture on the inside and matching colored caulk on the outside with two weld plates 6" long per wall.

B. Painting
1. Paint/Stain supplier recommendations shall be followed to ensure appropriate curing time before paint is applied to concrete.
2. Some applications may require acid etching. A 30% solution of hydrochloric acid shall be used, flushed with water and allowed to thoroughly air dry.
3. Painting shall not be done outside in cold, frosty or damp weather.
4. Painting shall not be done outside in winter unless the temperature is 50 degrees Fahrenheit or higher.
5. Painting shall not be done in dusty areas.
6. Schedule of finishes:
   a. Inside Concrete Surfaces
      1) Inside floors shall be 2 coats of 2-part water based epoxy or clear sealer as identified per unit by Owner.

2) Interior walls and ceilings shall be one coat primer/filler and 2 coats of white water based acrylic emulsion followed by l coat of clear anti-graffiti sealer.

b. Metal Surfaces both Inside and Out
   1) 1 coat primer and 2 coats of enamel

c. Exterior Concrete Surfaces
   1) Exterior slab shall be 1 coat of clear sealer.
   2) Stained enhanced exterior walls shall be 1 coat of pure acrylic water repellent penetrating stain in the same color as the walls or roof followed by l coat of clear anti-graffiti sealer.

PART 5 - QUALITY CONTROL AND INSPECTION

5.1 GENERAL

A. Pre-pour inspection.
   1. Check all panel measurements including diagonals (must be within ¼ inch).
   2. Check rebar spacing and clearance
   3. Check location of all embeds.

B. Concrete Testing
   1. The following tests shall be performed on concrete used in the manufacture of toilets. Testing shall only be performed by qualified individuals who have been certified ACI Technician Grade 1. Sampling shall be in accordance with ASTM C172.
      a. The slump of the concrete shall be performed on the first batch of concrete in accordance with ASTM C143. This slump shall be in the 3"-5" range.
      b. The air content of the concrete shall be checked per ASTM C231 on the first batch of concrete. The air content shall be in the range of 4%-6%.
      c. The compressive strength of the cylinders shall be tested to ASTM C39.
      d. Test cylinders shall be taken from every other batch.
         1) 1 cylinder shall be tested prior to removal of forms and must be at 2,500 psi or higher.
         2) 1 cylinder represents 7 day strength
         3) 2 cylinders shall represent 28 day strength and must be 4,500 psi or greater.

C. After Form Removal Inspection
   1. Recheck panel dimensions
   2. Verify that all embeds remained in place.
   3. Look for all cracks or blemishes that may cause rejection.
   4. Assure that panels are properly yarded and blocked.

PART 6 - INSTALLATION

6.1 GENERAL

A. Work specified under this section includes excavation, gravel base, backfill and placement of precast concrete vault toilet.
   1. The Provider of the latrine shall be responsible for; loading, transportation, unloading and installation at each designated site and for compliance to the Montana Department of Transportation Load and Speed Limit Policy.
   2. At the time of delivery and installation, the latrine shall be free from dust and debris. If necessary, the Provider shall wash the latrine after installation to remove dirt, dust and debris accumulated during transit to the site. Alternatively, the latrine components shall be covered during transit as an option to washing.
   3. The Contractor shall be responsible for excavation, gravel base, leveling and backfill and shall clear or designate overhead and underground obstructions.
   4. The Contractor shall be responsible for final cleaning related to backfill and site grading.

B. Materials
   1. Sealant between vault and toilet floor to be 1"x1" Butyl Rubber Sealant.

C. Location and Access to the Site
   1. The Owner shall locate the vault toilet in an area that provides safe and reasonable access for trucks and equipment.
   2. If at the time of delivery, access conditions are hazardous or unsuitable for truck and equipment delivery due to weather, roadway constraints, alternative equipment for setting the latrine shall be the responsibility of the Owner.

D. Toilet Vault, Structure and Accessories
   1. Apply Butyl rubber adhesive sealant to the top surface of the concrete vault before placing the structure on the vault.
   2. After exhaust pipe is installed Provider shall seal around pipe at top and underside of roof and at intersection of vent stack and slab with silicone caulk.
   3. Following latrine placement, Provider shall ensure latrine is clean, free of damage and fully functional. A checklist (Owner developed), shall be signed off on by provider and Owner personnel prior to payment. Checklist shall include (but not be limited to); door operation, access hatch operation, toilet lid operation, verification of signage, coat hooks, and toilet paper dispensers, inspection of paint, concrete surface condition, molding, window, door handle, dead bolt, riser, caulking and cleanliness.

E. Solar Light
   1. Install the solar panel, motion detector, interior light and appurtenances as recommended by the manufacturer.

PART 7 - MEASUREMENT AND PAYMENT

7.1 GENERAL

A. Measurement and payment for precast concrete latrines is made per lump sum. Payment will be made at the contract unit price and shall include the following items: furnishing all labor, materials, equipment as necessary for manufacturing of the latrine and appurtenances

(including a solar powered interior light), painting, hauling, unloading, topsoil stripping and stockpiling, excavation, gravel leveling pad, backfilling, topsoil re-spreading and all other incidentals required to complete the item.

B. Payment is made under:

1. Precast Concrete Latrine – Lump Sum

END OF SECTION