

Preliminary – Prefinal Submittal



PROJECT SPECIAL PROVISIONS

FOR

MOUNT ELDEN LOOKOUT ROAD – SCHULTZ CREEK CROSSING
PROJECT NO. 41EMELRSCC

GENERAL PROVISIONS

This project was designed based off the most current Maricopa Association of Governments (MAG) Uniform Standard Specifications for Public Works Construction, 2023. The purpose of these special provisions is to supplement, modify, replace, and/or delete that portion of the MAG Uniform Standard Specifications for Public Works Construction, 2023. These Special Provisions shall supersede the Standard Specifications where there is a conflict.

SCOPE: The scope of work includes furnishing of all labor, materials, equipment, fixtures, and services required for installing a three-barrel box culvert, installing channel protection over Kinder Morgans utility easement, providing channel protection upstream of the project, providing channel protection from the COF detention basins to the new boxes and reconstructing a portion of Mount Elden Lookout Road. Other associated work includes mobilization/demobilization, traffic control, survey/layout, roadway striping, guardrail improvements, stormwater pollution prevention plan (SWPPP), and reseeding of disturbed areas.

CONTRACT TIME: Completion of work under this contract shall be on a working day schedule. Contract time shall be ninety (90) working days, non-inclusive of weather days, with the start date being the date of issuance of NTP.

WORKING HOURS: Work hours shall be as needed to try and finish the project before July 1. Contractor to inform the County Engineer of working hours two weeks prior to starting the project to ensure inspection staff can be obtained.

RESTRICTED WORK: No work shall occur in unauthorized areas where the County does not have Right-of-Way (ROW) or permission to work.

The County is working with a landowner to the south of the project and to the west of the project to provide sufficient TCE's and a laydown yard. The Contractor shall schedule work accordingly and coordinate with County to confirm work is authorized and permitted in restricted locations prior to scheduling the work.

ENVIRONMENTAL PROTECTION MEASURES: The contractor shall follow and implement the following Environmental protection measures identified in the NEPA clearance decision memo:

- Equipment (other than for hauling) will be inspected and cleaned before entering the project area to prevent the introduction of invasive weeds.
- Stockpiled materials will be maintained in a weed-free condition.
- Any identified noxious weed will be mechanically removed from the site.
- If any previously undiscovered cultural or historical resources are discovered, measures to remove, reduce or mitigate effects to any such resources will be taken

at that time as directed by a Forest Service Representative in consultation with the Forest Archaeologist.

- If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 meters (100 feet) of the location and the area must be secured. The Arizona State Museum (ASM), lead agency, State Historic Preservation Office (SHPO), and appropriate Tribes must be notified of the discovery. All remains will be treated in accordance with NAGPRA (Public Law 101-601; 25 U.S.C. 3001-3013) or Arizona Revised Statutes (A.R.S. § 41-844 and A.R.S. § 41-865), as appropriate, and work must not resume in this area without authorization from ASM and the lead agency (Forest).
- If previously undiscovered Federally-listed or Forest Service sensitive plants are discovered, measures to remove, reduce or mitigate effects to any such resources will be immediately taken as directed by a Forest Service Representative.
- If any Federally-listed or Forest Service sensitive wildlife are encountered on-site, measures to remove, reduce or mitigate effects to any such resources will be immediately taken as directed by a Forest Service Representative.
- The contractor shall comply with Federal and State water and erosion control requirements.
- Erosion control shall be maintained prior to seasonal periods of precipitation or runoff.
- To reduce noise and dust during hauling, trucks hauling materials will be limited to no more than 25 miles per hour on Mt. Elden Lookout Rd.
- Traffic, pedestrian, and bicycle safety and access are of paramount concern to the Department. To ensure public safety, the Schultz Creek crossing project area would be closely monitored to protect the personnel and the public during construction. Provision for access by emergency response vehicles will permanently be in place. The contractor will also ensure that public and Forest Service access to Mt. Elden Lookout Rd. and adjoining properties/homes along Mt. Elden Lookout Rd. would be maintained throughout the duration of construction.

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Special Provisions to Maricopa Association of Governments (MAG) Uniform Standard Specifications for Public Works Construction

SECTION 101 – ABBREVIATIONS AND DEFINITIONS

101.2 DEFINITIONS AND TERMS

Is revised to include:

“County” definition, is revised to read:

Coconino County, organized and existing under and by virtue of the laws of the State of Arizona, also known as the “Owner.”

“Engineer” definition, is revised to read:

The person, appointed as County Engineer by the Board of Supervisors, acting directly or through a duly authorized representative.

“Working Day” definition, is revised to read:

A calendar day, corresponding with a County working day of eight (8) hours a day five (5) days a week, exclusive of Saturdays, Sundays, and legal holidays recognized by the County, on which weather and other conditions not under the control of the Contractor will permit construction operations to proceed for six (6) or more hours with the normal working force engaged in performing the controlling item or items of work which would be in progress at that time.

SECTION 102 – BIDDING REQUIREMENTS AND CONDITIONS

102 BIDDING REQUIREMENTS AND CONDITIONS

Is revised to include:

102.14 COOPERATIVE USE OF THIS CONTRACT:

This agreement may be extended for use by other governmental agencies and political subdivisions of the State including members of SAVE (Strategic Alliance for Volume Expenditures). Any such usage by other entities must be in accordance with the laws, ordinances, rules and regulations applicable to such entity, and the approval of the Contractor and the County. The provision of goods or services to other agencies under this contract does not absolve the Contractor from fully complying with the requirements set forth within the contract for materials and services to be provided to the County under this contract. Any attempt to represent any material and or service as being under this

contract with Coconino County, which is not a subject of, or an addition to this contract, is a violation of the contract. Any such action is subject to legal and contractual remedies available to Coconino County including, but not limited to, cancellation or suspension of the contract.

In the event that another governmental agency or subdivision chooses to use this agreement for procurement purposes, the procuring party shall be solely responsible for the ordering of materials, services or construction under this agreement. Payment, inspection and acceptance of goods or services ordered by the procuring party shall be the exclusive obligation of the procuring party. County shall not be liable in any way for alleged or actual violations by the procuring party or Contractor, and the procuring party shall hold County harmless from any liability which may arise from the action or inaction of the procuring party. Contractor agrees to look solely to the procuring party in pursuing all legal remedies that may be available to Contractor for acts or inaction of the procuring party.

The procuring party shall not use this agreement as a method for obtaining additional concessions or reduced prices for similar products or services.

MAG SECTION 104 – SCOPE OF WORK

104.1.1 General

Paragraph two is revised to read:

In the event a conflict exists between Contract Documents the order of precedence listed in descending order shall be as follows:

Change Orders

Addendum

Special Provisions

Project Plans

Coconino County Engineering Design and Construction Manual

MAG Uniform Standard Specifications for Public Works Construction

MAG Uniform Standard Details for Public Works Construction

ADOT Standard Specifications for Road and Bridge Construction

ADOT Construction Standard Drawings

104.1.2 Maintenance of Traffic

Is revised to include:

Within seven (7) calendar days following receipt of the notice of award, the contractor shall submit a traffic control plan to the Engineer. The Engineer shall review the construction schedule and traffic control plan and either approve them or provide a written

list of the items that will require revision. The contractor shall submit the corrected construction schedule and traffic control plan within seven (7) calendar days of receiving the list of required revisions. The corrected construction schedule and traffic control plan submittal shall address all required revisions.

The detailed traffic control plan shall be submitted to Engineer and approved by the Engineer prior to the start of work. The plan shall include provisions for access to all adjacent private properties within the project area. Through advance written notice and coordination with the Engineer and the property owners, the Contractor may temporarily limit a vehicular or pedestrian access to a property only if acceptable alternate access is provided.

The Contractor shall be required to provide no less than 48 hours advance written notice of all street closures and traffic restrictions, and commencement of construction activity to all affected property owners, business owners, residents, and the surrounding neighborhood as well as to the Engineer. The Engineer will indicate the limits of the notification. The notice shall include the projected date and duration of the closure and alternate detour routes. Each notice shall include the name of the Contractor, name and phone number of the Superintendent, and the Owner's public outreach contact information, countyroadsinfo@coconino.az.gov and 928-679-8300.

Existing pedestrian and bicycle facilities shall be continued through or detoured around the construction zone.

School bus stops and pedestrian access thereto shall be maintained. Should construction occur during the school year, any existing school bus stops will need to be temporarily relocated to another location acceptable to the Flagstaff Unified School District Transportation Director. The Contractor shall coordinate any school bus relocations through the Flagstaff Unified School District Transportation Director, Patrick Fleming at 928-527-2301.

All closures required must include notification and detour information for all School agencies affected. Contractor shall contact appropriate authorities 24 hours prior to any closures to coordinate access.

Any operations requiring lane closures will be accomplished with the use of flaggers and pilot vehicles, if needed, at which the maximum traffic cycle time is 20 minutes. Cycle time is the time that any vehicle is delayed by the lane closure and flagging operation. Pilot vehicles used during paving and other roadway projects shall be clearly marked, be equipped with warning lights, and be in radio communication with flaggers at each end of the traffic control area. Traffic control shall be maintained in accordance with the manual on uniform traffic control devices (MUTCD).

Solid Waste Pickup

When construction activity interferes with solid waste pickup, the Contractor shall provide for solid waste vehicle access to the affected properties or relocate the trash containers where access is acceptable.

Traffic Control and Safety

The Contractor shall designate an employee, other than the Project Superintendent, who is well qualified and experienced in construction traffic control and safety, to be available on the project site during all periods of construction to coordinate and maintain safe barricading whenever construction restricts traffic. The contractor shall designate and provide the contact information of one person who shall be available during non-construction hours in case of any traffic control and/or safety items that need to be handled in an urgent manner. This representative must be able to operate equipment and must be TCS certified. Traffic control shall include all forms of transportation, including pedestrian and vehicular traffic.

Emergency Access

All roadway closures shall be coordinated by the Contractor with the Engineer at each weekly meeting or at least 72 hours in advance of the roadway closures. The Contractor shall forward the street closure information to the Fire Department and Police Department.

U.S. Postal Service Access

The Contractor shall be responsible for maintaining access for United States Postal Service deliveries within the project area at all times. Mailboxes shall be protected in place. Should an existing mailbox be damaged by construction activity, the Contractor shall promptly remove and replace the damaged mailbox with like kind; including post and foundation, at no cost to the resident or the County. Placement of any mailbox shall be in accordance with USPS requirements.

MAG SECTION 105 – CONTROL OF WORK

105.5 COORDINATION OF CONTRACTOR

Is revised to include:

The contractor will be responsible for locating and controlling all staging areas. The County is currently working with the Museum of Northern Arizona to obtain a Temporary Construction Easement that will include a staging area south of Mt Elden Lookout Road, immediately west of the project site. See Sheet 2 of the plans for a schematic of the staging area.

105.5.1 WEEKLY CONSTRUCTION MEETING

Is revised to include:

The Superintendent shall attend weekly construction progress meetings. The Superintendent shall be prepared to discuss construction schedule, construction activities projected for the next two weeks, problems, issues and any other pertinent project details as may be required by the Engineer. The Superintendent shall prepare a meeting agenda and meeting notes and distribute such documentation to all the attendees.

105.5.2 PROTECTION OF WORK

Is revised to include:

The Contractor is required to protect work during inclement weather. The contractor shall grade areas to drain and utilize pumps to remove ponding water immediately during all stages of construction during both working and non-working hours.

105.7 COOPERATION BETWEEN CONTRACTORS

Last paragraph, is revised to read:

The Contractor is required to coordinate any access required by or from other contractors working on adjacent project. The Contractor should coordinate the construction activities with other Contractors to avoid any delays or destruction of work on said project. The County will not honor any claim for extra compensation due to delays, extra work, or extension of time caused by any other Contractors working within the limits of same project and adjacent projects.

105.8 CONSTRUCTION STAKES, LINES, AND GRADES

Is revised to read:

The Contractor shall layout the work from the lines, grades and dimensions shown on the drawings. The Contractor shall be responsible for all such work for the duration of the project. Any dimension or grade errors shall be immediately transmitted in writing to the Engineer for clarification, before proceeding with the work.

105.8.1 RECORD (AS-BUILTS) DRAWINGS is added to read:

Record Drawings are Construction drawings, documents or plans sealed and signed by a professional registered in the State of Arizona (usually a Professional Engineer or Registered Land Surveyor) which depict the locations of actual improvements to serve as a record of all changes to the intended physical product of the original, approved plans. Record Drawings are also known as “As-Builts” or “As Constructed Plans”.

Record Drawings shall show all changes that occurred during construction, including changes in materials, distances, lengths, locations, elevations, volumes, etc. and shall contain a Record Drawings certification conforming to these Standards.

The Contractor shall be responsible to accurately maintain records of the construction activities. This shall be provided to the County Engineer or his designee upon

completion of the work and prior to final acceptance. This shall be accomplished by recording the As-Built results of the work performed on the construction plans. This is to include all work performed by Subcontractors as well. The Record Drawings are to be submitted in a professional format, sealed and signed by a current Arizona Registrant (Civil or Surveyor). “Red lined” or Hand Annotated paper copy reproductions will not be accepted. The Record Drawings shall include, as appropriate, but not be limited to, the following:

1. Place “Record Drawing” lettering and date in lower right-hand corner of all sheets.
2. Contain all horizontal and vertical design information, sizes, thicknesses, and material types of improvements shown on the design/construction plan set (even if unchanged during construction).
3. Improvements deleted in the field shall be crossed out with an "x" and labeled "not built".
4. Improvements changed from the approved design plans shall be reflected and clearly called out by "clouding".
5. Plan sheets that represent improvements that were not changed from the approved design plans, shall have "Per Plan" placed in the lower right hand corner of that plan sheet.
6. Station and offsets and length of pipe and/or encasements.
7. Identification, station, offset, distance between new infrastructure and elevation where crossing of existing utilities are encountered.

Payment for this effort shall be bid as a Lump Sum per the Bid Schedule.

MAG SECTION 106 – CONTROL OF MATERIALS

106.2 – SAMPLES AND TESTS OF MATERIALS

Third paragraph, second sentence is revised to read:

Unless otherwise specified, samples and tests will be made in accordance with either: the Materials Testing Manual of the Contracting Agency; the standard methods of AASHTO, ASTM, or ADOT, which were in effect and published at the time of issuance of the solicitation for a construction price proposal (aka: at the time of advertising for bids).

106.2.1 CERTIFICATE OF COMPLIANCE bullet 6, is revised to read:

6. A statement that the individual identified in item eight below has the legal authority to bind the manufacturer or the supplier of the material. The person signing the certificate shall be in one of the following categories:

- A. An officer of a corporation.
- B. A partner in a business partnership or an owner.
- C. A general manager.

- D. Any person having been given the authority in writing by one of the three listed above. The manufacturer or supplier may submit a list of those who are authorized to sign certificates. This list shall be submitted under the name, title, and signature of one of the first three listed above. This list will be kept on file for subsequent certificates received on that project.

106.2.1 CERTIFICATE OF COMPLIANCE

Is revised to include:

The contractor shall submit to the Engineer an original or copy of either a Certificate of Compliance or a Certificate of Analysis, as required prior to the use of any materials or manufactured assemblies for which the specifications or these Special Provisions require that such a certificate be furnished.

The Engineer may permit the use of certain materials or manufactured assemblies prior to, or without, sampling and testing if accompanied by a Certificate of Compliance or Certificate of Analysis, as herein specified. Materials or manufactured assemblies for which a certificate is furnished may be sampled and tested at any time, and, if found not in conformity with the requirements of the contract documents, will be subject to rejection, whether in place or not.

The following is a list of materials generally requiring Certificates as specified in the Standard Specifications or by Policy and Procedure Directives. Materials in addition to this list may require a certification, as specified in the project Special Provision. Each of the below items require a Certificate of Compliance, except where a Certificate of Analysis is required as noted.

1. Concrete Admixtures
2. Hydraulic Cement (Certificate of Analysis)
3. Fly Ash (Certificate of Analysis)
4. Curing Compounds
5. Lime
6. Guardrail Materials
7. Concrete and Metal Pipe
8. Reinforcing Steel
9. Prestressing Steel (Certificate of Analysis)
10. Structural Steel (Certificate of Analysis)
11. Structural Metals
12. Steel Piling (Certificate of Analysis)
13. Geosynthetics (Geotextile Fabrics, etc.)
14. Sign Panels and Related Materials
15. Delineators and Markers
16. Raised Pavement Markers
17. Prismatic Reflectors

18. Reflective Sheeting
19. Thermoplastic Pavement Markings
20. Preformed Plastic Pavement Markings
21. Chain Link Cable Barrier
22. Damp Proofing, Water Proofing Materials
23. Joint Materials
24. Materials Used in Spillways, Down drains, Inlets and Outlets
25. Seeding and Planting Materials
26. Trees, Shrubs, and Plants
27. Topsoil (Certificate of Analysis)
28. Bituminous Materials
29. Asphalt-Rubber Material
30. Bearing Pads (Certificate of Analysis)
31. Materials for End-Product Asphaltic Concrete
32. Traffic Controller Assembly (Certificate of Analysis)
33. Paint (Certificate of Analysis)

MAG SECTION 107 – LEGAL REGULATIONS AND RESPONSIBILITY TO PUBLIC

107.2 PERMITS

Is revised to include:

The Contractor shall be required to obtain County, ADEQ, and other required permits and always keep a copy available onsite during construction.

Erosion Protection and Site Restoration

The size of this project is greater than one (1) acre. The Contractor is required to submit a Notice of Intent (NOI) and a Notice of Termination (NOT) to the Arizona Department of Environmental Quality. The Contractor shall use best management practices (BMP) in controlling stormwater runoff.

The contractor shall develop the stormwater pollution prevention plan (SWPPP). As a part of the SWPPP, the Contractor shall implement dust control at all times. The contractor shall develop and maintain a SWPPP inspection and maintenance binder that is to be kept on site during construction.

Measurement and Payment

Measurement shall include all items required to comply with the requirements of the AZPDES permit program and County requirements. The cost for obtaining and complying with the AZPDES permit, inspection documentation, erosion control devices, dust control, and all work associated with stormwater protection shall be included in the pay item for SWPPP.

107.7 BARRICADES AND WARNING SIGNS

Second paragraph, is revised to read:

The Contractor shall erect warning signs in advance of any place on the project where operations may interfere with the use of the road by traffic, and at all intermediate points where the new work crosses or coincides with an existing road. Such warning signs shall be constructed and erected in accordance with the Manual of Uniform Traffic Control Devices, latest edition, supplemented by the ADOT Traffic Control Manual for Highway Construction and Maintenance, latest edition, which are hereby made a part of these specifications.

107.9 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

Is revised to include:

The Contractor shall take special care to control construction-related dust and noise and to keep the project site cleaned up to the greatest extent possible. The Contractor is responsible to coordinate alternate measures for any impacted operations as mentioned which are acceptable to the parties involved.

Survey monuments and property corners shall be protected and not disturbed unless specifically called out on the plans for replacement. All costs associated with protecting or re-establishing disturbed survey monuments and property corners shall be borne solely by the Contractor.

The Contractor is responsible for replacing and/or restoring landscaping (including but not limited to fences, retaining walls, landscape walls, pavers, aggregate rock ground cover, plantings, sod) and owner improvements associated with the project to a pre-existing condition. Any fencing if impacted, must be immediately replaced (in kind). All cost shall be as incidental to the work, unless specified in the bid schedule or plans.

With the exception of areas disturbed by proposed work, the existing improvements and utilities beyond the edge of pavement shall remain in current condition.

107.11 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES

Is revised to include:

Locations of underground utilities shown on the plans are to be regarded as approximate only. Contractor shall contact Blue Stake to locate all the utilities within the project limits prior to any construction operation. Relocation of utilities is to be completed prior to the beginning of work by the contractor.

Not all service lines are shown on the plans and it is the Contractor's responsibility to determine their location in the field at the beginning of the project. The investigation of utilities and coordination is considered incidental to the construction of the project.

The Contractor is responsible for providing written notification to each affected resident at least 48 hours prior to any disruption to water service in the construction area. The notice must include the exact time of the disruption of service and the expected duration of the loss of service.

The Contractor shall protect existing water, power, cable, and gas service lines where the proposed work crosses the main and the individual service lines.

Protection or repair of existing service lines not in conflict with the work is also considered incidental. In the event that there is a physical conflict between an existing service line and the proposed work, the Contractor shall immediately notify the Engineer of the conflict. The County Engineer will make a determination as to how the conflict will be resolved. Any extra work required as a result of an unforeseen service conflict will be ordered and paid for in accordance with MAG General Provision Section 104.2.3.

Removal of any project elements including but not limited to guardrail and culverts shall be done with due caution so as to not disturb any of the existing utilities. Any damage to the existing utilities shall be Contractor’s responsibility and shall be repaired at no additional cost. Any utilities if found to be in conflict with project improvements that are not identified as relocations should be immediately notified to the Engineer. No work shall be done at conflict locations until further notification by the Engineer.

All the utility relocations that are in conflict should be relocated by respective utility franchise companies prior to the commencement of the work. If during the construction, any conflicts arise the Contractor should immediately notify the County Representative and the Engineer before continuing construction activities around utilities. Following is the contact information of the utility companies for all the utilities within the project limits:

Utility Company	Representative	Contact Information
APS-Power 2200 E. Huntington Dr. Flagstaff, AZ 86004	Jeff Ritter Erin Creekmur	Jeff.Ritter@aps.com Cell: (928)-225-4264 Erin.creekmur@aps.com (928) 773-6447
Lumen (CenturyLink) 112 N. Beaver St. Flagstaff, AZ 86001 (Phone/Cable)		Jordan.Gaard@lumen.com manuel.hernandez4@centurylink.com Office:(928) 779-4935 Cell: (928) 821-6007
Kinder Morgan 3920 E El Paso Dr. Flagstaff, AZ 86004	Cody Cox	cody_cox@kindermorgan.com <u>928-527-6526</u>

SECTION 108 – COMMENCEMENT, PROSECUTION AND PROGRESS

108.7 DETERMINATION AND EXTENSION OF CONTRACT TIME

Is revised to include:

The contract time, including final clean-up of the project site and storage areas, may be extended as a result of weather conditions that cannot be reasonably anticipated. The number of actual days that the scheduled work is actually impacted by adverse weather shall be recorded weekly during the construction period.

It is the Contractor's responsibility to request in writing any claims for the delay of critical work within two working days of experiencing adverse weather and associated project delays. Any adverse weather day requests that are not received as stated above shall not be considered nor approved. The County will convert any delays meeting the above requirements to working days and extend the contract period as necessary. No additional compensation will be allowed for direct and indirect overhead expenses associated with any such contract time extensions. The Contractor's schedule must include the above anticipated adverse weather delays on a month-by-month basis during the contractor's normal working schedule.

108.8 GUARANTEE AND WARRANTY PROVISIONS

First paragraph, is revised to read:

The Contractor shall guarantee all portions of the work under this contract against defective workmanship and materials for a period of one year from the date of final acceptance of the product by the Engineer, ordinary wear and tear and unusual abuse or neglect excepted.

108.9 FAILURE TO COMPLETE ON TIME

First sentence in first paragraph, is revised to read:

For each and every working day that work shall remain incomplete after the time specified for the completion of the work in the proposal, or as adjusted by the Engineer, the sum per calendar day shown in Table 108-1, unless otherwise specified in the proposal form, may be deducted from monies due to or to become due to the Contractor, not as a forfeit or penalty but as liquidated damages.

SECTION 109 – MEASUREMENTS AND PAYMENTS

109.7 PAYMENT FOR BOND ISSUE AND BUDGET PROJECTS

Subsection (B), first paragraph, is revised to read:

Request for final payment must be submitted to the Engineer within 45 days of project completion as determined by the Engineer. No additional pay requests will be

considered after the final pay request is submitted. All prior estimates and partial payments will be subject to correction in the final estimate for payment.

SECTION 201 – CLEARING AND GRUBBING

201.4 REMOVAL AND DISPOSAL OF SALVAGE ITEMS:

Add the following:

Logs and branches 6 inches in diameter and smaller, slash and woody debris resulting from tree removal operations shall be mulched and hauled from the site and disposed of in a legal manner and to a location as determined by the Engineer within the greater Flagstaff area.

Logs and branches greater than 6 inches in diameter shall cut to lengths as specified by the Engineer and hauled from the site to the nearest firewood staging area as designated by the USFS and/or the Engineer.

SECTION 220 – RIPRAP CONSTRUCTION

220.2 MATERIALS:

Add the following:

Feature rocks and footer rocks (boulders) for rock sills and cross vane weirs shall conform to Section 701.2 for Coarse Aggregate.

The least dimension of an individual rock shall be not less than one-third the greatest dimension of the rock. Rock shall be selected, and processed to meet the specified quality and grading requirements at the time the rock is installed.

Rock sizing will vary between different structure locations due to the forces exerted on them by flows. Contractor shall verify correct rock sizing and gradation with details provided on the plans.

220.5 RIPRAP PLACEMENT:

Add the following subsection:

220.5.1 Rock Structures: Rock shall be placed to the lines and grades as specified on the plans. Rock shall be placed by equipment on the surface and to the depth specified to provide maximum stability, foundation competence and geometry as shown on the construction plans. All rock shall be keyed-in such that finished rock surfaces conform to the plan. The rock should be placed with the proper equipment to ensure that the rocks are interlocked and stable. All rock shall be placed at position and orientation

specified utilizing an excavator with a hydraulically operated “Thumb” attachment. Excavator must be capable of handling 4 foot diameter rock.

All rock should touch adjacent rocks to form a tight fit. Footer rocks are to be placed to minimize voids. Sill rocks shall be placed on top of footer rocks so that each sill rock rests upon two halves of each footer rock below, and so that the sill rock is offset in the upstream direction. Fill all gaps and voids of structure with bedding rock to minimize piping of water through structure. Smaller rocks and spalls shall fill the voids between the larger rocks. Some hand placing may be required to provide a neat and uniform surface.

SECTION 230 – DUST PALLITIVE APPLICATION

Is revised to read:

MAG SECTION 230 shall not be applicable to project. All dust control related activities shall be incidental to the pay item for the SWPPP.

SECTION 301 – SUBGRADE PREPARATION

301.1 DESCRIPTION

Add the following:

The work under this section shall be in accordance with Section 301 of the MAG Standard Specifications and per the Geotechnical Investigation attached as Appendix B.

301.3 RELATIVE COMPACTION: (add the following paragraph)

Additional compaction requirements and soil treatment shall be per the Geotechnical Investigation prepared by Speedie and Associates as noted below.

Compaction Recommendations Table (Sourced from Geotechnical Report)

Engineered Fill Description	Percent Compaction per ASTM D698	Moisture Content
Scarified Native Subgrade Soils Below Roadway	95%	Zero to +3 Percent of Optimum
Imported Fills Below Roadway	95%	+/- 2 Percent of Optimum
ABC	100%	+/- 3 Percent of Optimum
Granular Trench Backfill – Within 2 feet of finished subgrade	100%	+/- 2 Percent of Optimum
Non-Granular Trench Backfill – Within 2 feet below fin. subgrade	95%	+/- 2 Percent of Optimum
Trench Backfill >2 feet below finished subgrade	95%	

MAG SECTION 317 – ASPHALT MILLING

317.1 DESCRIPTION:

First paragraph modified to read:

The work under this section shall consist of milling existing asphalt concrete pavement where shown on the Plans or requested. Millings not used for roadway shoulder shall be blended with the subgrade or aggregate base. Any additional millings will become the property of the Contractor. The Contractor shall properly dispose of the millings off site or may use to blend with subgrade material to build-up superelevated areas.

317.2 CONSTRUCTION REQUIREMENTS

Is revised to include:

The milled surface shall not be used as a temporary riding surface. All milled areas must be filled with new asphaltic concrete prior to allowing traffic to resume.

The Milling machine shall include the following:

- a) The milling equipment shall be specifically designed to remove material to a controlled line and grade by means of grinding or chipping. The equipment used shall be capable of removing the existing asphaltic concrete uniformly throughout the milled area at the required cross-slope and with 1/4 inch accuracy.
- b) Be equipped with an automatic grade control system operating in “profile” mode. The system shall be either:
 - a. A 30-foot-long paving machine ski with spring-loaded feet attached to the bottom on not more than 1.5-foot increments, such that the feet rise and fall over small irregularities on the pavement surface. The upper part of the ski shall be one piece and of such construction that it will not flex or bend by more than 1/8 inch at either end when supported off the grade by a fixture located at its center of gravity. The grade control system shall be referenced off the center of the ski, with skis mounted on each side of the milling machine such that the ski’s longitudinal center is even with the center of the milling machine’s cutting drum, or,
 - b. A sonic averaging system with automated controls. A minimum of each corner of the milling machine shall be equipped with sonic grade averaging and slope sensors. The system shall feature plug-in connections, internal cable routing, 2 dual control boxes for ground personnel each capable of controlling each side of the milling machine, and a separate control box for the operator.

The removal shall be accomplished in a manner which does not destroy the integrity of any pavement that remains. The milled material shall be removed and disposed of as specified by the County.

Quality Assurance

Ensure that the milling operation produces a uniform pavement texture that is true to line, grade, and cross section.

Milled pavement surfaces are subject to visual and straightedge inspections. A ten (10) foot straight edge shall be used to measure surface irregularities of the milled pavement surface. The cross slope shall be uniform and no depressions or slope misalignments greater than 1/4 in per ten (10) feet exist when the slope is tested with a straightedge placed perpendicular to the center line.

Milling Operation

During production milling operation if the Engineer determines that the desired surface finish is not being achieved, the contractor shall stop milling. Milling shall not resume until the Engineer is satisfied that the requirement can be met or until successful completion of another test section. The forward speed of the milling machine shall be checked throughout each production day, or at the discretion of the engineer. If the desired surface finish is not met, the Contractor shall reduce the forward mill speed as specified by the Engineer.

The profile of the milled surface, in both the longitudinal and transverse directions, shall not vary by more than 1/4 inch over a distance of ten feet, verified by a 10' straight edge test.

Milling operations shall progress from the low side of each roadway barrel or lane and progress towards the high side. Each successive pass of the milling machine shall meet the line and grade of the previous pass. All mainline milling shall be completed first before side streets and driveways are milled. The speed of the milling machine shall be maintained at a rate which results in a uniform pavement texture, as approved by the engineer.

Milling shall result in a grid-patterned textured pavement surface with longitudinal ridges approximately the same distance apart as the cutting teeth. The ridges shall be consistent in depth, width, and profile. The distance between the top of each ridge and the adjacent valleys shall not exceed 1/8 inch.

Milled pavement surfaces which do not conform to the requirements above shall be corrected by the Contractor. The Contractor shall prepare and submit to the Engineer for approval a correction plan prior to initiating corrective action.

During milling operations, the cutter teeth shall be regularly checked and replaced as necessary to maintain the tolerances and desired surface finish.

Milling methods that will produce a uniform finished surface and maintain a constant cross slope between extremities in each lane shall be required. The Contractor shall maintain the existing pavement profile cross-slopes & provide positive drainage in all existing directions.

Positive drainage shall be provided to prevent water accumulation on the milled pavement, as shown on the plans or directed by the Engineer.

Any damage to the existing infrastructure—including but not limited to the valve risers, manholes, survey monuments, concrete collars, curb ramps, sidewalks, and concrete curb & gutter—shall be repaired and/or replaced by the Contractor to the satisfaction of the Engineer.

Under no circumstances shall the removal of existing asphaltic concrete begin until the mix design for replacement surface treatment has been approved by the Engineer.

If during the milling operation, the Contractor breaks through the asphaltic concrete (AC) layer into the base/sub-base material, the disturbed base/sub-base material shall be reshaped, re-graded and re-compacted at the direction and to the satisfaction of the Engineer prior to the placement of the new AC. After the milling operation, any unstable remaining bituminous material shall be completely removed and replaced with an adequate thickness of AC to achieve the final total thickness of AC, per plans or as directed by the Engineer, with the binder specified in the Special Provisions. Payment for additional work shall be compensated according to the Special Provisions, i.e. time and materials or quotes.

Vehicular traffic will not be permitted to travel on the milled surface at any time including overnight. The Contractor will be required to fill/pave the milled trench or surface by the end of each working day. This includes all main line and side road match points unless approved by the Engineer.

Work Site Maintenance

Remove dust, milling slurry & residue, and loose milled material from the milled surface. Do not place the new surface treatment on the milled surface until removal is complete.

A self-loading motorized street sweeper equipped with both brooms and a vacuum system, and a functional water spray system shall immediately follow the milling machine. Sweeping shall continue until loose millings, silt, slurry and residual asphalt concrete materials have been completely removed and as requested by the Engineer. The Contractor shall maintain the milled surface for cleanliness until the surface treatment is applied.

317.3 MEASUREMENT AND PAYMENT

Is revised to read:

All work under this item for this project shall be measured and paid for per the contract unit price per square yard, inclusive of all labor, material, equipment, and incidentals necessary to complete the work. Payment shall be made proportionate to the agreed upon percentage of work complete at the end of the period as invoiced.

SECTION 321 – PLACEMENT AND CONSTRUCTION OF ASPHALTIC PAVEMENT

321.3 WEATHER AND MOISTURE CONDITIONS

Is revised to read:

Asphalt concrete shall be placed only when the surface is dry, and when the ambient temperature in the shade is 40 degrees F or above and rising, or above 50 degrees F if the temperature is falling. No asphalt concrete shall be placed when the weather is foggy or rainy, or when the base on which the material is placed is unstable, is in a wet condition (in excess of optimum), or in a frozen condition. Asphalt concrete shall be placed only when the Engineer determines that weather conditions are suitable.

321.7 Transportation

First paragraph is revised to include:

No free treating fluid shall be present in the truck bodies at the time of asphalt concrete loading. Diesel fuel shall not be used as a treating fluid.

321.8.1 Placing

Is revised to include:

It shall be the contractor's responsibility to immediately clean up any spillage. Failure to limit spillage and keep the job site cleaned up from such spillage shall be justification to shut the work down until adequate procedures and resources are provided to resolve the problem. Asphalt concrete found deficient in temperature shall be rejected and removed from the job site at no cost to the contracting agency.

321.8.2 Joints

Is revised to include:

Unless otherwise approved by the Engineer, mainline paving shall be done prior to side road matching, widenings, and turnouts. All longitudinal joints shall be raked and compacted and not vary more than *1/4 inch* vertically from adjacent new pavement.

321.8.4 Compaction: Asphalt Base Course and Surface Course

First paragraph, is revised to read:

It is the contractor's responsibility to perform Quality Control monitoring and/or testing during compaction operations to achieve the required compaction. The temperature of the asphalt concrete immediately behind the laydown machine shall be at least 275 degrees F. A probe type electronic thermometer with a current calibration sticker attached will be used to measure the temperature of the asphalt concrete mixture. When measuring the temperature of the mat, the probe shall be at a point 1 inch below the surface at the point of delivery and as horizontal as possible to the mat. The minimum placement temperature and may need to be increased if material is found unworkable by the Engineer. The contractor is responsible to achieve the required compaction.

321.8.4 Compaction: Asphalt Base Course and Surface Course

Fourth paragraph, is revised to read:

The Contractor shall determine the equipment and pattern of rolling that will provide the proper compaction, cost of which shall be considered incidental to the asphaltic concrete pay items. The Engineer will determine the acceptability of the pavement compaction in accordance with Section 321.10 of the MAG Standard Specifications.

321.8.5 Smoothness is revised to read:

The completed surfacing shall be thoroughly compacted, smooth, true to grade and cross-section, of uniform texture and appearance, and free of ruts, humps, roller marks, depressions or irregularities. An acceptable surface shall not vary more than *one-fourth (1/4) inch* from the lower edge of a *12-foot straightedge* when the straightedge is placed parallel and perpendicular to the centerline of the roadway.

321.11 Referee is revised to include:

If necessary, the Owner shall engage an accredited independent, third-party materials testing laboratory which shall perform a new set of acceptance tests representing the area or set of tests in question. Payment for the referee testing shall be the responsibility of either the Owner or the Contractor, depending on the new results. If the referee testing results are found to confirm the Quality Control results, as determined by the Contractor's Quality Control Engineer, then the Owner shall be responsible for the costs of the referee testing. Otherwise, the Contractor is responsible for covering the additional testing costs. The results of these referee determinations will be binding to both the Contractor and the Owner.

321.13 PAYMENT is revised to read

All work under this item for this project shall be included as a component of the overall lump sum contract amount, inclusive of all labor, material, equipment, and incidentals necessary to complete the work. Payment shall be made proportionate to the agreed upon percentage of work complete at the end of the period as invoiced.

SECTION 329 – TACK COAT

309.7 PAYMENT

Is revised to read:

No separate payment will be made for tack coat; All associated work and material for tack coat application shall be considered incidental to the contract.

SECTION 401 – TRAFFIC CONTROL

401.1 DESCRIPTION

Is revised to read:

All Traffic Control shall be in accordance with Section 401 of the MAG Standard Specifications and the **Manual on Uniform Traffic Control Devices, 2009 Edition (MUTCD)**, U.S. Department of Transportation, Federal Highway Administration, and all subsequent revisions thereto and as modified herein shall consist of furnishing, installing, maintaining, moving and removing barricades, warning signs, lights, signals, cones, and other traffic control devices, including construction signing of detour routes to provide safe and efficient passage through and/or around the work for movement of traffic through construction zones and to protect workmen in or adjacent to the work zone. The requirements of the MUTCD shall be considered as the minimum standards for the protection of workmen and the traveling public.

401.4 TRAFFIC CONTROL MEASURES

Is revised to include:

The Contractor is required to provide a Work Plan with a detailed Traffic Control Plan, Phasing Plan, and Property Access Plan per MAG Specification Section 401. This plan shall be submitted to the Engineer for review and approval.

At all times, the Contractor shall conduct the construction activities to safeguard pedestrians and vehicular access in the vicinity of the project. All holes or trenches left open overnight shall be surrounded by Type II barricades with Type A flashing warning lights, connected by warning tape or rope, as directed by the Engineer. The Contractor shall provide coverings or some other protection over holes satisfactory to the Engineer. There will be no direct measurement or additional payment for providing coverings or the warning tape, Type II barricades or rope, the costs being considered as included in the original cost of the contract.

401.5 GENERAL TRAFFIC REGULATIONS

Sixth paragraph is revised to read:

Vehicular access shall be maintained to developed properties at all possible times. Full closure of any roads within this project will not be permitted. When access must be restricted for construction, the Contractor shall give written notice to each affected resident, business, and association not less than 48 hours in advance.

401.6 METHOD OF MEASUREMENT

First paragraph is revised to read:

Traffic control shall be measured as a Lump Sum (LS) item and shall include all items, materials, equipment, workmen, devices, facilities and work necessary to provide adequate traffic control and detours as specified in the Traffic Control Plan and as directed by the Engineer.

401.7 PAYMENT

Is revised to read:

All work under this item for this project shall be included as a component of the overall lump sum contract amount, inclusive of all labor, material, equipment, and incidentals necessary to complete the work. Payment shall be made proportionate to the agreed upon percentage of work complete at the end of the period as invoiced.

MAG SECTION 405 – SURVEY MONUMENTS

405.1 DESCRIPTION

Is revised to include:

This work shall include protecting existing survey monuments in place. If the existing monuments are found to be too close to the existing grade that they cannot be protected in place, notify the Engineer before removing the monuments.

405.5 PAYMENT

Is revised to read:

All work under this item for this project shall be included as a component of the overall lump sum contract amount, inclusive of all labor, material, equipment, and incidentals necessary to complete the work. Payment shall be made proportionate to the agreed upon percentage of work complete at the end of the period as invoiced.

SECTION 430 – LANDSCAPING AND PLANTING

430.7 Native Seed

Is revised to read:

Supply and placement of grass seed mix shall be per the Coconino County Seeding Specification, included herein as Attachment A. The work shall include the supply and transport of all labor, material, and equipment required for soil preparation, furnishing, and placing seed as shown on the plans and to the requirements of the seeding specification.

430.10 MEASUREMENT AND PAYMENT

Is revised to read:

SUPPLY & PLACE GRASS SEED MIX shall be measured and paid on a per acre basis as determined from the plans and shall include all other areas disturbed by construction operations. Site preparation shall be incidental to those operations, and no separate payment will be made. No payment will be made for areas seeded with unapproved seed. No adjustment in payment will be made for the number of seeding mobilization activities.

Final payment will be made after determination of seeding establishment by the County.

The accepted quantities of seeding, measured as provided above, will be paid for at the contract price for the pay unit specified in the bidding schedule, complete in place.

No direct measurement or payment will be made for the preservation or repairs of seeded areas.

SECTION 702 – BASE MATERIALS

702.1 GENERAL

Is modified to include:

The aggregate base course will be clean, free of organic matter, and be of such a nature that it can and will be compacted to a dense, firm layer capable of supporting loaded trucks and self-propelled pavers without rutting. Volcanic cinders shall not be used for base materials.

MAG SECTION 710 – ASPHALT CONCRETE

710.1 – GENERAL

Is revised to include:

The mix designation is High Traffic 1/2" mix for all asphalt concrete in this project.

710.2.1– Asphalt Binder

Is revised to read:

The asphalt binder specified in this section has been developed for use in mountain climate conditions, such as this project. The asphalt binder shall be Performance Grade Asphalt conforming to the requirements of Section 711 for PG 64-28, unless otherwise approved by the Engineer or specified differently in the plans or special provisions. AC 20 conforming to Section 711 may be used if PG 64-28 is not available.

710.2.2– Aggregate

Second paragraph, is revised to read:

Coarse aggregate for hot mix asphalt is material retained on or above the No. 4 sieve and Fine aggregate is material passing the No. 4 sieve. Aggregates shall be relatively free of deleterious materials, volcanic cinders, clay balls, and adhering films or other material that prevent coating with the asphalt binder. Coarse and Fine aggregates shall conform to the following requirements when tested in accordance with the applicable test methods.

710.2.3 Reclaimed Asphalt Pavement (RAP)

Is revised to read:

Reclaimed Asphalt Pavement (RAP), as defined in Section 701.5, may be used in asphalt concrete provided all requirements of Section 710 are met. References to use of RAP in Section 710 apply only if RAP is used as part of the mixture.

When RAP is used in asphalt concrete, it shall be of a consistent gradation, asphalt content, and properties. When RAP is fed into the plant, the maximum RAP particle size shall not exceed 1 1/2 in. The percentage of asphalt in the RAP shall be established in the mix design. The percentage of RAP binder shall be established in the mix design.

When RAP is used in base and intermediate courses, the amount of RAP aggregate and RAP binder should not exceed 30% contribution; Surface courses should be limited to 20% RAP aggregate and RAP binder contribution.

In addition to the requirements of Section 710.3.1, the job mix formula shall indicate the percent of asphalt RAP and the percent and performance grade of virgin (added) asphalt binder.

When less than or equal to 15% RAP binder is used by weight of total binder in the mix, the added virgin binder shall meet the requirements for PG 70-22 as shown in Section 711. When greater than 15% RAP is used by weight of the total binder in the mix, the added virgin binder will be dropped one grade for low and high temperature properties to a PG 64-28, unless testing indicates that the blend of the recovered RAP binder and virgin binder meets the requirements for PG 64-28 as shown in Section 711. The virgin

asphalt binder shall not be more than one standard asphalt material grade different than the specified mix design binder grade.

710.3.2– Mix Design Criteria

Is revised to read:

The mix design shall be performed by Marshall Mix Design per 710.3.2.1. The 1/2” mix design criteria outlined in Table 710-3 shall be used. A minimum of 4 points will be used to establish the mix design results. The oven aging period for both Marshall and Gyratory mix design samples shall be 2 hours.

710.3.2.1. Marshall Mix Design is revised to include:

The percentage of asphalt range for half (1/2) inch asphaltic concrete shall be five and three-tenths percent (5.3%) to six percent (6%). The asphalt cement content shall be considered acceptable if it is within -0.30% or +0.40% of the mix design target value.

APPENDIX A: COCONINO COUNTY SEEDING SPECIFICATION

The Coconino County Seeding Specification is attached hereto shall be followed for reseeding of all disturbed areas with the exception of the seed mix. Modify the seed mix as follows to comply with Coconino National Forest requirements for seeding on USFS lands.

<u>Common Name</u>	<u>Species Name</u>	<u>lbs PLS/ac</u>
Blue Grama	<i>Bouteloua gracilis</i>	1.2
Little Bluestem	<i>Schizachyrium scoparium</i>	2.8
Slender Wheatgrass	<i>Elymus trachycaulus ssp. trachycaulus</i>	5
Arizona Fescue	<i>Festuca arizonica</i>	2.4
Prairie Junegrass	<i>Koeleria macrantha</i>	0.2
Muttongrass	<i>Poa fendleriana</i>	0.6

COCONINO COUNTY SEEDING SPECIFICATION

1.0 GENERAL CONDITIONS AND REQUIREMENTS

1.1 DESCRIPTION

The work shall include the supply and transport of all labor, material, and equipment required for soil preparation, furnishing, and placing seed as shown on the plans and to the requirements of this construction specification.

1.2 SCOPE OF WORK

1.2.1 Temporary Seed Mix

If required, prepare seedbed and seed all disturbed areas with Temporary seed mix once final grading is achieved.

1.2.2 Permanent Seed Mix

Prepare seedbed and seed all disturbed areas with Permanent seed mix once final grading is achieved. This task may consist of two applications of the Permanent seed mix. A second application may be required once success or failure of the first application has been determined by the County. The second application may occur over the previously prepared bed or require additional preparation at the discretion of the County.

1.3 SUBMITTALS

- Permanent seed mix utilized including composition percentages and application rates
- If required, Temporary seed mix utilized including composition percentages and application rates
- Seed labels and certified laboratory analysis results
- If Hydroseeding is utilized, the tacking agent swell volume test results

2.0 MATERIALS

2.1 SEED

2.1.1 Seed Certification Requirements

Seed shall be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect. Supplier will provide seed label with certified laboratory results for seed lot mix. Analysis shall include seed purity and percent inert matter, percent other crop seeds, percent weed seeds and name of restricted and noxious weed species (see below), percent germination along with percent hard and dormant seed, and any information on the

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certification class of seed. No seed will be accepted with a test date of more than 9 months before the delivery date to the site. Seed that does not meet the standard identified below will not be accepted. Seed should not be ordered or arrive on site until certified laboratory results have been reviewed and approved by the County. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. Seed bag tags provide the information needed to verify the quality and amount of seed in the lot. Bag tags should remain on the bags for inspector's verification.

- Live seed material not specified in the seed mix (see tables below) shall not exceed one percent (1%) by weight of the total mixture.
- No weeds on the Arizona Department of Agriculture's Arizona Noxious Weed List (updated January 2020) are allowed in the seed mix.
- Coconino National Forest maintains a list of Invasive Plant species for the area, which is categorized by level of concern. No category 'A', 'B', or 'E' species will be allowed in the seed mix. Category 'C' species in the mix will have the percent composition of the mix documented and reported to the project sponsor. The most recent Coconino National Forest Invasive Plant Species List is available from the USFS or Coconino County.
- The percent of noxious weed seed allowable shall be as defined in the current State laws relating to agricultural seeds or by the Coconino National Forest regulations, whichever is more restrictive. Coconino National Forest sets a high standard for weed management that is applicable to all Coconino County lands.

2.1.2 Seed Substitution

Substitutions for seed species or changes to percent composition of mix may be suggested by Contractor based on market availability of specified seed. However, all substitutions shall be reviewed and approved by the County prior to arrival on site and shall pass the same certification process as the original seed mix. Any cost reduction created by substitutions or changes to the seed mix shall be passed back to County upon approval.

2.1.3 Seed Mixes

The Temporary seed mix shall be used for a short-term cover which germinates and establishes rapidly for effective erosion control, weed control and temporary cover. A Temporary seed mix shall be required and applied to all disturbed areas if disturbed areas are left untouched or open for more than six weeks during the growing season (March through September) or in disturbed areas that will require future weed management or grading and that are left open during the growing season. The Permanent seed mix shall be used as the final diverse native grass mix. The Permanent seed mix will be applied to all disturbed areas before the end of the project.

For wetlands, wet meadows, riparian areas, or other areas deemed a special concern for habitat, the seed mix will depend on site conditions and must be specially designed to meet those site conditions and habitat goals. For normal construction

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areas, right of way work and staging areas, the seed mix can be derived from the conditions set forth below.

The seeding rates given below are for broadcast seeding methods (both mechanical and hand) and hydroseeding. Seeding rates for drill seeding may be halved.

A. TEMPORARY SEED MIX

Species	Scientific Name	% Composition	Seeding Rate
Quickguard™ Sterile Triticale*	<i>Triticum aestivum</i> x <i>Secale cereale</i>	100%	20 PLS lbs/ac

*or similar

Note: Sterile triticale seed will provide one season of growth only and the area must be overplanted with a permanent cover. All materials shall meet the approval of the Engineer (and USFS biological specialists when on USFS lands) before purchase and application.

-or-

Alternatively, the Temporary seed mix shall consist of at least one cool season and one warm season grass that are native to the immediate area and appropriate for the soils, aspect and hydrologic regime of the site.

B. PERMANENT SEED MIX

- i. For volcanic or limestone soils above 6,800 feet in elevation use:

Species	Scientific Name	% Composition	Pure Stand Seeding Rate PLS lbs/ac	Final Mix Seeding Rate PLS lbs/ac
Blue Grama	<i>Bouteloua gracilis</i>	25	4	1
Little Bluestem	<i>Schizachyrium scoparium</i>	25	10	2.5
Arizona Fescue	<i>Festuca arizonica</i>	25	6	1.5
Western Wheatgrass	<i>Pascopyrum smithii</i>	25	24	6

Potential Alternatives: Mountain Muhly (*Muhlenbergia montana*), Purple Three-awn (*Aristida purpurea*), or Pine Dropseed (*Blepharoneuron tricholepsis*) may be acceptable substitutions for Little Bluestem. Muttongrass (*Poa fendleriana*), Slender Wheatgrass (*Elymus trachycaulus* ssp. *trachycaulus*), Bottlebrush Squirreltail (*Elymus elymoides*), Prairie Junegrass (*Koeleria macrantha*), or Needle and Thread (*Hesperostipa comata*) may be acceptable substitutions for Arizona Fescue or Western Wheatgrass.

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ii. For volcanic or limestone soils below 6,800 feet in elevation use:

Species	Scientific Name	% Composition	Pure Stand Seeding Rate PLS lbs/ac	Final Mix Seeding Rate PLS lbs/ac
Blue Grama	<i>Bouteloua gracilis</i>	12.5	4	0.5
Sideoats Grama	<i>Bouteloua curtipendula</i>	12.5	14	3.5
Purple Three-awn	<i>Aristida purpurea</i>	25	12	3
Muttongrass	<i>Poa fendleriana</i>	25	5	1.25
Western Wheatgrass	<i>Pascopyrum smithii</i>	25	24	6

Potential Alternatives: Little Bluestem (*Schizachyrium scoparium*), Vine Mesquite (*Panicum obtusum*), Fringed Brome (*Bromus ciliatus*), Bottlebrush Squirreltail (*Elymus elymoides*), Slender Wheatgrass (*Elymus trachycaulus ssp. trachycaulus*), Needle and Thread (*Hesperostipa comata*), Prairie Junegrass (*Koeleria macrantha*), or Indian Ricegrass (*Achnatherum hymenoides*)

iii. For sand or cinder soils use:

Species	Scientific Name	% Composition	Pure Stand Seeding Rate PLS lbs/ac	Final Mix Seeding Rate PLS lbs/ac
Purple Three-awn	<i>Aristida purpurea</i>	25	12	3
Galleta Grass	<i>Pleuraphis jamesii</i>	25	16	4
Indian Ricegrass	<i>Achnatherum hymenoides</i>	25	14	3.5
Needle and Thread	<i>Hesperostipa comata</i>	25	20	5

Potential Alternatives: Spike Dropseed (*Sporobolus contractus*), Sand Dropseed (*Sporobolus cryptandrus*), Sideoats Grama (*Bouteloua curtipendula*), Blue Grama (*Bouteloua gracilis*), Cane Bluestem (*Bothriochloa barbinodis*), Sand Bluestem (*Andropogon hallii*), Thickspike Wheatgrass (*Elymus lanceolatus ssp. lanceolatus*), Vine Mesquite (*Panicum obtusum*: lower elevation)

iv. For clay soils use:

Species	Scientific Name	% Composition	Pure Stand Seeding Rate PLS lbs/ac	Final Mix Seeding Rate PLS lbs/ac
Galleta Grass	<i>Pleuraphis jamesii</i>	35	16	5.6
Alkalai Sacaton	<i>Sporobolus airoides</i>	30	4	1.2
Western Wheatgrass	<i>Pascopyrum smithii</i>	35	24	8.4

Potential Alternatives: Blue Grama (*Bouteloua gracilis*), Buffalograss (*Bouteloua dactyloides*), Little Bluestem (*Schizachyrium scoparium*), Muttongrass (*Poa fendleriana*), Curly Mesquite (*Hilaria belangeri*)

-or-

The permanent cover seed mix shall consist of, at minimum, two cool season and two warm season native, perennial grass species appropriate to the site. Chosen species should be dominant species from adjacent sites with similar soils,

hydrology and aspect. Perennial forbs and annual grasses can be added as required per the goals of the revegetation plan. However, all materials shall meet the approval of the County (and USFS biological specialists when on USFS lands) before purchase and application.

2.2 HYDROSEED ADDITIVES (IF UTILIZED)

Hydroseeding requires the use of a tacking agent, hydraulic mulch, and usually an indicator dye. Inoculum and fertilizer may be used if recommended by the supplier.

2.2.1 Tacking Agent

Tacking agent shall be a naturally occurring organic compound (often guar gum or plantago based) and shall be non-toxic. The tacking agent shall be a product typically used for binding soil and mulch in seeding or erosion control operations. The tacking agent shall be labeled indicating the type and purity. Tacking agents shall be applied at the rate recommended by the manufacturer or supplier.

2.2.2 Hydraulic Mulch

Hydraulic mulch shall be organic material (generally wood fiber or straw) that is designed to be used in hydroseeding. Hydraulic mulch should have low paper cellulose fiber content (high wood fiber or straw fiber content) and low ash content. Mulch shall be non-toxic, biodegradable, and have good absorbency or water holding content. Hydraulic mulch shall be applied at the rate recommended by the manufacturer or supplier.

2.2.3 Indicator Dye

An indicator dye should be used that is non-injurious to plant growth.

2.2.4 Inoculum and Fertilizer, if utilized

Inoculum and fertilizer can increase the success of seeding. Inoculum and fertilizer shall be used at the manufacturer recommended rate for hydroseeding.

3.0 EXECUTION

3.1 SEEDBED PREPARATION

Once the project area has been graded to appropriate elevations, ensure that the surface soil is in a roughened condition favorable for seed germination and growth. On sites where equipment can safely operate on slopes, the seedbed shall be adequately loosened (4 to 6 inches deep) and smoothed, with large clods being broken up. Areas that have been compacted by heavy equipment or other operations shall be ripped to a depth of at least 6 inches to ensure adequate permeability. All ripping should be conducted on contour to prevent rilling during runoff conditions. Disking, cultipacking, or both may be necessary to properly prepare a seedbed that is too rough to uniformly scatter seed. Where equipment

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cannot operate safely, the seedbed shall be prepared by hand methods by scarifying to provide a roughened soil surface so that broadcast seed will remain in place.

3.2 SEED APPLICATION

Application rate of seed, as specified, are for Pure Live Seed (PLS). PLS is a measure of seed that will germinate. PLS is determined by multiplying the percent purity by the sum of the percent of total viable seed (includes hard and dormant seed). Seed mix species, percent composition, and the PLS application rates per acre are shown in the seed mix tables above, Part 2.1.

All seeding operations shall be performed in such a manner that the seed is applied in the specified quantities uniformly in the designated areas. Seed shall be incorporated into the soil, but not more than 0.5 inch deep if using the dry method or hand application, as described below. Seeding should occur before installation of erosion control fabric, if required. To control erosion and weeds, apply seed to disturbed soil and slopes as soon as is practical after disturbance.

To increase likelihood of seeding success, seeding should be timed to precede seasonal monsoon moisture or winter snow cover. Avoid leaving seed on the soil for long periods of time without adequate moisture for germination and growth or winter cover, as this will promote seed predation by birds and insects. Seed should be worked into ground and/or protected by mulch. Seeding that occurs late in summer towards end of monsoon season rains may germinate but lack adequate growth during the shortened wet season to successfully over winter.

3.3 SEEDING METHODS

The following methods may be used to place material:

- *Hydroseeding Method.* Mix seed, hydraulic mulch, tacking agents, dye, inoculum and fertilizer (if utilized) with water in the amount and order specified by the manufacturer or supplier. Apply it under pressure at the rates specified. Hydroseeding mixing has the potential to mechanically damage native grass seeds. The mix should be utilized within 1/2 hour of adding seed to avoid over agitation and seed damage.
- *Dry Method.* Use mechanical, landscape, or cultipacker seeders, seed drills, or other approved mechanical seeding equipment to apply the seed. Dry method application must also utilize a weed-free mulch or erosion control fabric application over the seedbed as specified by the County and placed per manufacturer's specifications.
- *Hand Application.* Hand-operated seeding devices may be used to apply dry seed. Hand application method must also utilize a weed-free mulch or erosion control fabric application over the seedbed as specified by the County and placed per manufacturer's specifications.

4.0 MEASUREMENT AND PAYMENT

SUPPLY & PLACE GRASS SEED MIX shall be measured and paid on a per acre basis as determined from the plans and shall include all other areas disturbed by construction operations. Site preparation shall be incidental to those operations, and no separate payment will be made. No payment will be made for areas seeded with unapproved seed. No adjustment in payment will be made for the number of seeding mobilization activities.

Final payment will be made after determination of seeding establishment by the County.

***** END OF SECTION *****

APPENDIX B: GEOTECHNICAL EVALUATION