

Response Due Date 11/17/2016		Time 1:00 PM	Location 800 Lincoln Way, Ames, IA	
Proposal Number 17744	Description Seed Mixing and Storage			
Contract Begin Date	Contract Completion Date	Bid Bond NA	Performance Bond (Y/N) N	Liquidated Damages \$0.00
Purchasing Agent Assigned Rhonda Ruark	E-Mail Address rhonda.ruark@dot.iowa.gov	Phone 515-239-1285	Fax 515-239-1538	

RESPONDER INFORMATION				
Company Name			Federal Tax ID	
Street Address		City	State	Zip Code
Contact Name	E-Mail Address	Phone	Fax	
Responder agrees to sell goods/services or both at the same prices, terms and condition to any other Iowa state agency, Regent or Political Subdivision upon request. Please check Yes or No. <input type="checkbox"/> YES <input type="checkbox"/> NO			Responder is an Iowa Targeted Small Business? <input type="checkbox"/> YES <input type="checkbox"/> NO	

GENERAL INFORMATION

The entire contents of this solicitation; Addendums, Schedule of Prices, Specifications, Plans and Drawings, Supplemental Terms and Conditions, Standard Terms and Conditions shall become part of the contract or purchase order. **Faxed or email responses will be accepted.**

Acceptance/Rejection: The Iowa DOT reserves the right to accept or reject any or all responses and to waive irregularities or technicalities, provided such waiver does not substantially change the offer or provide a competitive advantage to a supplier or service provider. The Iowa DOT reserves the right to accept the response which is deemed to be in the best interest of the state. Any unauthorized changes, additions, or conditional responses including any ties to other solicitations or any reservations about accepting an award or entering into a contract, may result in rejection of the response. Responses must remain available for award for (30) days from the due date indicated above.

Method of Award: Award shall be made to the lowest responsible, responsive responder whose response meets the requirements of the solicitation unless otherwise specified. An Iowa responder will be given preference over an out-of-state responder when responses are equal in all aspects and are tied in price. By virtue of statutory authority preference will be given to products and provisions grown and coal produced within the State of Iowa.

Contracts: Successful contractor(s) may be sent either a formal contract or a purchase order. The contractor may not assign the contract to another party without written authorization from the Iowa DOT Purchasing Section.

Pricing and Discount: Unit prices shown in the response shall be quoted as the price per unit (e.g., gal., case, each, etc.) as stated in the solicitation. If there is a discrepancy between the unit prices, extended price, or total amount of response, the unit price shall prevail. Unless otherwise indicated, prices shall be firm for the duration of the contract or purchase order. Discounts for early payment are allowed, but not considered in award of the contract.

We certify that all materials, equipment, goods and/or services offered meet or exceed the specifications and requirements and will be supplied in accordance with the entire contents of this solicitation including delivery schedules.

Signed: _____

Date: _____



Iowa Department of Transportation
Standard Terms and Conditions
For
Submission of Quotations or Bids

-INFORMAL-

Informal - means a limited solicitation type of procurement where a sufficient number of responses from qualified sources are obtained and the aggregate amount of the purchase is less than \$50,000.

The entire contents of this bid solicitation shall become a part of a contract or purchase order. In case of a discrepancy between the contents of the solicitation documents, the following items listed by descending order shall prevail:

- Addendums to the solicitation
- Solicitation-
 - Schedule of Prices
 - Specifications
 - Plans and Drawings
- Supplemental Terms and Conditions
- Standard Terms and Conditions

(Example - if there is a statement in the Specifications that contradicts a statement in the Standard Terms and Conditions, the statement in the Specifications shall apply)

Preparation of Solicitation Response: All responses must address all aspects of the solicitation. Responses must be typed or completed in ink and submitted on the forms supplied by the Iowa DOT.

Responses must be signed and received prior to the bid opening date and time indicated on the Solicitation Response page or other specified areas throughout the solicitation document. The signed, submitted quotation or bidder's proposal shall become the official response to be considered for award.

Responses may be sent by email, fax, weblink, or delivered by a courier that ensures timely delivery.

A. Solicitation

1. **Opening:** The opening of responses are made public and conducted at the Iowa DOT, Ames complex unless otherwise specified. Responses received after the time of the opening will be returned to the bidder and considered non-compliant.
2. **Communications:** Questions concerning this solicitation should be directed to the purchasing agent listed on the Solicitation Response page. Inquiries can be written, phoned, or faxed. In all cases, written communication will take precedence over verbal communication.
3. **Pricing and Discount:** Unit prices shown on the response shall be quoted as the price per unit (e.g., gal., case, each, etc.) as stated in the solicitation. If there is a discrepancy between the unit bid prices, extended price, or total amount of response, the unit prices shall prevail. Unless otherwise indicated, prices shall be firm for the duration of the contract or purchase order. Discounts for early payment are allowed, but not considered in award of the contract.
4. **Acceptance/Rejection:** The Iowa DOT or provider reserves the right to accept or reject any or all responses and to waive irregularities or technicalities, provided such waiver does not substantially change the offer or provide a competitive advantage to any supplier(s). The Iowa DOT also reserves the right to accept that response which is deemed to be in the best interests of the state. Any unauthorized changes, additions, or conditional response including any ties to another response or any reservations about accepting an award or entering into a contract, may result in rejection of the response. Responses must remain available for award for thirty (30) days from date of opening.

5. **Bid Results & Disclosure:** Tabulation results will be sent to all responders and may be posted on the Iowa DOT website at www.iowadot.gov/purchasing under the *Bid Award* link referencing the proposal number with an award recommendation indicated. At the conclusion of the selection process, the contents of all received responses will be placed in the public domain and be open to inspection by interested parties, according to state law. Trade secrets or proprietary information that are recognized as such and are protected by law may be withheld if clearly identified.
6. **Quality of Goods:** All material shall be new and of first quality. Items which are used, demonstrators, refurbished, obsolete, seconds, or which have been discontinued are unacceptable without prior written approval by the Iowa DOT.
7. **Recycled Content:** The Iowa Code encourages purchase of products and materials with recycled content, including but not limited to paper products, oils, plastic products, compost materials, aggregate, solvents, and rubber products. Recycled items or alternatives must be noted in the Solicitation Response, if known.
8. **Shipping Terms:** Deliveries shall be F.O.B. Destination unless otherwise specified. All deliveries shall be accompanied by a packing slip indicating the Supplier, quantities shipped, and the purchase order number(s). All delivery charges shall be included in the response price and paid by the Supplier. No collect C.O.D. deliveries shall be accepted. When entering into a contract, the Supplier shall notify the freight company that all freight and delivery charges are to be prepaid by the Supplier. Goods delivered to the Iowa DOT Distribution Center at 800 Lincoln Way, Ames, IA shall be received between the hours of 7:00 a.m. and 3:00 p.m. on any day except Saturday, Sunday, or a holiday. For deliveries to other Iowa DOT locations, the Supplier may contact the destination location for available times to deliver as not all Iowa DOT locations have the same business hours. The Iowa DOT will not be liable for any freight claims or unpaid freight bills arising from contract or purchase order issues.

B. Award

The binding agreement (award) may be issued in the form a purchase order or contract or both depending on the requirements and complexity of the agreement.

1. **Method of Award:** Award shall be made to the lowest responsible, responsive responder whose response meets the requirements of the solicitation unless otherwise specified. An Iowa company or individual will be given preference over an out-of-state company or individual when responses are equal in all aspects and are tied in price. By virtue of statutory authority preference will be given to products and provisions grown and coal produced within the State of Iowa.
2. **Award Protests:** Protests of award recommendations are to be addressed to the Director of Purchasing, and shall be made in accordance with paragraph 761--20.4(6)"e" of the Iowa Administrative Code.
3. **Contracts:** Successful contractor(s) may be sent a formal Contract, Notification of Award or Purchase Order as confirmation of acceptance and award. Any of these binding agreements shall be for the term stated in the solicitation or on a purchase order and may be renewed for additional period(s) under the same terms and conditions upon mutual agreement as defined. The successful responder may not assign a contract to another party without written authorization from the Iowa DOT Purchasing Section. The Iowa DOT may offer a contract extension to the Contractor when a scheduled target date cannot be met.
4. **Consumer Price Index (CPI-U):** A CPI may be allowed as specified in the terms of the solicitation and at the discretion of the Iowa DOT based on currently posted CPI-U, US City Average, All Items – non seasonally adjusted unless otherwise specified. This applies each of any subsequent renewals, extensions, amendments issued under the contract for the duration of the contract.

5. **Payment Terms:** The Iowa DOT typically pays properly submitted vendor invoices within thirty (30) days of receipt, providing goods and/or services have been successfully delivered, installed or inspected (if required), and accepted. Invoices presented for payment must be only for quantities received by the Iowa DOT and must reference the purchase order number or contract to be submitted for processing.
6. **Default (Supplier):** Failure of the Supplier to adhere to specified delivery schedules or to promptly replace rejected materials shall render the Supplier liable for all costs in excess of the bid price when alternate procurement is necessary. This shall not be the exclusive remedy and the Iowa DOT reserves the right to pursue other remedies available to it by law or under the terms of the binding agreement.
7. **Default (Contractor):** Failure of a Contractor other than a Supplier to meet any specified project completion deadline shall render the Contractor liable for all costs incurred by the Iowa DOT that were: a) necessary to meet said deadline; or b) necessary to complete said project after said deadline. This shall not be the exclusive remedy and the Iowa DOT reserves the right to pursue other remedies available to it by law or under the terms of the agreement.

C. General

1. **Administrative Rules:** For additional details on the rules governing the action of the Iowa DOT Purchasing Section, refer to 761IAC, Chapter 20, Iowa Administrative Code, entitled "Procurement of Equipment, Materials, Supplies and Services".
2. **Affirmative Action:** The Contractor (and also subcontractor, vendor, service provider or supplier) is prohibited from engaging in discriminatory employment practices forbidden by federal and state law, executive orders and rules of the Iowa Department of Management, pertaining to equal employment opportunity and affirmative action. Contractor may be required to have a copy of their affirmative action program on file, containing goal and time specifications. Contractors doing business with Iowa in excess of \$5,000 annually and employing 50 or more full time employees may be required to file with the Iowa Department of Management a copy of their affirmative action plan. Failure to fulfill these non-discrimination requirements may cause the contract to be canceled and the contractor declared ineligible for future state contracts or subject to other sanctions as provided by law or rule.
3. **Applicable Law:** The contract shall be governed under the laws of the State of Iowa. The contractor shall at all times comply with and observe all federal and state laws, local laws, ordinances, and regulations which are in effect during the period of a contract and which in any manner affect the work or its conduct. Any legal action relating to a contract shall only be commenced in the Story County, Iowa, District Court or the United States District Court for the Southern District of Iowa.
4. **Conflict of Interest:** No state or county official or employee, elective or appointive shall be directly or indirectly interested in any contract issued by the Iowa DOT, see Code of Iowa 314.2.
5. **Debarment and Vendor Suspension:** By submitting a response, the contractor is certifying that it and its principals and/or subcontractors are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by the State of Iowa or any Federal department or agency.
6. **Equal Opportunity:** Responders to the solicitation must be an "Equal Opportunity Employer" as defined in the Civil Rights Act of 1964 and in Iowa Executive Order Number Thirty-four.
7. **Indemnification-Goods:** To the extent the goods are not manufactured in accordance with Iowa DOT's designs, Supplier shall defend, indemnify and hold harmless Iowa DOT, its assignees, and other users of the goods from and against any claim of infringement of any letters patent, trade names, trademarks, copyright or trade secrets by reason of sale or use of any articles purchased. Iowa DOT shall promptly notify Supplier of any such claim.
8. **Infringement:** Goods shall be delivered free of the rightful claim of any third party by way of infringement. Contractor shall indemnify and save harmless the State of Iowa and the Iowa DOT against all claims for infringement of, and/or royalties claimed under, patents or copyrights on materials and equipment furnished under this bid.
9. **Iowa Open Records Law:** All Solicitation Responses are subject to terms and provisions of Iowa Code Chapter 22 Examination of Public Records (Open Records), specifically 22.7- Confidential Records.

10. **Records Audit:** The contractor agrees that the Auditor of the State of Iowa or any authorized representative of the state, and where federal funds are involved, the Comptroller General of the U.S. Government, shall have access to and the right to examine, audit, excerpt, and transcribe any directly pertinent books, documents, papers, and records of the contractor relating to orders, invoices, or payments of a contract or purchase order.
11. **Targeted Small Businesses:** The Iowa DOT seeks to provide opportunities for women and/or minority small business enterprises. To apply for certification as an Iowa Targeted Small Business, contact the Iowa Department of Inspection and Appeals (515-281-5796). Contractors shall take documented steps to encourage participation from Targeted Small Businesses for the purpose of subcontracting and supplying of goods or services or both.
12. **Taxes:** Prices quoted shall not include state or federal taxes from which the state is exempt. Exemption certificates will be furnished upon request.
13. **Termination:**
 - **Termination Due to Lack of Funds or Change in Law**

The Iowa DOT shall have the right to terminate this Contract without penalty by giving thirty (30) days written notice to the vendor as a result of any of the following:

 - Adequate funds are not appropriated or granted to allow the Iowa DOT to operate as required and to fulfill its obligations under contract.
 - Funds are de-appropriated or not allocated or if funds needed by the Iowa DOT, at the Iowa DOT's sole discretion, are insufficient for any reason.
 - The Iowa DOT's authorization to operate is withdrawn or there is a material alteration in the programs administered by the Iowa DOT.
 - The Iowa DOT's duties are substantially modified.

Following a 30 day written notice, the Iowa DOT may terminate a binding agreement in whole or in part without the payment of any penalty or incurring any further obligation to the Supplier. Following termination upon notice, the Supplier shall be entitled to compensation upon submission of invoices and proper proof of claim for goods and services under contract up to and including the date of termination.



Schedule Of Prices

Number	17744
Date Required	11/17/2016 1:00 PM

Title Seed Mixing and Storage
Delivery Location
Shipping Terms FOB Destination/Freight Prepaid

Vendor
 PA Name Rhonda J Ruark
 Phone 515-239-1285
 E-Mail rhonda.ruark@dot.iowa.gov

Description

Product Availability Days: _____
Price Good Until: _____

All items must be bid.

Item	Qty	Unit	Description	Part #	Unit Price	Total Price
1	1	JOB	I-80/IA130 (Northwest Blvd) interchange in Davenport 114 pounds Delivery Location: ,			
Comments:						
2	1	JOB	Highway 218/C-57 interchange in Black Hawk County 7,894 pounds Delivery Location: ,			
Comments:						
3	1	JOB	Highway 20 Interchange near Dyersville between 330th Ave. and 332nd Ave. in Delaware County 4284 pounds Delivery Location: ,			
Comments:						
4	1	JOB	Highway 100 in Cedar Rapids between Covington Rd. and I- 380 in Linn County 7,955 pounds Delivery Location: ,			
Comments:						
5	1	JOB	Iowa DOT Main Complex in Ames, Story Co. 920 pounds			
Comments:						
6	1	JOB	U.S. 65 in Condurant in Polk County 90 pounds Delivery Location: ,			
Comments:						

I HEREBY CERTIFY THAT THIS PROPOSAL MEETS OR EXCEEDS THE MINIMUM REQUIREMENT INCLUDING SPECIFICATIONS AND ADDENDUMS.

Signature: _____ Date: _____

Section 1 Introduction & Bidding Information

1.1 Purpose

The purpose of this Request for Bid (RFB) is to solicit bids from responsible, responsive bidders to provide the goods and/or services identified and described below and specifically in Section 2 of this solicitation.

Overview The Iowa DOT is seeking contractor to provide all materials, labor, and equipment necessary to complete seed mixing and storage per pound of pure live seed, and then deliver this seed within 48 hours of notification from the Iowa DOT to the designated locations.

1.2 General

The owner of goods and/or services sought shall be the Iowa Department of Transportation.

1.2.1 Project Location *See Schedule of Pricing*

1.2.2 Issuing Agent

The Issuing Agent, identified on the Bid Response page is the sole point of contact regarding the RFB from the date of issuance until the notice of intent to award is issued (selection of the successful Bidder).

1.2.3 RFB posted on the Internet

Bidders are required to visit the Iowa DOT's website at www.iowadot.gov/purchasing/lettingschedule periodically for any and all addendums or other pertinent information regarding this solicitation.

The Iowa DOT must receive bids either **electronically or by standard mail on or before** the deadline on the Bid Response cover page. Bidders must furnish all information necessary to be considered for award. Bids that fail to meet the mandatory requirements of the RFB will be disqualified. Verbal information provided by Bidders shall not be considered part of the Bidder's bid response.

1.2.4 Clarification

If additional information is needed to interpret specifications found in Section 2 or any other part of the solicitation, written questions sent electronically or by standard mail will be accepted by the issuing office until the date and time bid are to be submitted.

The Iowa DOT reserves the right to contact Bidders after receiving bids for the purpose of clarification to ensure mutual understanding.

1.2.5 Responsiveness

The detailed requirements set forth in Section 2 shall be considered mandatory unless indicated otherwise.

1.2.6 No Minimum Guaranteed Purchase

The Iowa DOT anticipates that the successful Bidder will provide goods and/or services as requested in the solicitation. The Iowa DOT will not guarantee any minimum compensation will be paid to the Contractor or any minimum usage of the Contractor's services.

1.2.7 Incurring Costs

The costs of preparation and delivery of a bid are solely the responsibility of the Bidder. No payments shall be made by the Iowa DOT to cover costs incurred by any Bidder for the preparation of any bid.

Section 2 General Requirements & Specifications

2.1 Purpose/Scope of Work

The Iowa DOT is seeking contractor to provide all materials, labor, and equipment necessary to complete seed mixing and storage per pound of pure live seed, and then deliver this seed within 48 hours of notification from the Iowa DOT to the designated locations listed on the *Schedule of Prices*.

2.2 Specifications

Inspect seed upon arrival to ensure the seed is labeled in accordance with laws relating to agriculture seeds and the rules and regulations of Iowa Department of Agriculture. The exception being the information on the tag or label shall be mechanically printed. Each unit of seed furnished shall have a label or tag containing the name and address of the person or company who labeled said seed, kind and variety, percent purity, percent germination, percent hard seed, if present, and date tested.

Inspect the seed for damage due to rough handling and any exposure to moisture or rodents and the DOT minimum requirements for purity and germination as listed in Section 4169. Notify the DOT within 24 hours of receiving the seed should any evidence of contamination, or other reasons which would indicate the quality of seed is questionable.

Furnish with each shipment a certified seed mixture report and certification sheet. Each mixture report shall identify the county, project number, contractor or subcontractor and type of seed mixture.

Each certification sheet shall be signed by a designated responsible company representative.

Forward one copy of the above described documents to the project engineer at the time of delivery to the project. In addition, send one copy to the District Materials Engineer in the district in which the project is being administered. Information will be provided to successful bidder.

Store the seed upon arrival in a facility where the temperature plus humidity should not exceed 100 with ideal conditions being 50° Fahrenheit and 50% relative humidity.

Seed mixtures for each project will be forwarded to the contractor once the seed mixing contract is awarded.

Provide all materials, labor, and equipment necessary to complete seed mixing and storage per pound of pure live seed. Each project may have one to four seed mixes.

Deliver this seed within 48 hours of notification from the Iowa DOT to the following locations:

- 1) I-80/IA130 (Northwest Blvd) interchange in Davenport – approximately 114 PLS lbs.
Estimated delivery time will be between April 1 to May 31, 2017
- 2) Highway 218/C-57 interchange in Black Hawk County – approximately 7,894 PLS lbs.
Estimated delivery time will be between April 1 to April 30, 2017

- 3) Highway 20 interchange near Dyersville between 330th Ave. and 332nd Ave. in Delaware County – approximately 4,284 PLS lbs. Estimated delivery time will be between April 1 to April 30, 2017
- 4) Highway 100 in Cedar Rapids between Covington Rd. and I-380 in Linn County – approximately 7,955 PLS lbs. Estimated delivery time will be between April 1 to April 30, 2017
- 5) Iowa Department of Transportation Main Complex in Ames, Story County – approximately 920 PLS lbs. This shipment will be bagged in five acre lots of large seed, small seed and oats each. Estimated delivery time will be between April 1 to April 30, 2017
- 6) U.S. 65 in Bondurant in Polk County – approximately 90 PLS lbs. Estimated delivery time will be between April 1 to May 31, 2017

Successful contractor must be a certified seed conditioner approved by the Iowa Crop Improvement Association or other state's Crop Improvement Associations.

A copy of the certification to be provided with this bid.

Perform a seed germination, purity and noxious weed test at Iowa State University Seed Lab for the following species prior to mixing:

Big bluestem (Andropogon gerardii)
Canada wildrye (Elymus canadensis)
Virginia wildrye (Elymus virginicus)
Indiangrass (Sorghastrum nutans)
Little bluestem (Schizachyrium scoparium)
Partridge pea (Chamaecrista fasciculata)
Side-oats grama (Bouteloua curtipendula)
Switchgrass (Panicum virgatum)

All costs for the seed sampling will be paid by the winning bidder.

Certification and seed mixing report shall be completed per Materials I.M. 469.02

Collect samples from each container of seed for testing.

One pound of each seed type will be required to be submitted to Iowa State University Seed Lab. The one pound sample should be a representative sample of type of seed received. For example, if 10 bags of Big Bluestem are received, approximately 1/5 of a pound of seed should be sampled from each bag of Big Bluestem, combined then sent to Iowa State University Seed Lab.

Only one sample per supplier per lot will be required. For example, one lot (supplier) of Big Bluestem that will be used for several projects will only need to be sampled once and not multiple samples that would represent multiple seeding projects. If there are multiple lots (suppliers) of Big Bluestem though, a sample would be needed from each lot (supplier).

Forward test results to:

Iowa Department of Transportation
Mike Heller Office of Design
Roadside Development Section
800 Lincoln Way, Ames, IA 50010

MICHAEL.HELLER@dot.iowa.gov

2.3 DOT Responsibilities

The Iowa DOT project manager is Mike Heller and his contact information will be provided to the successful contractor.

Section 3 Supplemental Terms & Conditions

3.1 Contract Award

It is the intent of the Iowa DOT to award the contract to the responsible bidder whose submitted quotation is the most advantageous to the Iowa DOT, cost and other factors considered. Other factors include, but are not limited to: meeting or exceeding mandatory requirements, proposed staffing, and meeting required time schedule.

3.2 Contractor(s) Insurance Requirements

The resulting Contract will require the successful Contractor to maintain insurance coverage(s) of the type and in the amounts set forth below.

- It shall be the Contractor's responsibility to have liability insurance covering all of the project operations incident to contract completion and the Contractor(s) must have on file with the Contracting Authority a current "Certificate of Insurance" prior to award of contract. The certificate shall identify the insurance company firm name and address, contractor firm name, policy period, type of policy, limits of coverage, and scope of work covered (single contract or statewide). This requirement shall apply with equal force, whether the work is performed by persons employed directly by the Contractor(s) including a subcontractor, persons employed by a subcontractor(s), or by an independent contractor(s).
- In addition to the above, the Contracting Authority shall be included as an insured party, or a separate owner's protective policy shall be filed showing the Contracting Authority as an insured party.
- The liability insurance shall be written by an insurance company (or companies) qualified to do business in Iowa. For independent contractors engaged solely in the transportation of materials, the minimum coverage provided by such insurance shall be not less than that required by Chapter 325A, Code of Iowa, for such truck operators or contract carriers as defined therein. For all other contractors, subcontractors, independent contractors, and the Contracting Authority, the minimum coverage by such insurance shall be as follows:
 - Commercial General Liability including Contractual Liability;
- Contingent Liability; Explosion, Collapse and Underground Drainage
- Damage; Occurrence Basis Bodily Injury; Broad Form Personal Injury; Broad Form Property Damage.

Bodily Injury

The contractor will purchase and maintain throughout the term of this contract the following minimum limits and coverage:

- | | |
|----------------------------|-----------|
| • Each person | \$750,000 |
| • Each accident/occurrence | \$750,000 |
| • Workers Compensation | \$750,000 |
| • Statutory Limits | \$750,000 |
| • Employer's liability | \$750,000 |
| • Occupation Disease | \$750,000 |

Operations

- Property Damage \$250,000 each occurrence

The Contractor(s) shall require all subcontractor(s) meet the above insurance requirements.

The Certificate of Insurance must include the following;

- Iowa Department of Transportation must be listed as an additional insured

3.6 Public Contract Termination

The provisions of Iowa law as contained in Chapter 573A of the Code of Iowa, an Act to provide for termination of contracts for the construction of public improvements when construction or work thereon is stopped because of national emergency, shall apply to and be a part of this Contract, and shall be binding upon all parties hereto, including sub-contractors and sureties upon any bond given or filed in connection herewith.

INSPECTION & ACCEPTANCE OF SEED

GENERAL

The provisions of this IM shall apply to seed and seed mixtures defined in the plans and Section 4169 of the Standard Specifications.

ACCEPTANCE

Seed

Seeds shall be furnished and labeled in accordance with laws relating to agriculture seeds and the fuels and regulations of Iowa Department of Agriculture. The exception being the information on the tag or label shall be mechanically printed. Each unit of seed furnished shall have a label or tag containing the name and address of the person or company who labeled said seed, kind and variety, percent purity, percent germination, percent hard seed, if present, and date tested. The test date to determine the percentage of germination shall have been completed within a nine-month period prior to seed application exclusive of the calendar month in which the test was completed (for example, seed tested 8/5/12 shall be applied by 5/31/13. If seed is to be applied after 5/31/13, then seed requires a new test).

Prior to seeding, entire lots of seed to be used should be inspected for damage due to rough handling, exposure to moisture or rodents. Evidence of contamination, or other reasons which would indicate the quality of seed is questionable, should be considered cause for holding until the lots or bags in question have been tested before use. Routine monitoring samples for testing will not be required.

If the seed does not comply with minimum requirements for purity and germination, and such seed cannot be obtained, the Engineer may approve use of the seed on a basis of pure live seed (Germination times Purity equals Pure Live Seed) or may authorize a suitable substitution for the seed specified.

Seed Mixing

- On-site Mixing (rural stabilizing crop seeding only):

Prior to seeding operations, the Engineer shall be provided opportunity to inspect seed tickets and witness the mixing of seed varieties for compliance with requirements of the contract requirements. Contractor shall provide weighing equipment or evidence of the weights of pre-bagged seed to demonstrate required application rates.

- Off-site Mixing:

Seed mixtures certified by an approved source may be incorporated into the project. Each shipment to a project shall be accompanied by proper report and certification documents described in this IM. Seed bags shall be tagged with bag weight and lot number corresponding to certification documents.

Each shipment to a project should be inspected for damage, loss or contamination, and sufficiency to demonstrate required application rate. Bags shall arrive onsite from seed conditioner in sealed/unopened bags.

APPROVED SOURCES

Seed mixture from seed conditioners approved by the Iowa Crop Improvement Association may be furnished to Iowa DOT projects on a certification basis.

Seed conditioners approved by other state's Crop Improvement Associations may furnish seed mixtures on a certification basis.

Seed shall be mixed by an approved seed conditioner as described in this IM, but the seed is not required to come from an approved seed conditioner.

CERTIFICATION DOCUMENTS

Certified seed conditioner shall furnish with each shipment a certified seed mixture report and certification sheet (see Appendix A). Each mixture report shall identify the county, project number, contractor or subcontractor, type of seed mixture. Blank forms are available at the Office of Materials website.

Each certification sheet shall be signed by a designated responsible company representative. One copy of the above described documents shall be forwarded to the project engineer at the time of shipment to the project. In addition, one copy shall be sent to the District Materials Engineer in the district in which the project is being administered.

Certified seed mixture reports and seed lot test information for seeds furnished to Department projects shall be kept by the approved seed conditioner for a minimum of three years.

APPROVED SOURCE MONITORING

The District Materials Engineer shall be responsible for establishing and performing a supplier monitoring program at least once per year.

The following items shall be evaluated during a monitor inspection and documented on a Seed Monitor Report form (see Appendix B):

- Project number/customer
- Certification date and certifying scale company of all mixing scales
- Intended seed mixture
- Verification of seed varieties, germination percentage, purity percentage, PLS percentage, date tested, and lot number
- Verification of weighed seed increments and bags
- Labeling and certification/documentation

Seed Mixture Report – Native Grass and Wetland Grass

Project No.: _____ Date: _____
 County: _____ Seed Mix Type: _____
 Contractor: _____ # of Acres: _____
 Lot #: _____

Species (Scientific name)	Origin	Lot #	Test Date	Purity (%)	Germination (%)	PLS %	PLS Factor

Species (Scientific name)	# PLS/Acre	# of Acre	Total # PLS	PLS Factor	Total Bulk Lbs.
				Total:	

Lbs/Bag: _____ Acres/Bag: _____ # of Bags: _____

Seed Mixture Report – Urban and Rural

Project No.: _____ Date: _____
 County: _____ Seed Mix Type: _____
 Contractor: _____ # of Acres: _____
 Lot #: _____

Species (Scientific name)	Origin	Lot #	Test Date	Purity (%)	Germination (%)

Species (Scientific name)	Lbs. /Acre	# of Acre	Total Bulk Lbs.
		Total:	

Lbs/Bag: _____ Acres/Bag: _____ # of Bags: _____

Certification Statement

The materials itemized in this shipment are certified to be in compliance with the applicable requirements of the Iowa Department of Transportation.

Project No.	
County	
Seed Mixture Type	
# of Acres	
Total Bulk Lbs. of Mixture	
Lbs./Bag	
Acres/Bag	
Lot No.	
# of Bags	
Contractor	
Date	

Company: _____

Name: _____

Signature: _____

Date: _____

List state(s) where company is an approved seed conditioner:

Section 4169. Erosion Control Materials

4169.01 DESCRIPTION.

All materials required to be furnished and described in this section.

4169.02 SEEDS.

- A. Furnish seeds approved for use according to requirements of this section, including specified purity and germination, as shown in Tables 4169.02-1 and 4169.02-2.

Table 4169.02-1: Seeds (Common Names, Scientific Names, Purity, and Germination)

Common Name	Scientific Name	Purity (%)	Germination (%)
DOMESTIC GRASSES			
Bluegrass, Kentucky	<i>Poa pratensis</i>	85	80
Bluegrass, Ky. RAM-1	<i>Poa pratensis</i> -RAM-1	95	85
Bluegrass, Ky. PARK	<i>Poa pratensis</i> -PARK	95	85
Brome, smooth-LINCOLN	<i>Bromus inermis</i>	90	85
Fescue, tall, FAWN	<i>Festuca arundinacea</i> -FAWN	98	85
Fescue, chewings, red	<i>Festuca rubra</i> var. <i>commutata</i>	98	90
Fescue, creeping, red	<i>Festuca rubra</i>	98	85
Fescue, red-PENNLAWN	<i>Festuca rubra</i> PENNLAWN	98	85
Fescue, Tall, Olympic (Fineleaf)	<i>Festuca arundinacea</i> -Olympic	98	85
Fescue, Tall, Rebel (Fineleaf)	<i>Festuca arundinacea</i>	98	85
Fescue, Sheeps	<i>Festuca ovina</i>	98	85
Orchardgrass	<i>Dactylis glomerata</i>	90	90
Red top	<i>Agrostis alba</i>	92	85
Reed Canarygrass	<i>Phalaris arundinacea</i>	98	70
Wildrye, Canada	<i>Elymus Canadensis</i>	95	85
Wildrye, Russian	<i>Elymus junceus</i>	95	85
Ryegrass, Perennial	<i>Lolium perenne</i>	95	90
Timothy	<i>Phleum pratense</i>	99	85
LEGUMES			
Alfalfa, RANGER/VERNAL	<i>Medicago sativa</i>	99	90 ^(a)
Alfalfa, Travois	<i>Medicago</i> spp.	99	90 ^(a)
Birdsfoot Trefoil EMPIRE	<i>Lotus corniculatus</i>	98	85 ^(a)
Crownvetch, Emerald	<i>Coronilla varia</i>	98	70 ^(a)
Hairy Vetch	<i>Vicia villosa</i>	96	85 ^(a)
Lespedeza, Korean	<i>Lespedeza stipulacea</i>	98	80 ^(a)
Red Clover, medium	<i>Trifolium pratense</i>	99	90 ^(a)
Alsike Clover	<i>Trifolium hybridum</i>	99	90 ^(a)
White Clover	<i>Trifolium repens</i>	98	90 ^(a)
NURSE CROP OR STABILIZING CROP			
Oats	<i>Avena sativa</i>	97	90
Rye	<i>Secale cereale</i>	97	90
Sudangrass, PIPER	<i>Sorghum vulgare</i> var. <i>sudanese</i>	98	85

^(a) Includes hard seed.

Table 4169.02-2: Seeds (Common Names, Scientific Names, and PLS)

Common Names	Scientific Names	PLS (%)
*Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa.		
<u>NATIVE GRASSES</u>		
Big Bluestem*	<i>Andropogon gerardii</i>	30
Little Bluestem*	<i>Andropogon scoparius</i>	30
Switchgrass*	<i>Panicum virgatum</i>	63
Indiangrass*	<i>Sorghastrum nutans</i>	30
<i>Sorghastrum nutans</i>	<i>Bouteloua curtipendula</i>	30
Western Wheatgrass*	<i>Agropyron smithii</i>	56
Buffalograss*	<i>Buchloe dactyloides</i>	60
Sand Bluestem*	<i>Andropogon gerardii, var. paucipilus</i>	30
Blue Grama	<i>Bouteloua gracilis</i>	30
Intermediate Wheatgrass	<i>Agropyron intermedium</i>	70
Slender Wheatgrass	<i>Agropyron trachycaulum, var. unilaterale</i>	70
Prairie Dropseed	<i>Sporobolus heterolepis</i>	65
Sand Dropseed	<i>Sporobolus cryptandrus</i>	65
Sand Lovegrass	<i>Eragrostis trichodes</i>	65
Weeping Lovegrass	<i>Eragrostis curvula</i>	65
Hairy Wood Chess	<i>Bromus purgans</i>	60
Blue-joint grass	<i>Calamagrostis Canadensis</i>	47
Bottlebrush sedge	<i>Carex comosa</i>	62
Tussock sedge	<i>Carex stricta</i>	78
Fox sedge	<i>Carex vulpinoidea</i>	64
Virginia wild-rye	<i>Elymus virginicus</i>	60
Reed manna grass	<i>Glyceria grandis</i>	50
Fowl manna grass	<i>Glyceria striata</i>	72
Common rush	<i>Juncus effusus</i>	80
Rice Cut Grass	<i>Leesia oryzoides</i>	62
Rye grass, annual	<i>Lolium italicum</i>	89
Fowl bluegrass	<i>Poa palustris</i>	72
Green bulrush	<i>Scirpus atrovirens</i>	45
Wool grass	<i>Scirpus cyperinus</i>	78
Soft-stem bulrush	<i>Scirpus validus</i>	78
Indian grass	<i>Sorghastrum nutans</i>	60
Spike Rush	<i>Eleocharis palustris</i>	71
<u>FORBS</u>		
Canada anemone	<i>Anemone Canadensis</i>	72
Marsh milkweed	<i>Asclepias incarnate</i>	25
New England aster	<i>Aster novae-angliae</i>	25
Swamp aster	<i>Aster puniceus</i>	25
Showy tic-trefoil	<i>Desmodium canadense</i>	25
Joe-pye weed	<i>Eupatorium maculatum</i>	66
Boneset	<i>Eupatorium perfoliatum</i>	41
Ox Eye sunflower	<i>Heliopsis helianthoides</i>	38
Blue-flag iris	<i>Iris virginica-shrevii</i>	19
Meadow blazingstar	<i>Liatris ligulistylis</i>	24
Tall blazingstar	<i>Liatris pycnostachya</i>	24
Great blue lobelia	<i>Lobelia siphilitica</i>	13
Reed manna grass	<i>Glyceria grandis</i>	50
Fowl manna grass	<i>Glyceria striata</i>	72

Common Rush	<i>Juncus effuses</i>	80
Rice Cut Grass	<i>Leesia oryzoides</i>	62

- B. Furnish all seeds, including grass, legume, forbs, and cereal crop seeds, from an established seed dealer or certified seed grower. Ensure they meet requirements of the Iowa Department of Agriculture regulations (Iowa Seed Law) and are labeled accordingly. Ensure the test date to determine the percentage of germination requirement was completed within a 9 month period exclusive of the calendar month in which the test was completed. Ensure the seed analysis on the label is mechanically printed.
- C. Approval of all seed for use will be based on the accumulative total of PLS specified for each phase of the work, so that the PLS is not less than the accumulative total of the PLS specified. PLS is obtained by multiplying purity times germination.
- D. If the seed does not comply with minimum requirements for purity and germination and such seed cannot be obtained, the Engineer may approve use of the seed on a basis of PLS or may authorize a suitable substitution for the seed specified.
- E. The accumulative total of Pure Live Seed (PLS) is the product obtained by multiplying the pounds (kilograms) of each seed by the purity and germination percentages expressed as decimals. Calculations will be based on test results of samples taken by the Contracting Authority. If the seeds were not sampled or if these test results are not available, the PLS will be calculated from information shown on the label.

4169.03 FERTILIZER.

Furnish fertilizer of the grade, type, and form specified and that complies with Iowa Department of Agriculture rules and the following requirements:

- A. Fertilizer grade will be identified according to the percent nitrogen (N), percent available phosphoric acid, (P₂O₅), and percent water soluble potassium, (K₂O), in that order. Approval will be based on that identification.
- B. Furnish all fertilizer from an established fertilizer dealer. Ensure guaranteed analysis is provided either through mechanically printed commercial fertilizer bags or through a manufacturer's (not a distributor's) bill of lading.
- C. Fertilizer inspection and acceptance will be according to Materials I.M. 469.03.
- D. Furnish fertilizer of a type that can be uniformly distributed by the application equipment. Fertilizer may be chemically combined or may be furnished as separate ingredients. If supplying chemically combined fertilizer, have each unit of fertilizer chemically combined. Ensure the manufacturer's guarantee indicates compliance with this agreement. If supplying fertilizer as separate ingredients, comply with the following:
 - Each of the separate ingredients of uniform size,

- Analysis guaranteed by the manufacturer.
 - Mixed using a drum mixer, grinder mixer, or other mechanical mixers.
 - Mixed only by the fertilizer dealer.
- E. When 6-24-24 chemically combined commercial fertilizer has been specified, a combination of ammoniated phosphate (either monoammonium phosphate (11-52-0) or diammonium phosphate (18-46-0)), muriate of potash (granular form), and urea (granular form) may be used.
- F. When 13-13-13 chemically combined commercial fertilizer has been specified, a combination of ammoniated phosphate (either monoammonium phosphate (11-52-0) or diammonium phosphate (18-46-0)), muriate of potash (granular form), and urea (granular form) may be used.
- G. Fertilizer may be furnished in a dry or liquid form.
- H. Furnish a list of the number of containers and a corresponding scale ticket from an approved scale for the fertilizer to be used in the work.
- I. Official samples taken by the Contracting Authority may be tested. A tolerance of minus 1.0 percentage point from the guaranteed analysis for each nutrient will be considered substantial compliance.
- J. Ground limestone is to be of the type known as No. 1 fine (70% passing No. 200 (75 μ m) sieve) with an analysis of elemental calcium of no less than 37% or no more than 40%.

4169.04 INOCULANT FOR LEGUMES.

An inoculant is a culture of bacteria specifically formulated for legume seeds (alfalfa, clovers, lespedeza, birdsfoot trefoil, hairy vetch, and crownvetch). Ensure the manufacturer's container indicates the specific legume seed to be inoculated and the expiration date. Use inoculant that meets the requirements of the Iowa Seed Law. Follow the safety precautions specified on the product label.

4169.05 STICKING AGENT.

A sticking agent is a commercial material recommended by the manufacturer to improve adhesion of inoculant to the seed. For quantities less than 50 pounds (25 kg), the sticking agent need not be a commercial agent; however, the Engineer's approval is required. Apply separately prior to application of inoculant. Follow safety precautions specified on the product label. A sticking agent is not required if a liquid formulation of inoculant is used.

4169.06 SOD.

- A. Use sod consisting of approximately 1 inch (25 mm) of well established turf consisting of live Kentucky bluegrass, unless otherwise specified. Ensure sod is free from roots of trees or brush, stones, and other objectionable materials. Ensure sod is free from all noxious weeds and reasonably free of all other weeds.
- B. Ensure sod is cut in strips of uniform width and thickness with ends square. The Engineer may order the thickness adjusted to meet the sod conditions.

Cut sod to the length specified for the use intended. If not specified, cut to a minimum length of 3 feet (1 m). Mow sod areas to a height of approximately 1 1/2 inches (40 mm) to 2 inches (50 mm) prior to cutting.

- C. Ensure sod was regularly maintained prior to cutting. Apply pre-emergence weed control chemicals and weed control chemicals for broadleaf weeds.
- D. Roll or stack sod within 1 hour after being cut. The Engineer may approve other methods of handling sod. Take precautions to prevent drying or heating. Do not use sod damaged by heat or dry conditions, or sod cut more than 18 hours before being incorporated into the work.
- E. Sod will be subject to inspection by the Engineer at the job site, and approval of the work constitutes approval of the material.

4169.07 MULCH.

A. Straw Mulch.

Material used as mulch may consist of dry cereal straw or native grass straw. Use Certified Noxious Weed Seed Free Mulch certified by the Iowa Crop Improvement Association or other state's Crop Improvement Associations. Bail cereal or native grass straw the same growing season as the grain was harvested from the plant.

B. Hydraulic Mulches.

1. Wood Cellulose Fiber.

- a. Natural or cooked cellulose fiber processed from whole wood chips, or a combination of (50%-50%) cellulose fiber produced from whole wood chips and recycled fiber from sawdust, recycled paper, chipboard, or corrugated cardboard.
- b. Contains a colloidal polysaccharide tackifier adhered to the fiber to prevent separation during shipment and avoid chemical coagglomeration during mixing.
- c. Forms a homogeneous slurry of fibers, tackifier, and water that can be applied with standard hydraulic mulching equipment and be dyed green to facilitate visual metering during application.
- d. Contains no growth or germination inhibiting factors, and has a minimum pH of 4.8.

2. Bonded Fiber Matrix.

- a. Long-strand wood fibers held together by organic tackifiers and bonding agents that, when dry, become insoluble and non-dispersible.
- b. Upon curing (24 to 48 hours) forms a continuous, 100% coverage, flexible, absorbent, erosion-resistant blanket that encourages seed germination.
- c. Manufactured to be applied with standard hydraulic mulching equipment and dyed green to facilitate visual metering during application.
- d. Contains no growth or germination inhibiting factors.
- e. Physical Properties:

- 1) **Fibers:** Virgin wood, greater than 88% by volume.
 - 2) **Organic Material:** Greater than 96% by volume.
 - 3) **Tackifier:** 8 to 10%.
 - 4) **pH:** 4.8 minimum.
 - 5) **Moisture Content:** 12% \pm 3%.
 - 6) **Minimum Water Holding Capacity:** 1.2 gallons per pound (10 L/kg).
- f. All components pre-packaged by manufacturer to ensure material performance and compliance. Field mixing of additives or any components will not be allowed.
- g. Other products not meeting requirements of Article 4169.07, B, 2, e, may be approved if they meet the following requirements:
- 1) Contain non-toxic tackifiers that upon drying become insoluble and non-dispersible to eliminate direct raindrop impact on soil according to ASTM D 7101 and EPA 2021.0-1.
 - 2) Contain no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth.
 - 3) Hydraulic mulch that is completely photo-degradable or biodegradable.
 - 4) Contain a minimum 90% organic material according to ASTM D 2974.
 - 5) Have a rainfall event (R-factor) of $140 < R$ according to ASTM D 6459.
 - 6) Have a cover factor of $C \leq 0.03$ according to ASTM D 6459.
 - 7) Vegetation Establishment of 400% minimum according to ASTM D 7322.
 - 8) Water Holding Capacity 600% minimum according to ASTM D 7367.

3. Mechanically-Bonded Fiber Matrix.

- a. Long-strand wood fibers and crimped, interlocking synthetic fibers.
- b. Upon curing (2 hours) forms a continuous, 100% coverage, flexible, absorbent, porous, erosion-resistant blanket that encourages seed germination.
- c. Manufactured to be applied with standard hydraulic mulching equipment and dyed green to facilitate visual metering during application.
- d. Contains no growth or germination inhibiting factors.
- e. Physical Properties:
 - 1) **Virgin Wood Fibers:** 73% minimum.
 - 2) **Crimped, Interlocking Synthetic Fibers:** 5% \pm 1%.
 - 3) **Tackifier:** 10% \pm 1%.
 - 4) **Moisture Content:** 12% \pm 3%.
 - 5) **Minimum Water-Holding Capacity:** 1.2 gallons per pound (10 L/kg).
 - 6) **pH:** 4.8 minimum.
- f. All components pre-packaged by manufacturer to ensure material performance and compliance. Field mixing of additives or any components will not be allowed.
- g. Other products not meeting requirements in Article 4169.07, B, 3, e, may be approved if they meet the following requirements:

- 1) Contain non-toxic tackifiers that upon drying become insoluble and non-dispersible to eliminate direct raindrop impact on soil according to ASTM D 7101 and EPA 2021.0-1.
- 2) Contain no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth.
- 3) Hydraulic mulch that is completely photo-degradable or biodegradable.
- 4) Contain a minimum 90% organic material according to ASTM D 2974.
- 5) Have a rainfall event (R-factor) of $175 < R$ according to ASTM D 6459.
- 6) Have a cover factor of $C \leq 0.01$ according to ASTM D 6459.
- 7) Vegetation Establishment of 500% minimum according to ASTM D 7322.
- 8) Water Holding Capacity of 700% minimum according to ASTM D 7367.

4169.08. COMPOST.

- A. Use an organic substance produced by the biological and biochemical decomposition of source-separated compostable materials separated at the point of waste generation. Organic substances may include, but are not limited to:
 - Leaf and yard trimmings,
 - Food scraps,
 - Food processing residues,
 - Manure and/or other agricultural residuals,
 - Forest residues and bark, and
 - Soiled and/or unrecyclable paper and biosolids.
- B. Compost is to contain no visible admixture of refuse or other physical contaminants nor any material toxic to plant growth. Compost is to meet the additional requirements below. All physical requirements are to comply with the United States Composting Council, "Testing Methods for the Examination of Composting and Compost" (TMECC).
 1. **Minimum organic material:** 30% (dry weight (mass) basis) as determined by loss on ignition.
 2. **Moisture content:** 30% to 60%. Organic material shall be loose and friable and not dusty.
 3. **Soluble salts:** less than 5.0 ds/m.
 4. **Stability:** Carbon dioxide evolution rate less than 8 according to TMECC 5.08-B. Growth screening: Emergence a minimum of 80% for all compost to be vegetated.
 5. **pH:** 6.0 - 8.0.
 6. **Fecal Coliform:** Comply with TMECC 07.01-B.

7. **Heavy Metals:** Comply with TMECC 04.06 and TMECC 04.13-B.
8. Comply with the following for particle size:
 - **Pneumatic Seeding (Urban):** 100% passing the 1/2 inch (12.5 mm) screen.
 - **Pneumatic or Mechanical Seeding (Rural):** 100% passing the 1 inch (25 mm) screen, 80% to 90% passing the 3/4 inch (19 mm) screen, and 70% to 80% passing the 1/2 inch (12.5 mm) screen.
 - **Filter Sock, Filter Berm, and Filter Blanket:** 100% passing the 2 inch (50 mm) screen, 70% to 90% passing the 1 inch (25 mm) screen, and 50% to 70% passing the 1/2 inch (12.5 mm) screen.

4169.09 STAKES FOR HOLDING SOD.

Use either wood or metal wire stakes for holding sod. Use wood stakes in sandy soils or when the Engineer requires.

A. Wood Stakes.

- 1 inch (25 mm) to 1 1/2 inches (40 mm) wide, 1/4 inch (6 mm) to 1/2 inch (13 mm) thick, and 12 inches (300 mm) long.
- Where this length of stake does not provide firm bearing, the Engineer may require stakes of sufficient length to secure firm bearing.

B. Wire Stakes.

- Staples made from No. 11 (3.06 mm diameter) wire or heavier and with a minimum 2 inch (50 mm) flat spread on the top of the sod.
- Legs at least 6 inches (150 mm) long. The Engineer may require wire legs longer than 6 inches (150 mm).

4169.10 SPECIAL DITCH CONTROL, TURF REINFORCEMENT MAT, SLOPE PROTECTION, AND OUTLET OR CHANNEL SCOUR PROTECTION (TRANSITION MAT).

Comply with the following and meet the requirements of Materials I.M. 469.10.

A. Wire Staples.

Meet the following requirements for wire staples for holding special ditch control wood excelsior mat and special ditch control jute mesh over sod:

1. U-shaped wire staples.
2. Each leg a minimum of 6 inches (150 mm) long. In sandy soil conditions the Engineer may require the length of each leg to be a minimum of 12 inches (300 mm).
3. No. 11 (3.06 mm) diameter wire.
4. Staples of sufficient hardness to facilitate installation without bending.

B. Special Ditch Control.

1. Wood Excelsior Mat.

A mat of interlocking wood fibers. Meet the following requirements:

- Plastic netting applied to both sides for holding the excelsior in place.
- Nontoxic to growth of plants and germination of seeds.
- Minimum dry weight (mass) of 0.68 pounds per square yard (334 g/m²) according to ASTM D 6475.
- Furnished in rolls with a uniform width of 48 inches (1.2 m), with a tolerance of minus 1 inch (25 mm) and a minimum length of 80 feet (24 m).
- Furnished in plastic bags or otherwise protected to prevent damage from weather and handling.

2. **Coconut Fiber Mat.**

At the Contractor's option, coconut fiber mat may be substituted for wood excelsior mat for special ditch control. Meet the following requirements:

- Uniform thickness with the coconut fiber evenly distributed over the entire area of the mat.
- Both sides of the mat covered with polypropylene netting attached with cotton thread.
- Minimum dry weight (mass) of 0.40 pounds per square yard (182 g/m²) according to ASTM D 6475.
- Furnished in rolls with a uniform width of 48 inches (1.2 m) with a tolerance of minus 1 inch (25 mm) and a minimum length of 80 feet (24 m).
- Furnished in plastic bags or otherwise protected to prevent damage from weather and handling.

C. **Slope Protection.**

Wood excelsior mat, coconut fiber mat, straw mat, or straw coconut mat may be used for slope protection.

1. **Wood Excelsior Mats.**

A mat of interlocking wood fibers meeting the requirements of Article 4169.10, B, 1. with the following exceptions:

- Plastic netting applied to one or both sides for holding the excelsior in place. Mats without netting where the excelsior is mechanically stitched together to hold it in place may be allowed.
- Minimum dry weight (mass) of 0.50 pounds per square yard (246 g/m²) according to ASTM D 6475.

2. **Straw Mat, Straw-Coconut Fiber Mat, or Coconut Fiber Mat.**

At the Contractor's option straw mat, straw-coconut fiber mat, or coconut fiber mat may be substituted for wood excelsior mat for slope protection. Meet the following requirements:

- Consistent thickness with the straw, straw-coconut fiber, or coconut fiber evenly distributed over the entire area of the mat.
- The top side of the mat covered with polypropylene netting attached with cotton thread.
- Minimum dry weight (mass) of 0.40 pounds per square yard (182 g/m²) according to ASTM D 6475.

- Furnished in rolls with a uniform width of 48 inches (1.2 m), with a tolerance of minus 1 inch (25 mm) and a minimum length of 80 feet (24 m).
- Furnished in plastic bags or otherwise protected to prevent damage from weather or handling.

D. Netting.

1. Comply with the following mesh netting sizes. A tolerance of plus or minus 0.10 inch (2.5 mm) applies to netting size.
 - Netting applied on wood excelsior mats: no more than 1 inch by 2 inches (25 mm by 50 mm).
 - Netting applied on coconut fiber only mats for channel and slope: no more than 3/4 inch by 3/4 inch (19 mm by 19 mm).
 - Netting applied on the top side of straw and straw-coconut fiber mats for slopes only: no more than 1/2 inch by 1/2 inch (13 mm by 13 mm).
2. A minimum weight of 9 pounds per 1000 square yards (44 g/m²) is required for netting for special ditch control or slope protection.

E. Turf Reinforcement Mat (TRM).

1. **Type 1 TRM:** constructed of a web of mechanically or melt-bonded polymernetting, or monofilaments fibers entangled to form a strong and dimensionally stable mat. Bonding methods include polymer welding, thermal or polymer fusion, or the placement of synthetic fibers between two high-strength, biaxially-oriented nets, mechanically bound by parallel stitching with polyolefin thread. Products may contain a degradable component.
2. **Type 2 and 3 TRM:** constructed of a web of mechanically or melt-bonded polymer netting, or monofilaments, or fibers that are entangled to form a strong and dimensionally stable mat. Non-woven bonding methods include polymer welding, thermal or polymer fusion, or the placement of fibers between two high-strength, biaxially oriented nets, mechanically bound by parallel stitching with polyolefin thread. Components are to be 100% synthetic and resistant to biological, chemical, and ultraviolet degradation.
3. **Type 4 TRM:** a high performance/survivability TRM composed of monofilament yarns woven into a resilient uniform configuration. Use mats consisting of a matrix exhibiting very high interlock and reinforcement capacities with both soil and root systems and demonstrating a high tensile modulus. TRMs manufactured from discontinuous or loosely held together by stitched or glued, netting, or composites will not be allowed in this category. Components are to be 100% synthetic and resistant to biological, chemical, and ultraviolet degradation. Use this category when field conditions exist with high loading and/or high survivability requirements.

4. Comply with Table 4169.10-1 for minimum material property and performance requirements:

Table 4169.10-1: Minimum Material Property and Performance Requirements

Property	Property	Test Method	Type 1	Type 2	Type 3	Type 4
Material	Thickness	ASTM D 6525	0.25 in (6.25 mm)	0.25 in (6.25 mm)	0.25 in (6.25 mm)	0.25 in (6.25 mm)
Material	Tensile Strength ^(a, b)	ASTM D 6818	125 lb/ft (186 kg/m)	240 lb/ft (357 kg/m)	750 lb/ft (1116 kg/m)	3000 lb/ft (4465 kg/m)
Material	UV Resistance	ASTM D 4355	80% @ 500 hrs	80% @ 1000 hrs	80% @ 1000 hrs	90% @ 3000 hrs
Performance	Maximum Shear Stress (Channel Applications) ^c	ASTM D 6460	7-9 lb/ft ² (34.2 - 43.9 kg/m ²)	10-11 lb/ft ² (48.8 - 53.7 kg/m ²)	12-14 lb/ft ² (58.6 - 68.4 kg/m ²)	15-16 lb/ft ² (73.2 - 78.1 kg/m ²)
Performance	Maximum Slope Gradient (Slope Applications)	N/A	1:1 (H:V) or flatter	1:1 (H:V) or flatter	1:1 (H:V) or greater	1:1 (H:V) or greater
a. Minimum Average Roll Values, machine direction only. b. Tensile Strength of structural components retained after exposure. c. Maximum shear stress that fully-vegetated TRM can sustain without physical damage or excess erosion (1/2 inch (12.5 mm) soil loss) during a 30 minute flow event in large scale testing. Acceptable large scale testing protocol includes ASTM D 6460 or independent testing conducted by the Texas Transportation Institute, Colorado State University, Utah State University, or other approved testing facility. Bench scale testing is not acceptable.						

F. Outlet or Channel Scour Protection (Transition Mat)

1. Mat.

- a. Constructed of 85% minimum UV resistant material with a maximum ground cover of 80%.
- b. Meet the requirements of Table 4169.10-2:

Table 4196.10-2: Material Property and Performance Requirements

Property	Test Method	Value
Mass/Unit Area (max)	ASTM D 6566	3 lbs/ft ² (15 kg/m ²)
Thickness (min)	ASTM D 6525	0.4 in (10 mm)
Thickness (max)	ASTM D 6525	1.1 in (28 mm)
Tensile Strength (TD)	ASTM D 6818	550 lbs/ft (820 kg/m)
Percent Open Area (min)	ASTM D 6567	20%
UV Stability	ASTM D 4355	85%

2. Anchoring Devices.

- a. Furnish bullet tip style anchors made of a metal alloy attached to a wire rope.
- b. Anchors capable of withstanding a minimum 300 pounds (136 kg) of pull out resistance in cohesive soils.
- c. Wire rope a minimum of 30 inches (762 mm) in length with a minimum breaking strength of at least 300 pounds (136 kg).
- d. The top washer a minimum of 3 inches (76 mm) in diameter and constructed of a UV resistant plastic.

- e. Each anchor equipped to allow the retightening of the anchor when deemed necessary by the Engineer.

4169.11 FILTER FABRIC.

Furnish nonwoven polypropylene, UV stabilized filter fabric complying with Table 4169.11-1.

Table 4169.11-1: Filter Fabric Properties

Property	Typical	Minimum
Tensile Strength, lbs (metric)	130 (metric)	115 (metric)
Grab Elongation, %	70	50
Trapezoidal Tear Strength, lbs (metric)	60 (metric)	50 (metric)

4169.12 PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE.

A. General.

1. Provide wattles, sediment logs, and filter socks consisting of wood products (including wood mulch), cereal grain straw, or native grass straw contained in a tube of photo degradable fabric or synthetic netting.
2. Fill wattles, sediment logs, and filter socks using a mechanical device. Hand filling of wattles, sediment logs, and filter socks will not be allowed.
3. Ensure wattles, sediment logs, and filter socks do not contain:
 - A visible admixture of refuse or other physical contaminants,
 - Germination or growth inhibiting factors, or
 - Material toxic to plant growth.
4. Ensure wattles, sediment logs, and filter socks have waterproof identification tags printed using permanent ink and containing manufacturer’s name and address. For wattles and sediment logs, tags shall be attached to the inside of the netting of each wattle or sediment log. For filter socks, tags shall be attached to the outside of each sock.
5. Approved perimeter and slope sediment control devices are listed in Materials I.M. 469.10, Appendix E.

B. Wattles and Sediment Logs.

1. Ensure cereal grain straw for wattles or sediment logs is Certified Noxious Weed Seed Free Mulch certified by the Iowa Crop Improvement Association or other state’s Crop Improvement Associations.
2. Wattles or sediment logs with observed unharvested seed heads will not be accepted.

3. For wood excelsior sediment logs and straw wattles, meet the following minimum weight (mass) requirements:
- 20 inch (510 mm) sediment logs and straw wattles: 3 pounds per foot (4.45 kg/m) with tolerance of 0.25 pounds per foot (0.40 kg/m).
 - 12 inch (300 mm) sediment logs and straw wattles: 2 pounds per foot (3.00 kg/m) with tolerance of 0.25 pounds per foot (0.40 kg/m).
 - 9 inch (230 mm) sediment logs and straw wattles: 1 pound per foot (1.50 kg/m) with a tolerance of 0.1 pounds per foot (0.15 kg/m).
 - 6 inch (150 mm) sediment logs and straw wattles: 0.5 pounds per foot (0.75 kg/m) with a tolerance of 0.1 pounds per foot (0.15 kg/m).

C. Filter Socks.

Provide filter socks with a maximum 3/8 inch (10 mm) opening and filled with a compost/wood blend filter material consisting of compost from an approved source meeting Article 4169.08.