A Seeding Handbook For County Federal Aid Secondary Roads



State of Nebraska Department of Roads

3-2005



In cooperation with the Soil Conservation Services, University of Nebraska, Nebraska Natural Resources Commission, Nebraska Natural Resource Districts, and the Nebraska Game and Parks Commission

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SEEDING AREAS



SEED MIXTURE

AREA 1

PLS/Acre

Reed canarygrass – loreed or Minn. origin, Rise, Vantage	2 lbs.
Switchgrass – Blackwell, Pathfinder, Trailblazer	2 lbs.
Indiangrass – Nebr. 54 or Oto	2 lbs.
Little Bluestem – Aldous or Blaze or Camper	1 lb.
Sideoats Grama – Butte or Trailway	2 lbs.
Intermediate Wheatgrass – Slate, Oahe	3 lbs.
K-31 Fescue	2 lbs.
Red Clover – 2 x inoculation	2 lbs.
Ranger Alfalfa or Sweetclover 2 x inoculation	0.25 lbs.

AREA 2

Species

Species

PLS/Acre

Reed canarygrass – loreed or Minn. origin, Rise, Vantage	2 lbs.
Switchgrass – Pathfinder, Nebr. 28,	
Sunburst, Summer, Trailblazer	2 lbs.
Indiangrass – Holt, Oto or Nebr. 54	2 lbs.
Little Bluestem – Blaze, Camper or Aldous	1 lb.
Sideoats Grama – Butte, Trailway	2 lbs.
Intermediate Wheatgrass – Slate, Oahe, Amur	3 lbs.
Red Clover – 2 x inoculation	2 lbs.
Ranger Alfalfa or Sweetclover 2 x inoculation	0.25 lbs.

AREAS 3 A, B & C

Species

PLS/Acre

Switchgrass Nebr 28

Nebr. 28 Pathfinder Blackwell Sunburst Trailblazer	A,B,C A,B,C C only A only A,B,C	2 lbs.
Sideoats Grama – Butte or Trailw	ay	2 lbs.
Big Bluestem – Champ – A & B		2 lbs.

AREAS 3 A, B & C (cont'd.)

Species

Species

Little Bluestem		
Blaze	A,B,C	
Aldous	С	
Camper	A,B,C	1 lb.
Cimarron	С	

Intermediate Wheatgrass – Slate, Oahe	3 lbs.
Blue Grama – Nebr. or adjoining states,	
Lovington, Hachita (3C)	1 lb.
Western Wheatgrass – Barton or Flintlock	5 lbs.
Hairy Vetch – 2 x inoculation	3 lbs.
Ranger or Travois Alfalfa or Sweetclover 2 x inoculation	0.25 lbs.

AREA 4

PLS/Acre

Sand Lovegrass – Nebr. 27..... 1 lb. Sand Bluestem – Garden County, Goldstrike, Champ 3 lbs. Switchgrass – Nebr. 28, Pathfinder 1 lb. Little Bluestem – Camper, Nebr. Native 2 lbs. 0.50 lbs. Sweetclover 2 x inoculation Prairie Sandreed – Goshen, Pronghorn 2 lbs. Indiangrass – Holt 2 lbs. Western Wheatgrass – Barton, Flintlock 2 lbs.

AREA 5

PLS/Acre

Western Wheatgrass – Barton, Flintlock	5 lbs.
Little Bluestem – Nebr. native, Camper, Cimarron	2 lbs.
Sideoats Grama – Butte	2 lbs.
Blue Grama – Nebr. or adjoining states, Lovington, Hachita	3 lbs.
Intermediate Wheatgrass – Slate or	
Pubescent Wheatgrass – Mandan	2 lbs.
Buffalograss – Sharps improved, Texoka	2 lbs.
Crested Wheatgrass – Ruff, Nordan, Hycrest	1 lb.
Travois Alfalfa or Sweetclover - 2 x inoculation	0.50 lbs.

Note: All of the above are to be planted as one mixture. If any of these species are not available, contact the local Soil Conservation Service Field Office for the necessary information to adjust the seeding mixture.

NEBRASKA NATURAL RESOURCES DISTRICT BOUNDARIES



NATURAL RESOURCES DISTRICT ROSTER

Upper Big Blue NRD

105 Lincoln Ave York NE 68467

(402) 362-6601

Lower Big Blue NRD 805 Dorsey St PO Box 826 Beatrice NE 68310

(402) 228-3402

Upper Elkhorn NRD 301 N Harrison O'Neill NE 68763

Lower Elkhorn NRD Country Club Plaza 601 E Benjamin Ave Ste 101 PO Box 1204 Norfolk NE 68702-1204

Little Blue NRD 110 W 2nd PO Box 100 Davenport NE 68335

(402) 364-2145

Upper Loup NRD E Highway 2 PO Box 212 Thedford NE 69166 Lower Loup NRD Hadar Indrustrial Park North Highway #11 PO Box 210 Ord NE 68862-0210

(308) 728-3221

Lewis & Clark NRD 608 N Robinson Ave PO Box 518 Hartington NE 68739-0518

Papio-Missouri River NRD 8901 S 154th St Omaha NE 68138-3621

Nemaha NRD 125 Jackson Tecumseh NE 68450 (402) 335-3325

Upper Niobrara-White NRD 430 E 2nd St Chadron NE 69337-2433

Middle Niobrara NRD 526 E 1st St Valentine NE 69201 (402) 376-3421 Lower Niobrara NRD 410 Walnut St PO Box 350 Butte NE 68722

(402) 775-2343

North Platte NRD 1054 Rundell Rd PO Box 36 Gering NE 69341

South Platte NRD 551 Parkland Dr PO Box 294 Sidney NE 69162-0294

(308) 254-2377

Twin Platte NRD United Nebraska Bank Center 111 S Dewey St PO Box 1347 North Platte NE 69103-1347

Central Platte NRD 215 N Kaufman Ave Grand Island NE 68803

(308) 381-5825

Lower Platte North NRD 511 Commercial Park Rd PO Box 126 Wahoo NE 68066-0126 (402) 443-4675 Lower Platte South NRD 3125 Portia St

Lincoln NE 68501-3581

(402) 476-2729

Upper Republican NRD 135 W 5th St

PO Box 1140 Imperial NE 69033

(308) 882-5173

Middle Republican NRD 220 Center PO Box 81 Curtis NE 69025

(308) 367-4281

Lower Republican NRD

Harlan County Courthouse PO Box 618 Alma NE 68920

(308) 928-2182

Tri-Basin NRD 1308 2nd St Holdrege NE 68949

(308) 995-6688 (308) 995-5168

GRASS DRILLS OWNED/LEASED BY NRDs

NRD	Number	Location	Telephone	Remarks
Upper Big Blue				
Lower Big Blue				
Upper Elkhorn	2	Neligh O'Neill	402-887-4669 402-336-3867	No Charge to County
Lower Elkhorn	6	Pierce Bancroft Stanton Schuyler Dixon	402-329-4938, 4480 402-648-7803 402-439-2213 402-352-5200 402-287-2445	No Charge to County
Little Blue	2	Davenport	402-364-2145	
Upper Loup	1	Thedford	308-645-2250	
Lower Loup	8	Ord, Platte Co., Spalding, Fullerton	308-728-3221	
Lewis and Clark	4	Hartington Creighton	402-254-6758 402-358-3366	No Charge to County
Papio-Missouri River	6	Walthill Blair Papillion	402-846-5463 402-426-4782 402-331-1714	No Charge to County
Nemaha	None			
Upper Niobrara- White	None			
Middle Niobrara	1 (J.D. Power Drill)	Valentine	402-376-3241	
Lower Niobrara	6	Butte Winnetoon Mills	402-755-2343 402-847-3364 402-497-2496	No Charge to County
North Platte	None			
South Platte	None			
Twin Platte	1	North Platte	308-532-0220	
Central Platte	None			
Lower Platte North	2	Wahoo	402-443-4675	
Lower Platte South	1	Lincoln	402-476-2729	
Upper Republican	9	Benkelman Imperial	308-423-2627 308-882-5173	
Middle Republican	4	Curtis Hayes Center Trenton McCook	308-367-8307, 4281 308-286-3479, 3440 308-334-5655 308-345-1374	
Lower Republican	10	Beaver City Alma Franklin Red Cloud	308-268-2215 308-928-2626 308-425-6276 402-746-2268	
Tri-Basin	5	Elwood Minden Holdrege	308-785-2360 308-832-1895 308-995-6688	No Charge to County

Assembled by Nebraska Natural Resources Commission, August 1989

SOIL CONSERVATION SERVICE FIELD OFFICES IN NEBRASKA



CONDENSATION OF SPECIFICATIONS

- 1. Prepare a good firm seed bed two inches in depth is enough and not as smooth as an alfalfa seed bed.
- 2. Fertilize using 200 pounds of 16-48-0 or 18-46-0 and work into the seed bed.
- 3. Select the seed mix for your area.
- 4. Drill the seed if at all possible and control the depth of the seed to be around ½ to ¾ inch deep. Planting depth is critical to good germination. If planted too shallow the seeding will dry out and if too deep the seed will not emerge.
- 5. Pack the seed bed after seeding to reduce evaporation and to provide good soil-seed contact.
- 6. Mulch the seeding, using two (2) tons per acre of prairie hay or two (2) tons of threshed grain straw. Mulch should be used whenever possible for the best seeding results with the least silt pollution see leafy spurge caution page 13.
- 7. Seeded oats may be used for a living mulch in a fall seeding August 1 to October 15 use 10-15 pounds per acre. The oats will provide the necessary protection for the seedings.
- 8. For unusual project conditions consult your local SCS office.

SAMPLE SPECIFICATION FOR SEEDING FERTILIZING MULCHING

SEEDING

DESCRIPTION

- 1. This work shall consist of furnishing and placing seed, fertilizer and mulch in accordance with these specifications at locations shown in the plans or designated by the engineer.
- 2. Rates of application and seed mixtures shall be shown in these specifications.

MATERIAL REQUIREMENTS

- 1. All seeds shall comply with applicable state and federal seed laws.
- 2. The minimum percentage of purity for seed to be used shall be specified.
- 3. Kinds of seeds and the proportions for required mixtures shall be as specified. Seed shall be premixed under supervision of the engineer prior to delivery. The seed shall be bagged in known acreage lots.
- 4. Seed proposed for use shall not be planted without the prior approval of the engineer.
- 5. The contractor shall obtain from the seed dealer and furnish to the engineer, an analysis of each type and lot of seed he proposes to use. The analysis shall provide complete information on the seed as required by State and Federal seed laws. The engineer may approve use of the seed, if the information on the analysis is satisfactory.
- 6. Fertilizer shall be an approved commercial type, and shall be guaranteed to comply with the minimum requirements of these specifications.
- 7. Mulch shall be an approved native hay or straw free from all noxious weeds, relatively free from all other weeds and applied as required in these special provisions.

CONSTRUCTION METHODS

- 1. The contractor shall notify the engineer at least 48 hours in advance of the time he intends to begin work and shall not proceed with such work until permission to do so has been granted by the engineer.
- Seeding operations shall be performed only during the periods between March 1 and June 1 and between August 1 and December 31 except by express permission of the engineer. No work shall be performed during excessively windy weather or when the ground is frozen, wet or otherwise untellable.

If the seeding and grading work are being performed under separate contracts, any necessary repair to the slopes, borrow areas or ditches will be performed by County Forces prior to the time the seeding contractor begins his operations.

- 3. Not more than five days prior to the sowing of seed, the seed bed shall be prepared by loosening the soil to a depth of not less than two inches by discing, harrowing, raking or by other approved means. Several discings, harrowings, or similar means may be required to provide a satisfactory seedbed. Discing, harrowing and raking shall be longitudinal on all slopes.
- 4. Existing weed stubble and small weeds shall be cut and partially incorporated into the soil during the seedbed preparation work. All other growth of vegetation what will interfere with seeding operations shall be removed. Extreme care shall be exercised to avoid injury to trees and shrubs that have been designated by the engineer to be preserved.
- 5. For seeding, approved mechanical power drawn drills, broadcast type seeder or hydraulic seeders may be used.

When drills are used, they shall be equipped with press wheels or drag chains. When broadcast type seeders or hydraulic seeders are used, the seed shall be harrowed with the exception of slopes too steep to operate equipment on as determined by the engineer. Seeded areas should be packed to reduce evaporation and provide good soil-seed contact.

Hydraulic seeding equipment shall include a pump, rated and operated at 100 gallons per minute and at 100 pounds per square inch pressure, unless otherwise directed by the engineer. The equipment shall have a suitable pressure gauge and a nozzle adapted to the type of work. Storage tanks of irregular shapes shall have a means of estimating the volume used or remaining in the tank.

Mechanical power-drawn drills shall have depth bands set to maintain a planting depth of one-half inch to one inch.

6. Mulch shall be in accordance with these special provisions.

Seed shall comply with the following requirements and shall be applied at the rate shown:

SEE SEED MIXTURE FOR YOUR AREA

The seed furnished may be sampled and analyzed by a representative of the Nebraska Department of Agriculture. If the seed tag analysis does not equal or exceed the sample analysis after application of the tolerances allowed by "The Rules for Testing Seeds – Association of Official Seed Analysts," a contract unit price adjustment may be made.

FERTILIZER

Rate of application of commercial inorganic fertilizer shall be:

200 lbs./acre of either 16-48-0 or 18-46-0

MULCH

The mulch shall be dry cured native hay applied at the rate of two tons per acre or dry threshed grain straw applied at the rate of two tons per acre.

METHOD OF MEASUREMENT

The work of seeding will be measured by the acre, surface measurement, of surface seeded in accordance with these specifications.

BASIS OF PAYMENT

The quantity of completed and accepted work, measured as provided herein, shall be paid for at the contract unit price per acre for the item "Seeding" . . . This price shall be full compensation for the furnishing and applying of fertilizer, furnishing and sowing seed, furnishing and applying mulch materials, preparation of the seedbed, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

FERTILIZING

DESCRIPTION

This work shall be the application of substances to enrich the planting soil or to supply nourishment for plants and seeds. All fertilizers shall be checked and approved by the engineer for acceptability prior to their use.

MATERIAL REQUIREMENTS

1. Fertilizer shall be a standard commercial inorganic product containing nitrogen, available phosphoric acid and soluble potash, as required by the special provisions, in a recognized plant food form. This fertilizer shall be either suspendable or soluble in water.

All fertilizer shall comply with the provisions of the State of Nebraska Fertilizer Act of 1955, with subsequent amendments or revisions thereto. Under this act, each brand and grade of commercial fertilizer must be registered by the Nebraska Department of Agriculture and Inspection. Each container of commercial fertilizer shall have placed on or affixed to the container, in written or printed form, the net weight and the following additional information:

- a) The name and address of the person guaranteeing the fertilizer.
- b) The brand and grade.
- c) The guaranteed analysis showing the minimum percentage of plant food claimed in the following order and form:

Total	Available Phosphoric	Soluble Potash
Nitrogen – percent	Acid (P_2O_5) – percent	(K ₂ O) – percent

If distributed in bulk, a written or printed statement of the weight and preceding information shall accompany delivery and be supplied to the engineer.

- 2. Any grade or mixture of grades of nitrogen and phosphoric acid fertilizer may be used providing the proportions of the minimum rate of application per acre in accordance with the special provisions or as directed by the engineer.
- 3. Fertilizer shall be furnished and delivered in standard bags or bulk.
- 4. The engineer may approve immediate use of any commercial inorganic fertilizer, which is registered for sale in Nebraska. On the basis of the guaranteed analysis, the engineer shall specify the mixing proportions and application rate necessary in order to provide the minimum pounds per acre of nitrogen and available phosphoric acid and water soluble potash, in conformance with the plans or special provisions.
- 5. The grade and the guaranteed analysis of a fertilizer express the minimum total nitrogen content, and the minimum phosphoric acid content (P_2O_5) and the minimum water soluble potash (K_2O) content, in that order 15-15-0 grade fertilizer contains 15 percent total nitrogen, 15 percent available phosphoric acid, and zero percent water soluble potash.

CONSTRUCTION METHODS

The fertilizer shall be applied with approved mechanical spreaders or with the hydraulic seeder, at the rate specified in the special provisions and shall uniformly cover the entire area.

BASIS OF PAYMENT

This work will not be paid for directly but shall be considered as subsidiary work pertaining to the items which require the use of fertilizer.

MULCHING

DESCRIPTION

This work shall consist of placing a mulch on areas designated by the engineer or shown in the plans. The mulch shall be loose enough to allow sunlight to penetrate and air to slowly circulate, but thick enough to shade the ground, reduce the rate of water evaporation and prevent or reduce water or wind erosion.

MATERIAL REQUIREMENTS

- 1. Mulch shall be either dry cured native hay or threshed grain straw. Hay or straw shall be free from seeds of noxious weeds and relatively free from seeds of all other weeds.
- 2. Leafy spurge and spotted knapweed are serious pasture pests in Nebraska and other states. You need to know the source of your hay or use straw.

CONSTRUCTION METHODS

- 1. The contractor shall apply a protective mulch, consisting of dry cured hay or threshed grain straw within 48 hours after sowing the seed, unless otherwise directed by the engineer. The mulch shall be applied with a mulch blowing machine or other approved methods at the rate specified in the special provisions.
- 2. Immediately following the spreading of the mulch, the material shall be anchored to the soil by a V-type wheel land packer, a soil erosion mulch tiller, or other suitable equipment which will secure the mulch firmly to form a soil-binding mulch.

The contractor shall furnish the necessary equipment, and assistance needed to insure that specified quantities of mulch are being placed.

METHOD OF MEASUREMENT AND BASIS OF PAY

This work will not be paid for directly but shall be considered as subsidiary work pertaining to the items which require the use of mulch.

TEMPORARY EROSION AND SILTATION CONTROL MEASURES

There are many situations which occur on a typical road construction project where erosion and pollution problems become evident and control becomes mandatory. The methods presented here are relatively inexpensive to install and have been proven successful in other installations.

HAY BALE DAMS USED ALONG TOE OF SLOPE



NOTE: Embed bales 4 to 6 inches.

BALED HAY OR STRAW EROSION CHECKS Type A



TO BE USED WHERE THE EXISTING GROUND SLOPES TOWARDS THE HIGHWAY EMBANKMENT AS CALLED FOR ON PLANS.

MEASUREMENT AND PAYMENT WILL BE BY THE BALE IN PLACE. BALES WILL BE ALLOWED TO ROT IN PLACE SO THERE WILL BE NO REMOVAL ITEM. THERE WILL BE NO PROVISIONS FOR MAINTENANCE OTHER THAN REPLACEMENT OF A BALE IF REQUIRED.



TO BE USED WHERE THE EXISTING GROUND SLOPES AWAY FROM THE HIGHWAY EMBANKMENT AS CALLED FOR ON PLANS.

MEASUREMENT AND PAYMENT WILL BE BY THE BALE IN PLACE. BALES WILL BE ALLOWED TO ROT IN PLACE SO THERE WILL BE NO REMOVAL ITEM. THERE WILL BE NO PROVISIONS FOR MAINTENANCE OTHER THAN REPLACEMENT OF A BALE IF REQUIRED.

HAY BALE DAMS USED IN DITCHES



TYPES OF TEMPORARY DAMS

NOTE – DAM SHOULD EXTEND FAR ENOUGH UP DITCH SIDE SLOPES TO EFFECTIVELY POND THE RUNOFF AND PREVENT EROSION AND WASHOUT.



LOG AND HAY EROSION CHECK DAM



PLAN

PROTECTION AT STREAM CROSSING MEDIAN AND SIDE DITCHES



TEMPORARY BARRIER – HAY BALES



TEMPORARY SUMP-STONE FILTER INLET SEDIMENT TRAPS



SAND AND GRAVEL FILTER INLET SEDIMENT TRAP



EMBANKMENT CONSTRUCTION UTILIZING SILTATION CONTROLS



EROSION PROTECTION AT PIPE OUTLET



NOTE: DUMPED STONE TO BE PLACED IMMEDIATELY AFTER PIPE IS INSTALLED.

NEBRASKA GAME & PARKS COMMISSION ROADSIDE SEEDING PROGRAM

The Nebraska Game & Parks Commission has been working with cooperating counties to stabilize roadsides since 1977. During the first 12 years this program was in effect, the Commission purchased nearly \$513,000 worth of grass and legume seed for participating counties.

Roadsides provide important habitat for several wildlife species and the Commission is interested in optimizing the benefits of these areas for wildlife. The Commission is also interested in stabilizing roadsides so that silt does not enter our rivers, lakes and streams.

Under the program, the Commission reimburses participating counties for the cost of grass and legume seed which is planted on construction or maintenance projects. This successful program varies somewhat with the different planting regions in the state. A list of Game & Parks personnel who can assist interested people is included at the back of this section.

The Living Snowfence: A New Look at an Old Problem



Tree and shrub plantings have been used with great success to prevent blowing snow from closing state and county highways. In addition, living snowfences:

Can be far less expensive than slat or board fences Will outlast slat or board snowfencing by as much as 10 to 1 In severe blizzards, can be more effective than traditional snowfences Will provide much-needed habitat for a host of wildlife Can provide wind and snow protection for livestock Add considerable aesthetic beauty to the landscape

The Living Snowfence: A New Look at an Old Problem

This living snowfence in Nebraska is seven years old. During a severe blizzard, this planting was more effective than slat fencing in stopping blowing snow.

Shrubs, lower right, provide wildlife food and cover.

For more information on living snowfences, contact the Soil conservation Service, Soil Conservation District, State Forest Service District Forester, or state wildlife agency.









In cooperation with the USDA Forest Service

LIVING SNOW FENCE HISTORY

Nebraska may very well lay claim to the reincarnation of the living snow fence program.

While the use of living coniferous trees to protect public roadways is not a new venture, a structured program of local government working with natural resources districts, Game & Parks Commission, and State Roads Department is.

State and county government officials in Nebraska have developed a cost effective living snow fence program to provide the motoring public safe and open roadways, while reducing maintenance costs, providing wildlife habitat and increasing the aesthetic beauty of roadsides.

Traditional methods of keeping snow off public roads consisted of erecting 5' tall crib fencing north or west of snow problem areas. The fencing slowed the wind, causing the snow to fall into a drift upwind from the roadway. All wind barriers work basically the same way. They create an area on the leeward side of the barrier in which the wind is slowed down. This protected area is 10-12 times the height of the barrier.

The problem with a 5' tall fence is that it fills up too quickly with snow during a blizzard. Then when the snow continues to blow for the next two to three days, there is no additional snow storage and the roads begin to fill up again and again.

Living Snow Fences, LSF, create a much larger snow storage area because of the taller barrier they provide. While crib fencing has a storage area of only 60 feet, a 15' tall LSF has a storage area of at least 180 feet. Established LSFs have been known to keep roads clear of snow after two or three snowstorms and the associated blowing of old snow.

The initial cost of crib fencing appears to be the expensive alternative. But when the annual costs of erecting and tearing down slatted fence is coupled with the five year live expectancy of the materials, costs begin to rise. Living snow fences do have a larger establishment cost. But once established, they are effective for at least fifty years. And LSFs create a more effective snow barrier that requires few if any repeat trips by maintenance crews. A number of studies have shown that living snow fences are the most cost-effective alternative for roadway snow control.

LIVING SNOW FENCE

Minimum Specifications

- 1. All trees in the living snow fence will be fenced to exclude livestock.
- 2. The windward tree row shall be a minimum of 100 feet, but not farther than 350 feet from the centerline of the road.
- 3. A minimum of two (2) rows of trees consisting of eastern red cedar and/or Rocky Mountain Juniper shall be planted.
- 4. A maximum of five (5) rows of trees can be planted. The first two (2) windward rows shall be eastern red cedar and/or Rocky Mountain Juniper. In plantings with four (4) and five (5) rows, at least one (1) leeward row shall be mixed shrub species.
- 5. Dead trees will be replaced for the first three (3) years.
- 6. Site preparation, species selection, spacing and other specifications not listed above shall be in accordance with the Soil Conservation Service specifications for living snow fence.

For further information on living snow fences and roadside seeding funding, contact the Game & Parks Commission at the following locations:

Lincoln	Pat Cole 2200 N 33 rd St PO Box 30370 Lincoln NE 68503	Norfolk	Clayton Stalling PO Box 934 Norfolk NE 68702
	(402) 471-5413	North Platte	Dan Rochford RR 4 PO Box 36
Alliance	Gary Schlichtermeier PO Box 725 Alliance NE 69301 (308) 762-5605		North Platte NE 69101 (308) 532-6225

Bassett Ben Rutter PO Box 508 Bassett NE 68714

EROSION CONTROL FABRICS

There are several products on the market. Excelsior mat, straw mat, jute mat, and nylon mat are all available at this time. Each fabric has its capabilities and limitations, and no one product is best for every installation. For help in selecting the erosion control fabric or fabrics which would be best in your situation, contact the nearest Department of Roads office or the nearest Soil Conservation Office.



Erosion in the Sandhills – rubble-filled ditches – not working.



Riser pipe protected below grade with filter fabric.



Ground preparation for drain tile being installed in the water course.



Mulching the project to improve grass establishment.



Riser pipe with guard.



Completed waterway with basins and tile drains.



Outlet pipe protected with rip-rap.

It pays to do it right the first time - "Experience."