Practice 3.01
Temporary Gravel Construction Entrance/Exit Pad

Purpose *(Exhibit 3.01-A)*
* To provide a stable entrance/exit condition from the construction site.
* To keep mud and sediment off public roads.

Exhibit 3.01-A. Temporary gravel construction entrance/exit pad helps keep sediment off public roads.

Requirements *(Exhibit 3.01-B)*
Material: 2-3 in. washed stone (INDOT CA No. 2) over a stable foundation.
Thickness: 6 in. minimum
Width: 12 ft. minimum or full width of entrance/exit roadway, whichever is greater.
Length: 50 ft. minimum. The length can be shorter for small sites such as for an individual home.
Washing facility (optional): Level area with 3 in. washed stone minimum or a commercial rack, and waste water diverted to a sediment trap or basin (Practice 3.72).
Geotextile fabric underliner: May be used under wet conditions or for soils within a high seasonal water table to provide greater bearing strength.

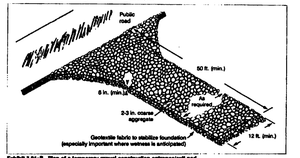

Exhibit 3.01-B. Plan of a temporary gravel construction entrance/exit pad.

3. Apply topsoil evenly to a depth of at least 4 in. (8-12 in. if the underlying material is bedrock, loose sand, rock fragments gravel, or other unsuitable soil material); then compact slightly to improve contact with the subsoil.
4. After spreading, grade and stabilize.

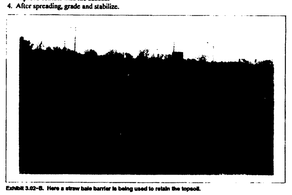

Exhibit 3.02-B. Here a straw bale barrier is being used to retain the topsoil.

Maintenance
* Inspect newly topsoiled areas frequently until vegetation is established.
* Repair eroded or damaged areas and revegetate.

Common concerns
Topsoil spread when conditions were too wet—results in severe compaction.
Topsoil mixed with too much unsuitable subsoil material—results in poor vegetation establishment.
Topsoil contaminated with soil sterilants or chemicals—results in poor or no vegetation establishment.
Topsoil not adequately incorporated or bonded with the subsoil—results in poor vegetation establishment and soil slippage on sloping areas.
Topsoiled areas not protected—results in excessive erosion.

Practice 3.02 (Top Soil Salvage and Utilization)
Page 2

Purpose *(Exhibit 3.02-A)*
* To provide a suitable soil medium for vegetative growth on areas with poor moisture, low nutrient levels, undesirable pH, and/or the presence of other materials that would inhibit establishment of vegetation.

Exhibit 3.02-A. A silt fence barrier retains the stored topsoil at this homesite.

Requirements
Material: Normally darker, friable, and loamy surface soil taken from areas that have not been stripped or graded.
Storage area: Kept free of stumps, rock, and construction debris.
Preferred site conditions: Flatter than 2:1 and free of noxious weeds.
Removal/storage/re-spreading plan: Needed to assure these operations will be compatible with overall construction activities at the site.

Application *(Exhibit 3.02-B)*
SALVAGING AND STOCKPILING TOPSOIL:
1. Determine depth and suitability of topsoil at the site. (For help, contact your local SWCD office to obtain a county soil survey report or consult with a soil scientist.)
2. Prior to stripping topsoil, install any site-specific downslope practices needed to control runoff and sedimentation.
3. Remove the soil material no deeper than what the county soil survey describes as 'surface soil' (i.e., A or Ap horizon).
4. Stockpile the material in accessible locations that neither interfere with other construction activities nor block natural drainage; and install silt fences, straw bales, or other barriers to trap sediment (see *Exhibit 3.02-B*). (Several small piles around the construction site are usually more efficient and easier to retain than one large pile.)
5. If soil is stockpiled for more than 6 mo., it should be temporarily seeded or covered with a tarp or surrounded by a sediment barrier.

SPREADING TOPSOIL:
1. Prior to applying topsoil, grade the subsoil and roughen the top 3-4 in. by disking. This helps the topsoil bond with the subsoil.
2. Do not apply topsoil when the site is wet, muddy, or frozen, because it makes spreading difficult, inhibits bonding, and can cause compaction problems.

Practice 3.03 Surface Roughening
Page 2

Purpose *(Exhibit 3.03-A)*
* To aid in the establishment of vegetative cover from seed.
* To reduce runoff velocity and increase infiltration.
* To reduce erosion and provide for sediment trapping.

Exhibit 3.03-A. Surface roughening by bulldozer cleats.

Where used
On all slopes that are to be stabilized with vegetation.
On graded areas that are not stabilized immediately, in order to reduce runoff velocity until seeding takes place. (NOTE: Although appearing finished, graded areas with smooth, hard surfaces are difficult places on which to establish vegetation.)

Installation *(Exhibits 3.03-B, C, D, and E)*
ROUGHENING CUT SLOPES NOT TO BE MOWED:
1. Stair-step grade or groove any cut slopes having a gradient steeper than 3:1. (Use stair-step grading on any erodible material soil enough to be ripped with a bulldozer, particularly on slopes consisting of soft rock with some subsoil.)
2. To stair-step, (a) make the vertical cut distance less than the horizontal distance, (b) make each vertical cut no more than 2 ft. in soft material or 3 ft. in rocky material, and (c) slightly slope the horizontal position of each "step" in toward the vertical wall (see *Exhibit 3.03-B*).
3. To groove, (a) use implements that can be safely operated on the slope (e.g., disk, tiller, spring harrow, front-end bucket loader teeth) to create a series of ridges and depressions that run across the slope on the contour, and (b) make grooves at least 3 in. deep and no more than 15 in. apart (see *Exhibit 3.03-C*).

ROUGHENING FILL SLOPES NOT TO BE MOWED (see *Exhibit 3.03-D*):
1. Place fill slopes having a gradient steeper than 3:1 in 6-8 in. lifts and compact each lift.
2. Cover the face of the slope with 4-6 in. of loose, uncompacted fill.
3. If necessary, use grooving as described above to roughen the face of the slope, but do not blade or scrape.

ROUGHENING SLOPES TO BE MOWED:
1. Make slopes to be mowed no steeper than 3:1.

Practice 3.03 Surface Roughening
Page 3

2. Using a tiller, disk, harrow, or cultipacker to roughen the slopes, creating shallow grooves no more than 10 in. apart and at least 1 in. deep.
3. Make the final pass of tillage implement on the contour.

ROUGHENING AREAS WITH TRACKED MACHINERY:
1. Limit roughening with tracked machinery to sandy or relatively dry, finer-textured soils to avoid undue surface compaction. (Tracking is generally not as effective as the other roughening methods.)
2. Operate the tracked machinery up and down the slope so as to leave horizontal depressions in the soil (see *Exhibit 3.03-E*). (Do not back-blade during the final grading operation.)

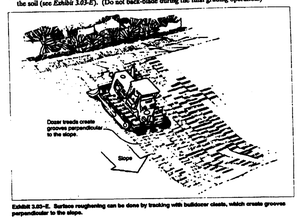

Exhibit 3.03-E. Surface roughening can be done by tracking with bulldozer cleats, which create grooves perpendicular to the slope.

SEEDING/FERTILIZING/MULCHING ROUGHENED AREAS:
1. Immediately seed, fertilize, and mulch surface-roughened areas while soil is loose and moist to aid germination and growth (Practices 3.11, 3.12, and 3.15).
2. If roughening with tracked machinery, consider seeding, fertilizing, and mulching first, letting the cleats incorporate the seed and fertilizer and anchor the mulch. (This is especially well suited for temporary seedings when timeliness is critical and other equipment is unavailable to plant.)

Maintenance
* Periodically check seeded slopes for rills and gullies.
* Fill any eroded areas to slightly above the original grade, then re-seed and mulch as soon as possible.

Common concerns
Severe compaction due to equipment operation—results in unsuitable seedbed and poor vegetative establishment.
Rough areas difficult to mow—caused by cutting grooves too deep or excessive erosion from grooves not being on the contour.
Grooving done perpendicular, rather than parallel, to slope—results in accelerated erosion.

Practice 3.11
Temporary Seeding

Purpose *(Exhibit 3.11-A)*
* To reduce erosion and sedimentation damage by stabilizing disturbed areas where additional work (e.g., grading) is not scheduled for a period of 2 mo. to 1 yr.
* To reduce problems associated with mud or dust from bare soil surfaces during construction.
* To reduce sediment runoff to downstream areas.
* To improve visual aesthetics of the construction area.

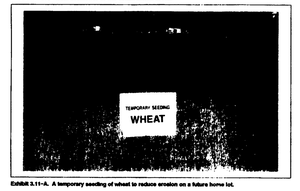

Exhibit 3.11-A. A temporary seeding of wheat to reduce erosion on a future home lot.

Requirements
Site and seedbed preparation: Graded and fertilizer applied.
Plant species: Selected on the basis of quick germination, growth, and use of year to be seeded (see *Exhibit 3.11-B*).
Mulch: Clean grain straw, hay, wood fiber, etc., to protect seedbed and encourage plant growth.
Seeding frequency: As often as possible following construction activity. Daily seeding of rough graded areas when the soil is loose and moist is usually most effective.

Application *(Exhibit 3.11-B)*
SITE PREPARATION:
1. Install practices needed to control erosion, sedimentation, and water runoff, such as temporary and permanent diversions, sediment traps or basins, silt fences, and straw bale dams (Practices 3.21, 3.22, 3.72, 3.73, 3.74, and 3.75).
2. Grade the site as specified in the construction plan.

SEEDBED PREPARATION:
1. Test soil to determine its nutrient levels. (Contact your county SWCD or Cooperative Extension office for assistance and soils information, including available soil testing services.)
2. Fertilize as recommended by the soil test. If testing is not done, consider applying 400-600 lbs. /acre of 12-12-12 analysis, or equivalent, fertilizer.
3. Work the fertilizer into the soil 2-4 in. deep with a disk or rake operated across the slope.

SEEDING:
1. Select a seeding mixture and rate from *Exhibit 3.11-B*, and plant at depth and on dates shown.
2. Apply seed uniformly with a drill or cultipacker-seeder or by broadcasting, and cover to the depth shown in *Exhibit 3.11-B*.

Practice 3.11 Temporary Seeding
Page 2

3. If drilling or broadcasting, firm the seedbed with a roller or cultipacker.
4. Mulch seeded areas to increase seeding success. Anchor all mulch by crimping or tackifying. Use of netting or erosion control blankets is possible, but may not be cost-effective for temporary seedings.

Exhibit 3.11-B. Temporary Seeding Recommendations.

Seed species*	Rate/acre	Planting depth	Optimum dates**
Wheat or rye	150 lbs.	1 to 1½ in.	9/15 to 10/30
Spring oats	100 lbs.	1 in.	3/1 to 4/15
Annual ryegrass	40 lbs.	1/4 in.	3/1 to 5/1
			8/1 to 9/1
German millet	40 lbs.	1 to 2 in.	5/1 to 6/1
Sudangrass	35 lbs.	1 to 2 in.	5/1 to 7/30

* Perennial species may be used as a temporary cover, especially if the area to be seeded will remain idle for more than a year (Practice 3.13).
** Seeding done outside the optimum dates increases the chances of seeding failure

Maintenance
* Inspect periodically after planting to see that vegetative stands are adequately established; re-seed if necessary.
* Check for erosion damage after storm events and repair, reseed and mulch if necessary.
* Topdress fall seeded wheat or rye seedings with 50 lbs./acre of nitrogen in February or March if nitrogen deficiency is apparent. (*Exhibit 3.11-B* shows only wheat/rye fall seeded.)

Common concern
Fertilizer not incorporated at least 2 in. deep—may be lost in runoff or remain concentrated near the surface to inhibit germination.
Mulch rate inadequate—results in poor germination and failure.
Seeding uneven or rate too low—results in patchy growth and erosion.

Practice 3.12
Permanent Seeding

Purposes *(Exhibit 3.12-A)*
* To reduce erosion and sedimentation damage by stabilizing exposed areas where additional work (e.g., grading) is not scheduled for a period of more than a year or areas where final grading has been completed.
* To reduce problems associated with mud or dust from bare soil surfaces during construction.
* To reduce sediment runoff to downstream areas.
* To improve the visual aesthetics of the construction area.

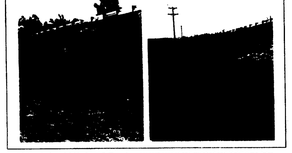

Exhibit 3.12-A. A road right-of-way (left) newly permanent seeded and mulched and (right) 6 mo. later.

Requirements
Site and seedbed preparation: Graded, and lime and fertilizer applied.
Plant species: Selected on the basis of soil type, soil pH, region of the state, time of year, and planned use of the area to be seeded (see *Exhibit 3.12-C*).
Mulch: Clean grain straw, hay, wood fibre, etc., to protect seedbed and encourage plant growth. The mulch may need to be anchored to reduce removal by wind or water, or erosion control blankets may be considered.

Application *(Exhibits 3.12-B, C, and D)*
Permanently seed all final grade areas (e.g., landscape berms, drainage swales, erosion control structures, etc.) as each is completed and all areas where additional work is not scheduled for a period of more than a year.

SITE PREPARATION:
1. Install practices needed to control erosion, sedimentation, and runoff prior to seeding. These include temporary and permanent diversions, sediment traps and basins, silt fences, and straw bale dams (Practices 3.21, 3.22, 3.72, 3.73, 3.74, and 3.75).
2. Grade the site and fill in depressions that can collect water.
3. Add topsoil to achieve needed depth for establishment of vegetation (Practice 3.02).

SEEDBED PREPARATION:
1. Test soil to determine pH and nutrient levels. (Contact your county SWCD or Cooperative Extension office for assistance and soils information, including available testing services.)
2. If soil pH is unsuitable for the species to be seeded, apply lime according to test recommendations.

Practice 3.12 Permanent Seeding
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3. Fertilize as recommended by the soil test. If testing was not done, consider applying 400-600 lbs./acre of 12-12-12 analysis, or equivalent, fertilizer.
4. Till the soil to obtain a uniform seedbed, working the fertilizer and lime into the soil 2-4 in. deep with a disk or rake operated across the slope (*Exhibit 3.12-B*).

SEEDING:
Optimum seeding dates are Mar. 1-May 10 and Aug. 10-Sept. 30. Permanent seeding done between May 10 and Aug. 10 may need to be irrigated. As an alternative, use temporary seeding (Practice 3.11) until the preferred date for permanent seeding.
1. Select a seeding mixture and rate from *Exhibit 3.12-C*, based on site conditions, soil pH, intended land use, and expected level of maintenance.
2. Apply seed uniformly with a drill or cultipacker-seeder (*Exhibit 3.12-D*) or by broadcasting, and cover to a depth of 1/4-1/2 in.
3. If drilling or broadcasting, firm the seedbed with a roller or cultipacker.
4. Mulch all seeded areas (Practice 3.15). Consider using erosion control blankets on sloping areas (Practice 3.17). (NOTE: If seeding is done with a hydroseeder, fertilizer and mulch can be applied with the seed in a slurry mixture.)

Exhibit 3.12-B. Preparing the seedbed with a combination rotor-tiller and cultipacker.

Exhibit 3.12-C. Permanent Seeding Recommendations.

This table provides several seeding options. Additional seed species and mixtures are available commercially. When selecting a mixture, consider site conditions, including soil properties (e.g., soil pH and drainage), slope aspect and the tolerance of each species to shade and droughtiness.

Seed species and mixtures	Rate per acre	Optimum soil pH
OPEN AND DISTURBED AREAS (REMAINING IDLE MORE THAN 1 YR.)		
1. Perennial ryegrass	35 to 50 lbs.	5.6 to 7.0
+ white or ladino clover*	1 to 2 lbs.	
2. Kentucky bluegrass	20 lbs.	5.5 to 7.5
+ smooth bromegrass	10 lbs.	
+ switchgrass	3 lbs.	
+ timothy	4 lbs.	
+ perennial ryegrass	10 lbs.	
+ white or ladino clover*	1 to 2 lbs.	

Practice 3.12 Permanent Seeding
Page 3

Exhibit 3.12-C. Continued.

Seed species and mixtures	Rate per acre	Optimum soil pH
3. Perennial ryegrass	15 to 30 lbs.	5.6 to 7.0
+ tall fescue**	15 to 30 lbs.	
4. Tall fescue**	35 to 50 lbs.	5.5 to 7.5
+ ladino or white clover*	1 to 2 lbs.	
STEEP BANKS AND CUTS, LOW MAINTENANCE AREAS (NOT MOWED)		
1. Smooth bromegrass	25 to 35 lbs.	5.5 to 7.5
+ red clover*	10 to 20 lbs.	
2. Tall fescue**	35 to 50 lbs.	5.5 to 7.5
+ white or ladino clover*	1 to 2 lbs.	
3. Tall fescue**	35 to 50 lbs.	5.5 to 7.5
+ red clover*	10 to 20 lbs.	
(Recommended north of US 40)		
4. Orchardgrass	20 to 30 lbs.	5.6 to 7.0
+ red clover*	10 to 20 lbs.	
+ ladino clover*	1 to 2 lbs.	
5. Crownvetch*	10 to 12 lbs.	5.6 to 7.0
+ tall fescue**	20 to 30 lbs.	
(Recommended south of US 40)		
LAWNS AND HIGH MAINTENANCE AREAS		
1. Bluegrass	105 to 140 lbs.	5.5 to 7.0
2. Perennial ryegrass (turf-type)	45 to 60 lbs.	5.6 to 7.0
+ bluegrass	70 to 90 lbs.	
3. Tall fescue (turf-type)**	130 to 170 lbs.	5.6 to 7.5
+ bluegrass	20 to 30 lbs.	
CHANNELS AND AREAS OF CONCENTRATED FLOW		
1. Perennial ryegrass	100 to 150 lbs.	5.6 to 7.0
+ white or ladino clover*	1 to 2 lbs.	
2. Kentucky bluegrass	20 lbs.	5.5 to 7.5
+ smooth bromegrass	10 lbs.	
+ switchgrass	3 lbs.	
+ timothy	4 lbs.	
+ perennial ryegrass	10 lbs.	
+ white or ladino clover*	1 to 2 lbs.	
3. Tall fescue**	100 to 150 lbs.	5.5 to 7.5
+ ladino or white clover*	1 to 2 lbs.	
4. Tall fescue**	100 to 150 lbs.	5.5 to 7.5
+ Perennial ryegrass	15 to 20 lbs.	
+ Kentucky bluegrass	15 to 20 lbs.	

* Per lawn mowin: (a) legume seed should be inoculated; (b) seeding mixtures containing legumes should preferably be spring-seeded, although the grass may be fall-seeded and the legume fall-seeded (Practice 3.13); and (c) if legumes are fall-seeded, do so in early fall.
** Tall fescue provides little cover for, and may be toxic to, some species of wildlife. The IDNR recommends against the need for additional research on alternatives to tall fescue, such as buffalograss, orchardgrass, smooth bromegrass, and switch-grass. This research, in conjunction with demonstration areas, should focus on erosion control characteristics, wildlife toxicity, turf durability, and drought resistance.

NOTE: An oat or wheat companion or nurse crop may be used with any of the above permanent seeding mixtures. If so, it is best to seed during the fall seeding period, especially after Sept. 15, and at the following rates: spring oats—1/4 to 3/4 lbs./acre; wheat—no more than 1/2 lbs./acre.

Practice 3.12 Permanent Seeding
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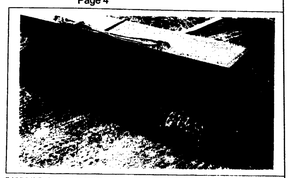

Exhibit 3.12-D. A cultipacker-seeder.

Maintenance
* Inspect periodically, especially after storm events, until the stand is successfully established. (Characteristics of a successful stand include: vigorous dark green or bluish-green seedlings; uniform density with nurse plants, legumes, and grasses well inter-mixed; green leaves; and the perennials remaining green throughout the summer, at least at the plant base.)
* Plan to add fertilizer the following growing season according to soil test recommendations.
* Repair damaged, bare, or eroded areas by filling any gullies, re-fertilizing, over- or re-seeding, and mulching.
* If plant cover is sparse or patchy, review the plant materials chosen, soil fertility, moisture condition, and mulching; then repair the affected area either by over-seeding or by re-seeding and mulching after re-preparing the seedbed.
* If vegetation fails to grow, consider soil testing to determine acidity or nutrient deficiency problems. (Contact your SWCD or Cooperative Extension office for assistance.)
* If additional fertilization is needed to get a satisfactory stand, do so according to soil test recommendations.

Common concerns
Insufficient topsoil or inadequately tilled, limed, and/or fertilized seedbed—results in poor establishment of vegetation.
Unsuitable species or seeding mixture—results in poor establishment of vegetation.
Nurse crop rate too high in the mixture—results in competition with the perennials.
Seeding done at the wrong time of year—results in poor establishment of vegetation, also plant hardiness is significantly decreased.
Mulch rate inadequate—results in poor germination and failure.

Practice 3.13
Dormant and Frost Seeding

Dormant seeding is a temporary or permanent seeding application at a time when soil temperatures are too low for germination to occur (less than 50°F). *Frost seeding* is a temporary or permanent seeding application in early spring when soils are in the freeze-thaw stage. (This practice can be used to repair or enhance areas having thin or declining cover or to re-vegetate an area.)

Purposes *(Exhibit 3.13-A)*
* To provide early germination and soil stabilization in the spring.
* To reduce sediment runoff to downstream areas.
* To improve the visual aesthetics of the construction area.
* To repair previous seedings.

Exhibit 3.13-A. Use of dormant seeding could have reduced excessive early spring erosion on this site.

Requirements
Site and seedbed preparation: Graded as needed, and lime and fertilizer applied.
Plant species: Selected on the basis of soil type, adaptability to the region, and planned use of the area (see *Exhibits 3.13-B* and *3.13-C*).

Application *(Exhibits 3.13-B and C)*
SITE PREPARATION:
1. Grade the area to be seeded.
2. Install needed erosion /water runoff control practices, such as temporary or permanent diversions, sediment basins, silt fences, or straw bale dams (Practices 3.21, 3.22, 3.72, 3.74, or 3.75).

FOR DORMANT SEEDING:
Site and seedbed preparation and mulching can be done months ahead of actual seeding; or if the existing ground cover is adequate, seeding can be done directly into it.
Seeding dates: Dec. 1-Feb. 28 (north of U.S. 40), Dec. 10-Jan. 15 (south of U.S. 40).
1. Broadcast fertilizer as recommended by a soil test; or if testing was not done, consider applying 400-600 lbs./acre of 12-12-12 analysis, or equivalent, fertilizer.
2. Apply mulch upon completion of grading (Practice 3.15).
3. Select an appropriate seed species or mixture from *Exhibit 3.13-B* for temporary seeding or *Exhibit 3.13-C* for permanent seeding, and broadcast on top of the mulch and/or into existing ground cover at the rate shown. (If site preparation occurs within the recommended dates, fertilize and lime, seed, and mulch at that time.)

Practice 3.13 Dormant and Frost Seeding
Page 2

FOR FROST SEEDING:
Seed is broadcast over the prepared seedbed and incorporated into the soil by natural freeze-thaw action.
Seeding dates: Feb. 28-Mar. 28 (north of U.S. 40), Feb. 15-Mar. 15 (south of U.S. 40).
1. Broadcast fertilizer as recommended by a soil test; or if testing was not done, consider applying 400-600 lbs./acre of 12-12-12 analysis, or equivalent, fertilizer.
2. Select an appropriate seed species or mixture from *Exhibit 3.13-B* for temporary seeding or *Exhibit 3.13-C* for permanent seeding, and broadcast on to the seedbed or into the existing ground cover at the rate shown. (Do not work the seed into the soil.)

Exhibit 3.13-B. Temporary Dormant or Frost Seeding Recommendations.

Seed species*	Rate per acre
Wheat or rye	150 lbs.
Spring oats	150 lbs.
Annual ryegrass	60 lbs.

* Perennial species may be used as a temporary cover, especially if the area to be seeded will remain idle for more than a year (Practice 3.13).

Exhibit 3.13-C. Permanent Dormant or Frost Seeding Recommendations.

This table provides several seeding options. Additional seed species and mixtures are available commercially. When selecting a mixture, consider site conditions, including soil properties (e.g., soil pH and drainage), slope aspect and the tolerance of each species to shade and droughtiness.

Seed species and mixtures	Rate per acre	Optimum soil pH
OPEN AND DISTURBED AREAS (REMAINING IDLE MORE THAN 1 YR.)		
1. Perennial ryegrass	50 to 75 lbs.	5.6 to 7.0
+ white or ladino clover*	1½ to 3 lbs.	
2. Kentucky bluegrass	30 lbs.	5.5 to 7.5
+ smooth bromegrass	15 lbs.	
+ switchgrass	5 lbs.	
+ timothy	6 lbs.	
+ perennial ryegrass	15 lbs.	
+ white or ladino clover*	1½ to 3 lbs.	
3. Perennial ryegrass	22 to 45 lbs.	5.6 to 7.0
+ tall fescue**	22 to 45 lbs.	
4. Tall fescue**	50 to 75 lbs.	5.5 to 7.5
+ ladino or white clover*	1½ to 3 lbs.	
STEEP BANKS AND CUTS, LOW MAINTENANCE AREAS (NOT MOWED)		
1. Smooth bromegrass	35 to 50 lbs.	5.5 to 7.5
+ red clover*	15 to 30 lbs.	
2. Tall fescue**	50 to 75 lbs.	5.5 to 7.5
+ white or ladino clover*	1½ to 3 lbs.	
3. Tall fescue**	50 to 75 lbs.	5.5 to 7.5
+ red clover*	15 to 30 lbs.	
(Recommended north of US 40)		
4. Orchardgrass	30 to 45 lbs.	5.6 to 7.0
+ red clover*	15 to 30 lbs.	
+ ladino clover*	1½ to 3 lbs.	
5. Crownvetch*	15 to 18 lbs.	5.6 to 7.0
+ tall fescue**	30 to 45 lbs.	
(Recommended south of US 40)		

Practice 3.14
Sodding

Purposes *(Exhibit 3.14-A)*
* To stabilize disturbed areas by establishing permanent grass stands with sod.
* To provide immediate vegetative cover of critical areas, channels, and sediment control structures.
* To prevent erosion and damage from sedimentation and runoff.
* To reduce the problems associated with mud or dust from bare soil surfaces.

Exhibit 3.14-A. Grass sod installed on a homesite brings instant erosion control as well as instant beauty.

Requirements
Site and seedbed preparation: A smooth, firm soil surface, with lime and fertilizer applied.
Plant materials: High-quality, healthy, vigorous sod of a variety well-adapted to the region and compatible with the intended use. (Selection of varieties is usually much more limited than when establishing vegetation from seed.)
Irrigation: As needed to ensure rooting of sod.

Installation *(Exhibits 3.14-B, C, and D)*
Sod should not be installed on hot, dry soil, frozen soil, compacted clay, gravel, or pesticide-treated soil. The ideal time to sod is May 1-June 1 or Sept. 1-Oct. 20, although it can be installed as early as Mar. 15 if available and temperatures are above 32°F or June 1-Sept. 1 if irrigated. (To help retain moisture when irrigating, cover the sod with a uniform layer of straw mulch 1/2 in. thick or so the grass is barely visible through the mulch.)

SITE PREPARATION:
1. Install any practices needed to control erosion, sedimentation, and runoff, such as diversions, sediment basins, silt fences, and straw bale dams (Practices 3.21, 3.22, 3.72, 3.74, and 3.75).
2. Break up compacted soils sufficiently to create a favorable rooting depth of 6-8 in., using a chisel, disk, harrow, or rake.
3. Apply topsoil if the site is otherwise unsuited for establishing vegetation (Practice 3.02).
4. Shape, smooth, and firm the soil surface.

SOD-BED PREPARATION:
1. Have the soil in the sod-bed tested to determine its pH and nutrient levels. (Contact your county SWCD or Cooperative Extension office for assistance and soils information, including available testing services.)

Practice 3.14 Sodding
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2. If soil pH is too acidic for the grass sod to be installed, apply lime according to test results or as the rate recommended by the sod supplier.
3. Fertilize as recommended by the soil test. If testing was not done, consider applying 400-600 lbs./acre of 12-12-12 analysis, or equivalent, fertilizer.
4. Work the fertilizer and lime into the soil to 2-4 in. deep with a disk or rake operated across the slope.
5. Rake or harrow to achieve a smooth final grade, then roll or cultipack to create a firm surface on which to lay the sod.

LAYING THE SOD:
1. If possible, install sod within 36 hrs. of its harvest (see *Exhibit 3.14-B*).
2. Store the rolls of sod in a shaded place during installation.
3. Immediately before laying, rake the soil surface to break any crust and irrigate lightly if the weather is hot.
4. Lay the strips of sod in a brick-like pattern (see *Exhibit 3.14-C*).
5. Butt all joints tightly against each other (but do not stretch or overlap them); and match angled ends correctly to prevent voids, using a knife or mason's trowel to trim and fit irregularly shaped areas (see *Exhibit 3.14-D*).
6. Roll the sod lightly after installation to ensure a firm soil contact.
8. Irrigate the sodded area until the soil is wet to a depth of 4 in., then keep moist until the grass takes root.

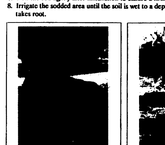

Exhibit 3.14-B. Install rolled sod within 36 hrs. of harvest; keep it shaded at the site.

Exhibit 3.14-C. Lay the strips of sod in a staggered, brick-like fashion.

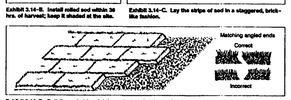

Exhibit 3.14-D. Butt the sod strips tightly against each other, using a sharpened mason's trowel to angle and trim where the ends.

SLOPE APPLICATION:
1. Install the sod strips with their longest dimension perpendicular to the slope.
2. Where slope exceeds 3:1, staple or stake each strip at the corners and in the middle.

CHANNEL APPLICATION:
(Sodding provides quicker protection than seeding and may reduce the risk of early washout.)

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DRAWN BY:
CHECKED BY: R.E.
DATE: 4/21/03
PROJECT NO.:
REVISIONS
SCALE: NONE
SHEET NO.: OF S4.5