Slide 1 - Vegetation Establishment for Erosion Control

Slide notes

We will now discuss information to help you understand the 2008 Standard Specifications for soil and vegetation establishment. This training will cover several sections of the 2008 Standards and Specifications.

Notes

Slide 2 - Landscape Operations Division Assists with Landscape Specifications & Inspection

Slide notes

The Landscape Operations Division has many responsibilities during project design and construction.

The Technical Resources Team of the Landscape Operations Division evaluates new products, writes landscape specifications, and reviews landscape plans during project design.

The three Regional Teams of the Landscape Operations Division work closely with Project Engineers and Contractors during construction.

Every construction project with landscaping is assigned a Landscape Inspector from one of the Regional Teams.

The Landscape Inspectors inspect and approve landscape materials of Section nine twenty of the 2008 Specifications. Their inspections affect approval and payment for permanent vegetation establishment.

If you do not know who has been assigned to a project, please call the regional Team to find out.

Notes

Slide 3 - Section 701 Topsoil and Subsoil

Section 701
Topsoil and Subsoil

Section 701 Includes Three Tasks

Salvaging Soil…
Digging and moving it to stockpiles

Placing Salvaged Soil…
Taking it back and spreading it on the project

Placing Furnished Soil...
Buying and bringing it to the project

Placing 4 in. layer of furnished topsoil over smoothly graded subsoil

Slide notes

The placement of soil layers is important for the survival of landscape plantings. As shown in the photo, topsoil is being placed over a previously spread layer of subsoil.

Section seven oh one involves three separate tasks: Salvaging soil, placing salvaged soil, and placing furnished soil.

Notes

Slide 4 - 701 Topsoil and Subsoil

Slide notes

For all soils the goal is to ensure. Conformance with state law, compliance with landscape material specifications, rapid growth of vegetation groundcover, long term success of landscape plantings, and preservation of the soil.

Notes

Slide 5 - 701 Topsoil and Subsoil

701 Topsoil and Subsoil

Section 920.01.01

Specifications for Salvaged Topsoil

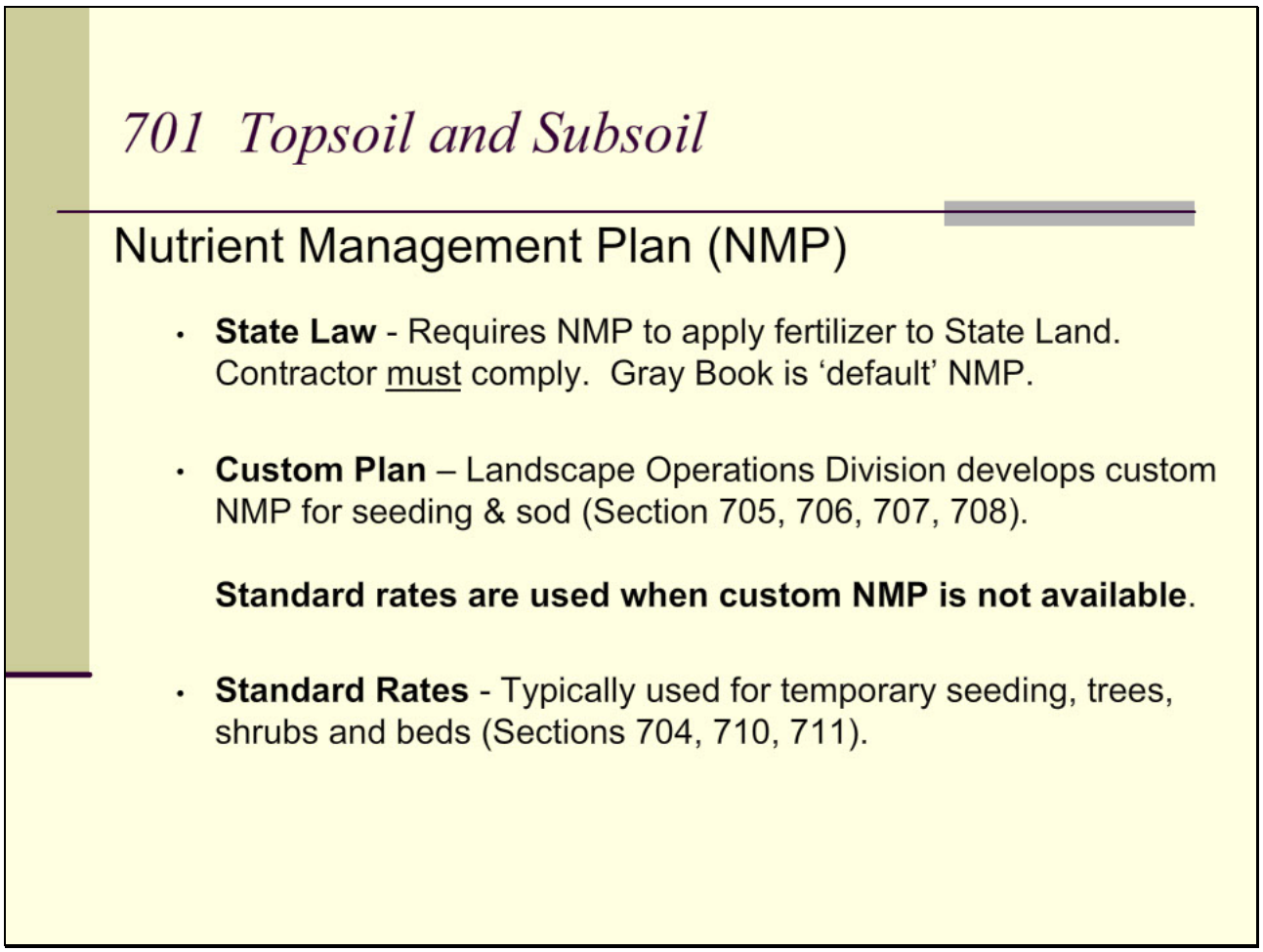
COMPOSITION - SALVAGED TOPSOIL					
TEST PROPERTY	**TEST METHOD**	**TEST VALUE AND AMENDMENT**			
Prohibited Weeds	—	Free of seed or viable parts of shattercane, Johnsongrass, Canada thistle, bull thistle, plumeless thistle, musk thistle, and common reed when inspected before transportation.			
Debris	—	1.0 % or less by weight of cement, concrete, asphalt, crushed gravel or construction debris when inspected.			
Grading Analysis	T 87	**Sieve Size**		**Passing by Weight Minimum %**	
		2 in.		100	
		No. 4		90	
		No. 10		80	
Textural Analysis	T 88	**Particle**		**% Passing by Weight**	
		Size	**mm**	**Minimum**	**Maximum**
		Sand	2.0 – 0.050	20	75
		Silt	0.050 – 0.002	10	60
		Clay	less than 0.002	5	30
Soil pH	D 4972	pH of 4.8 to 7.4. Apply limestone to soil with pH 4.8 to 6.1 per NMP. Apply sulfur or iron sulfate to soil with pH 7.1 to 7.4 per NMP.			
Organic Matter	T 194	1.0 to 8.0 % OM by weight. Apply compost to soil with 1.0 to 1.7% OM per NMP to achieve at least 2.0% OM.			
Nutrient Content	Mehlich-3	Administration will assess. Apply fertilizer per NMP for nitrogen requirement and optimum fertility index values (FIV) for phosphorus and potassium.			
Soluble Salts	EC1:2 (V:V)	800 ppm (1.25 mmhos/cm) or less. Apply gypsum to soil with 500 to 800 ppm (0.78 to 1.25 mhos/cm) per NMP.			
Harmful Materials	—	Shall not contain substances in concentrations that are harmful to human health, water quality, or plant growth. Industrial waste such as ash, slag, raw sludge, dredge spoil, or similar materials shall not be soil components.			

Slide notes

Both the topsoil and the subsoil must meet materials clearance standards of Section nine twenty of the 2008 Specifications. Salvaged soils are the property of SHA, but furnished soils are selected and purchased by the Contractor. Only the soil of producers included in the Office of Materials Technology Qualified Products List may be used. For furnished soils to be approved, the soils must be tested, and the Nutrient Management Plan (NMP) must be completed before the soil is delivered to the project.

Notes

Slide 6 - 701 Topsoil and Subsoil



Slide notes

According to State law, a Nutrient Management Plan (NMP) is required whenever fertilizer is applied to State land.

The Maryland Department of Agriculture has approved the fertilizers and application rates of the 2008 Specifications. Because of this, the application rates of the 2008 Specifications are always legal when fertilizer is applied as specified.

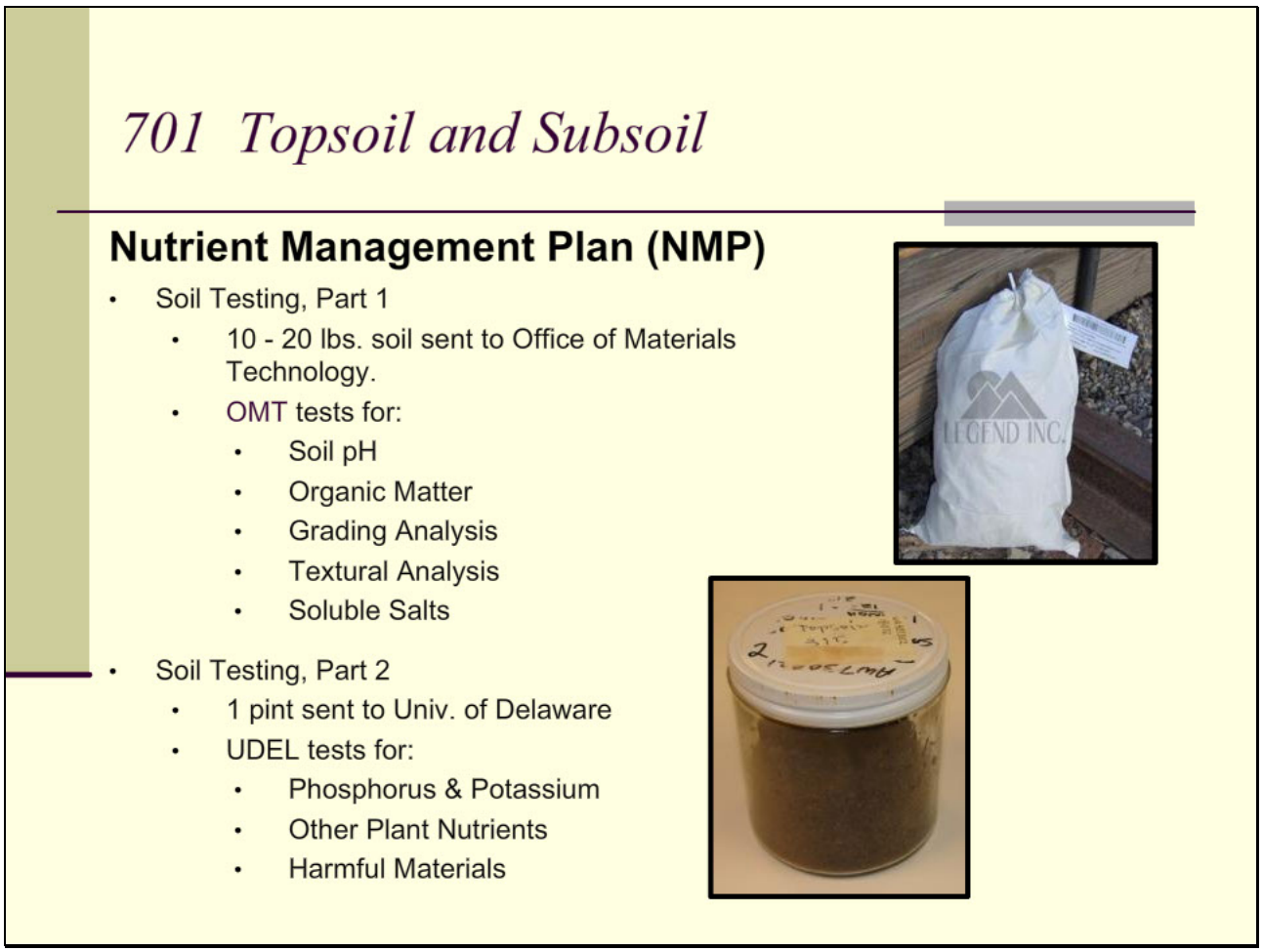
However, to reduce costs and avoid excessive use of fertilizer, the Landscape Operations Division develops a custom Nutrient Management Plan when fertilizer is applied to large areas of turfgrass establishment, meadow establishment, and shrub seeding.

The standard specified rates of fertilizer are used for Temporary Seed and Tree and Shrub Establishment unless a Nutrient Management Plan is developed.

It is the Contractors responsibility to follow the requirements of the Nutrient Management Plan when applying fertilizer.

Notes

Slide 7 - 701 Topsoil and Subsoil

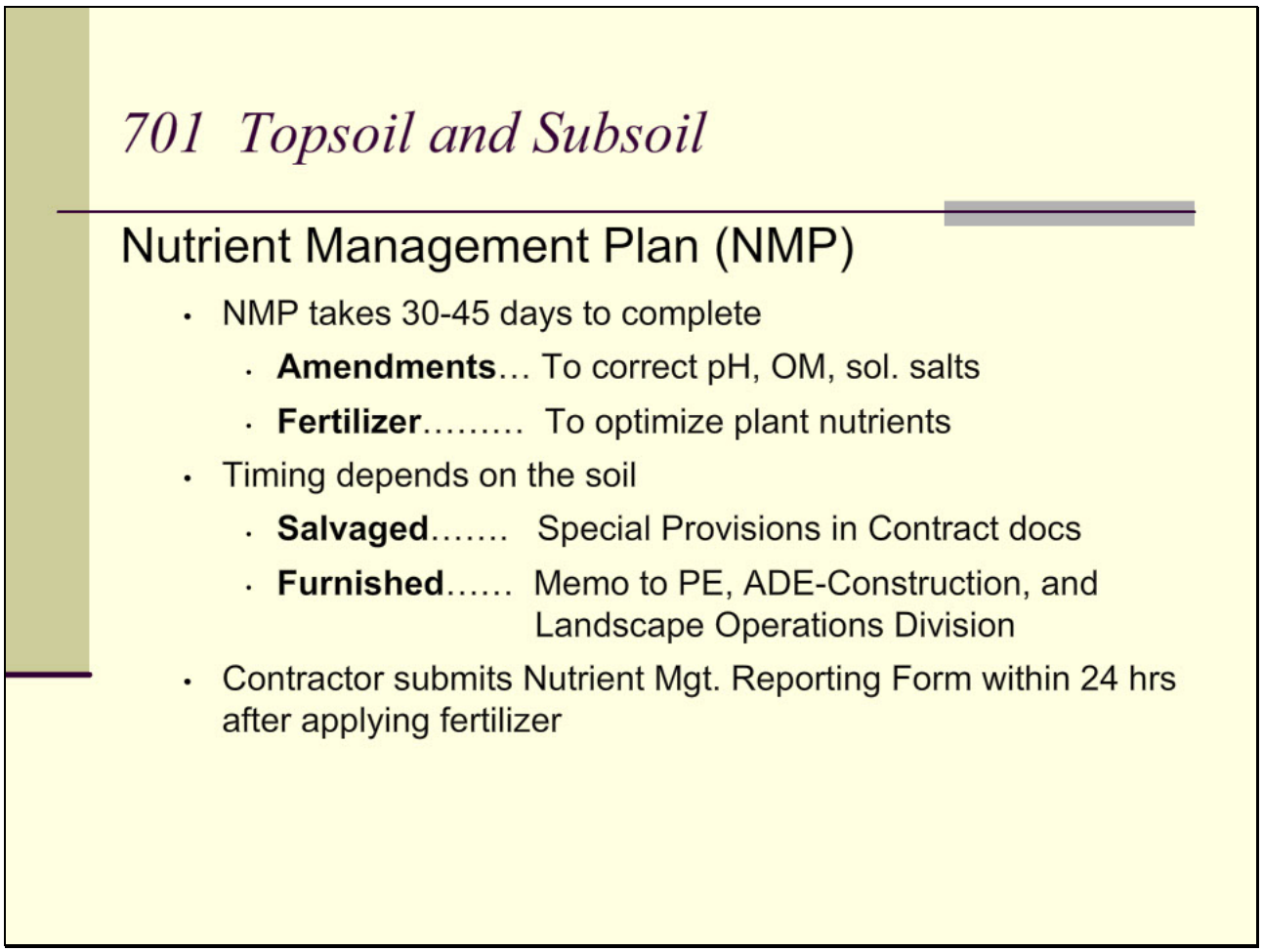


Slide notes

The Nutrient Management Plan is developed using tests conducted by both the State Highway Administration and the university of Delaware.

Notes

Slide 8 - 701 Topsoil and Subsoil



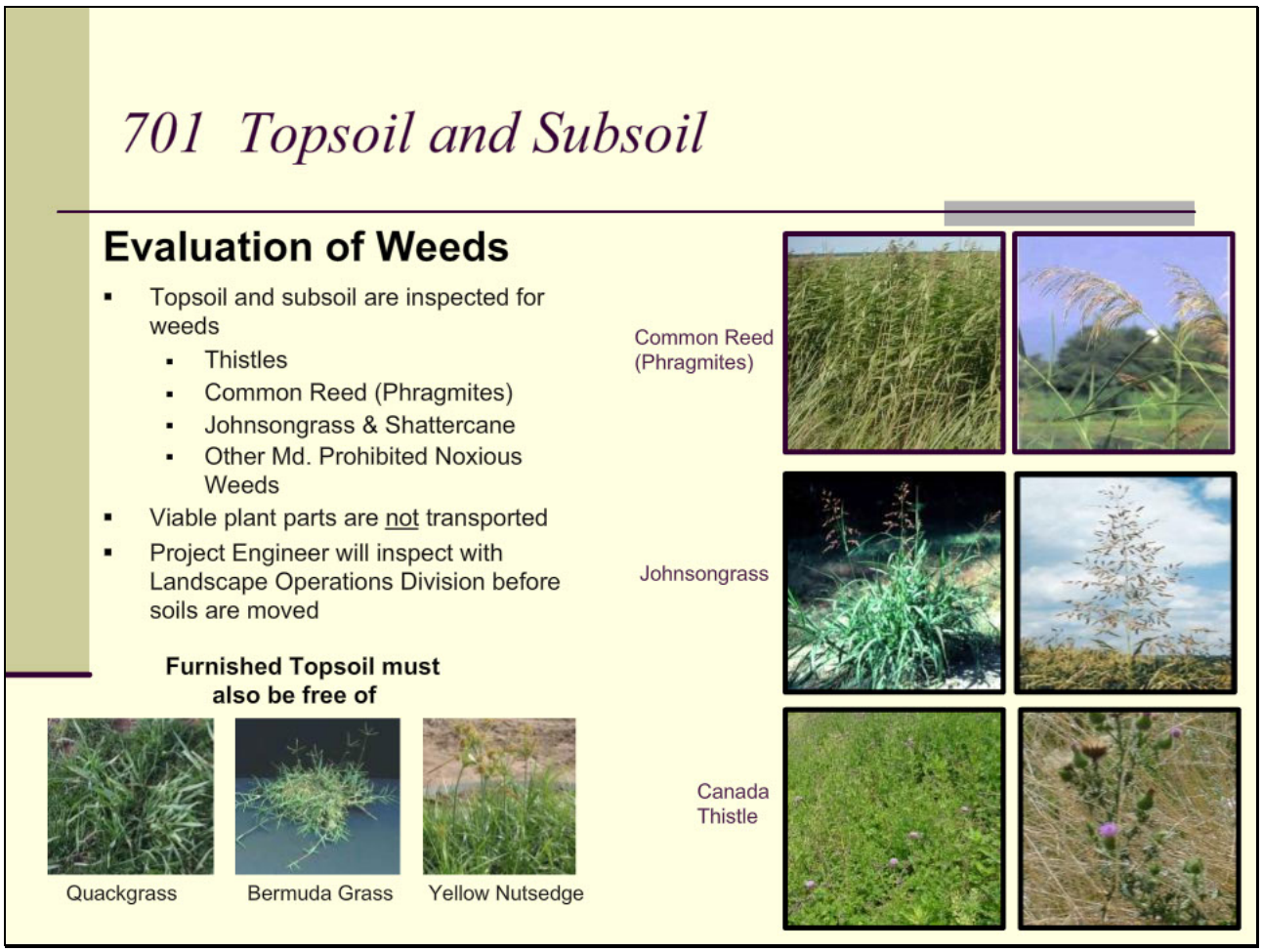
Slide notes

For salvaged soils, the Nutrient Management Plan is included in the contract documents.

For furnished soils, the Nutrient Management Plan is sent to the project Engineer 30 to 45 days after the source of supply is sampled and tested.

Notes

Slide 9 - 701 Topsoil and Subsoil



Slide notes

The Maryland Noxious Weed Law does not allow certain weeds to be transported in Maryland.

If the Contractor moves these weeds into or out of the project area, it is a violation of State law.

Although there are several weeds of concern to SHA, the control of Canada thistle, Common Reed and Johnsongrass is most important during construction.

The Landscape Inspector will assist with weed identification to ensure that soils with prohibited weeds are not transported during soil salvaging or soil placing operations.

Notes

Slide 10 - 701 Topsoil and Subsoil

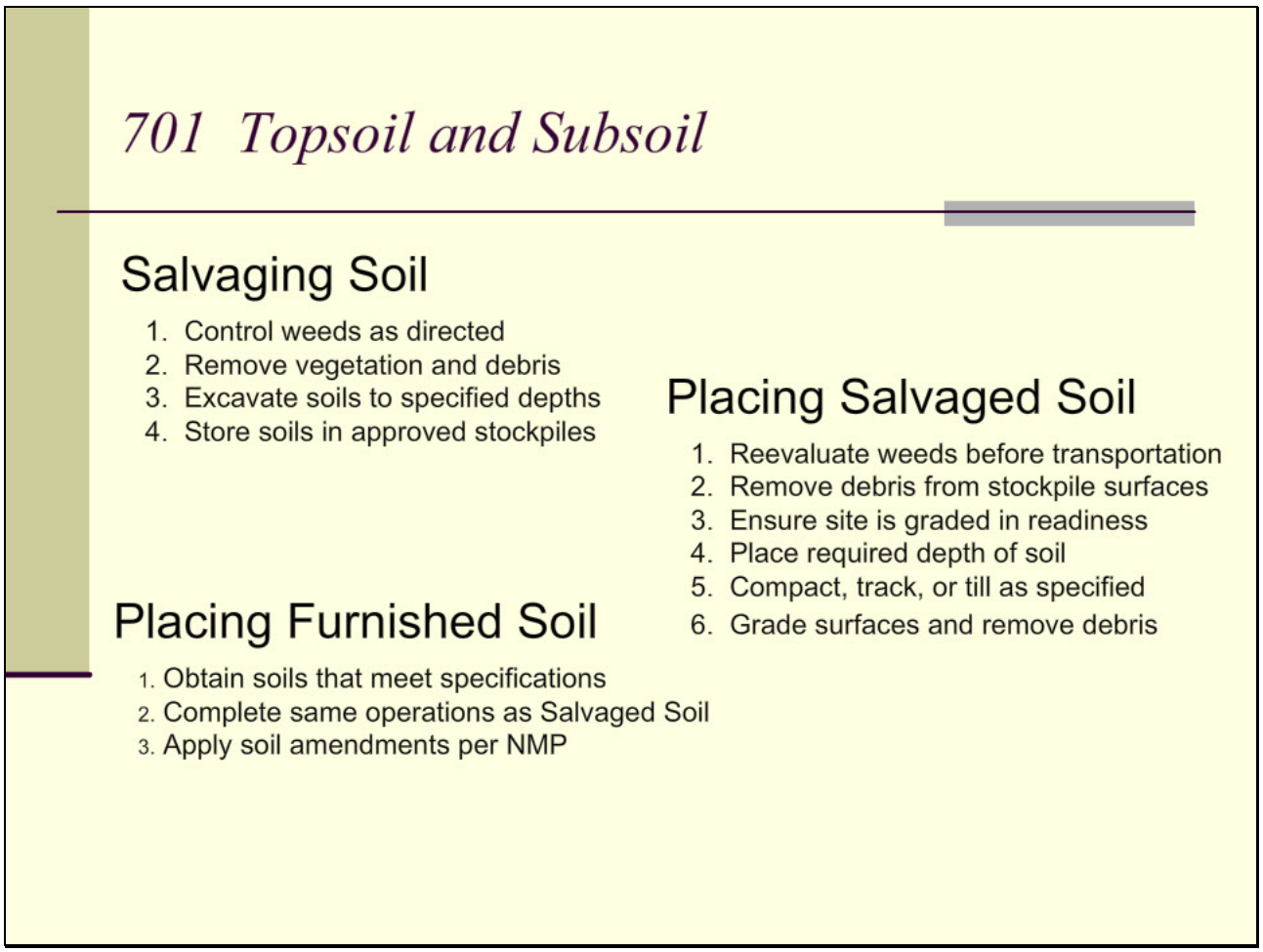
Slide notes

According to the Standard Specifications for furnished soil, the first load of soil delivered each day must be delivered with documentation from the approved source.

The Contractor submits the Nutrient Management Reporting Form within 24 hours after applying fertilizer.

Notes

Slide 11 - 701 Topsoil and Subsoil

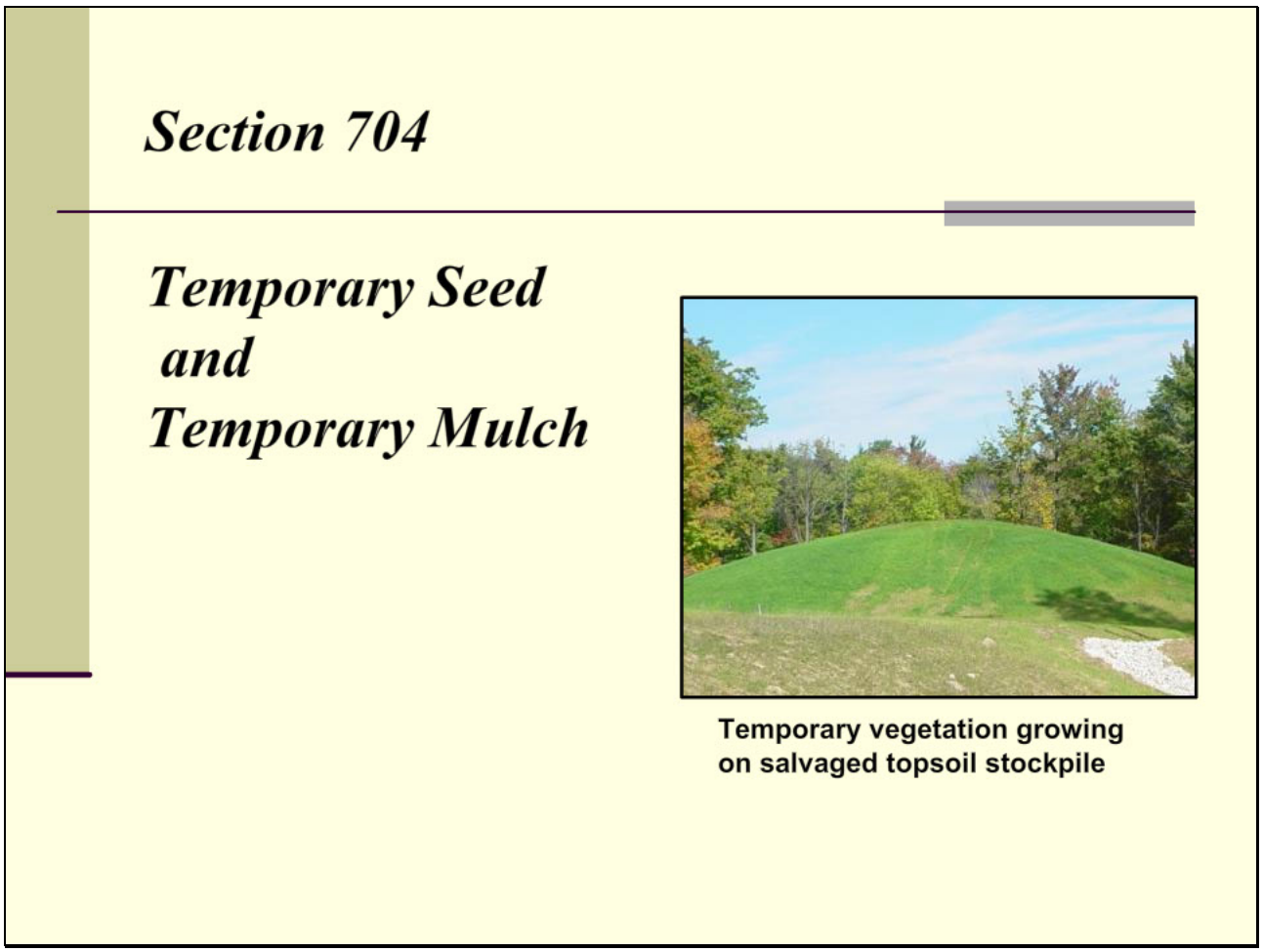


Slide notes

There are several steps involved with the handling of soils on a State Highway project. Take a moment to review the steps involved with both salvaging soils and placing soils.

Notes

Slide 12 - Section 704 Temporary Seed and Temporary Mulch



Slide notes

Temporary Seed and Temporary Mulch are included in most Contracts. These two operations are a strong tool against soil erosion, and are often used during construction.

Both Temporary Mulch and Temporary Seed are used any time of the year, as directed by the Engineer. And like Section seven oh one, both Temporary Seed and Temporary Mulch are paid 100% by the Project Engineer when all the materials are installed and approved.

Notes

Slide 13 - 704 Temporary Mulch

704 Temporary Mulch

Temporary Mulch (Performed any time of the year, 100% payment upon completion)

1. When area will be disturbed in <u>less than 2 months</u>
2. Complete 2 Operations for 100% Payment
    1. Apply straw mulch
    2. Apply wood cellulose fiber mulch binder

Wood cellulose fiber mulch binder holds straw in place

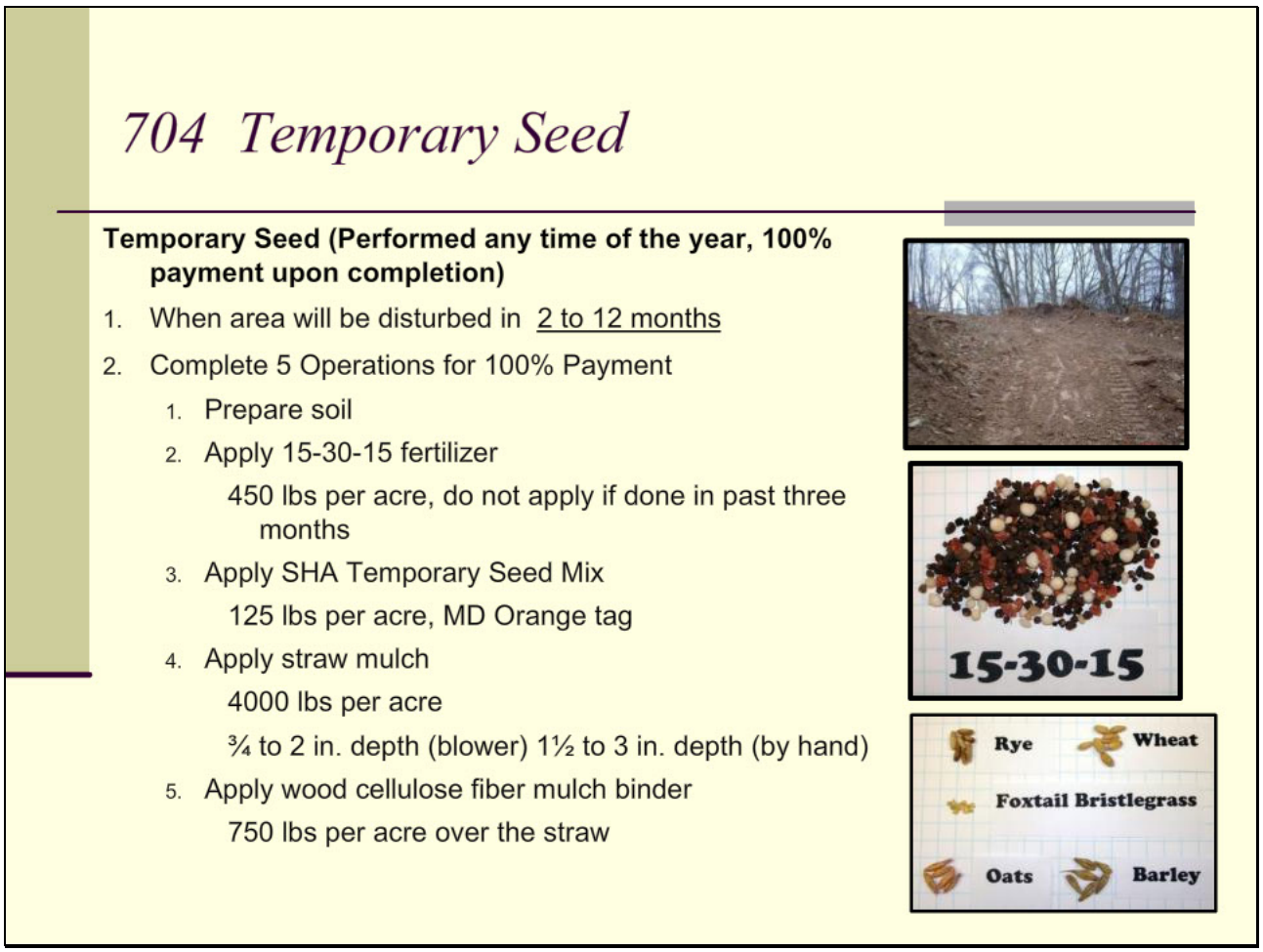
Straw <u>is not</u> sufficient
Mulch binder <u>is not</u> applied
Mulch and soil <u>are not</u> secure

Slide notes

When the area will be disturbed again in less than 2 months, the Project Engineer should request Temporary Mulch.

Notes

Slide 14 - 704 Temporary Seed



Slide notes

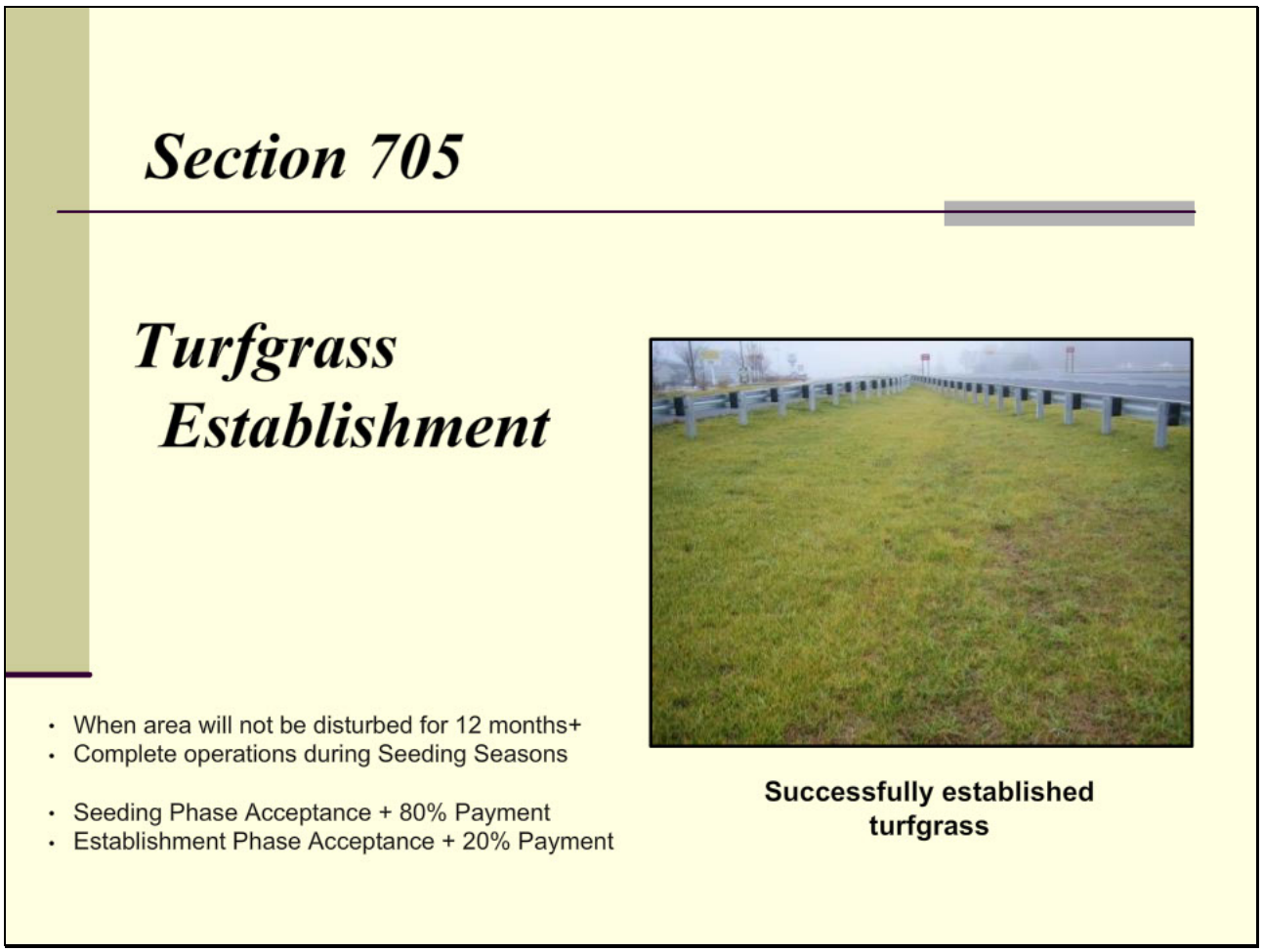
Apply Temporary Seed when the area will be disturbed again within the next 2 to 12 months.

When an area will be disturbed in more than 12 months, the Project Engineer should request permanent vegetation such as Turfgrass Establishment.

Even though this item is temporary there are multiple steps required for proper installation and payment.

Notes

Slide 15 - Section 705 Turfgrass Establishment



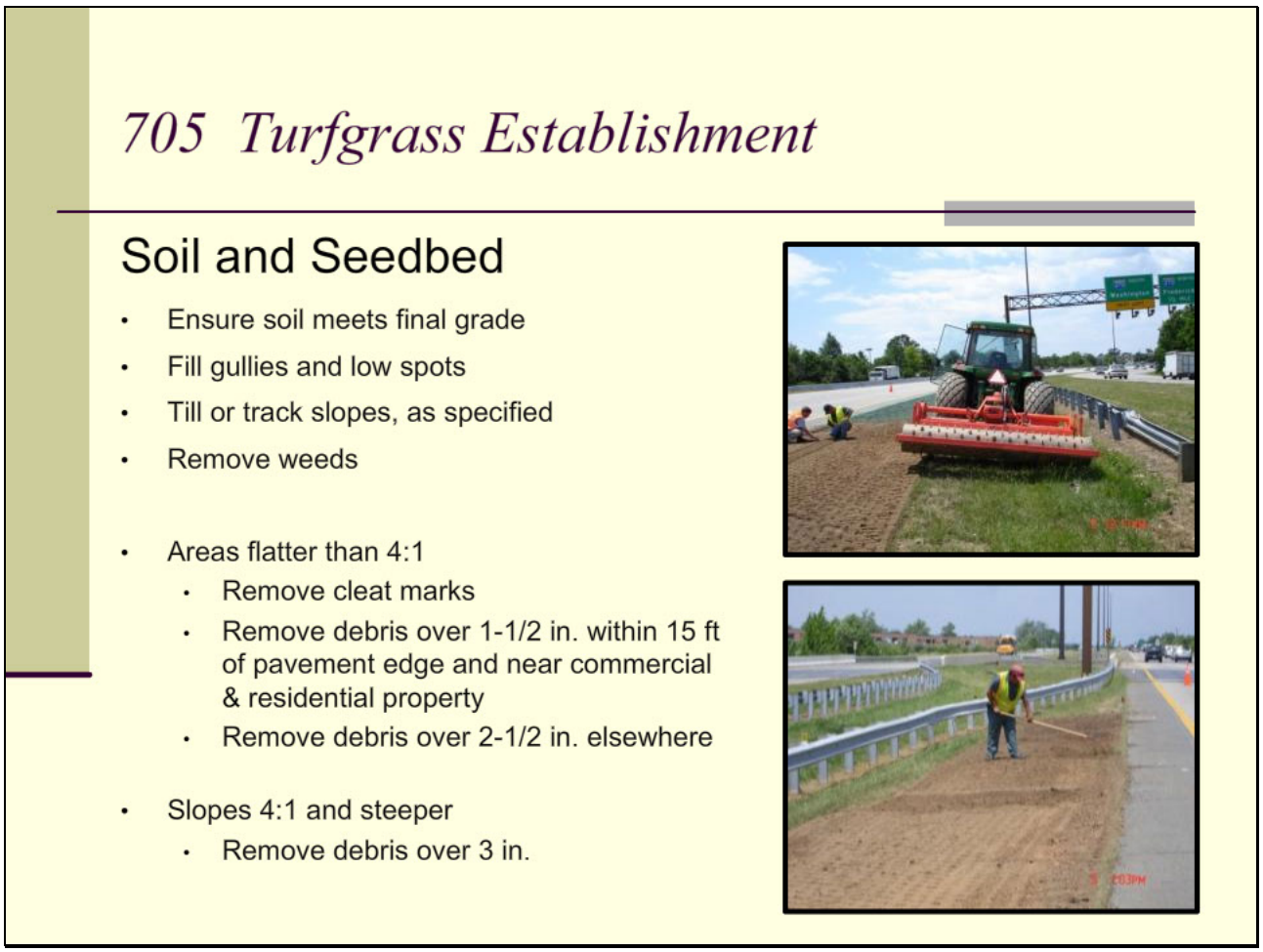
Slide notes

Turfgrass Establishment involves growing grass from seed. This work is only performed during certain seeding seasons when the area will not be disturbed for at least 12 months.

Because of the importance of turfgrass groundcover, 80% of the Contract price is paid at the end of the Seeding Phase, when all operations are completed and all materials are applied. The final 20% is paid when the turfgrass meets specified standards for growth, color, and groundcover.

Notes

Slide 16 - 705 Turfgrass Establishment



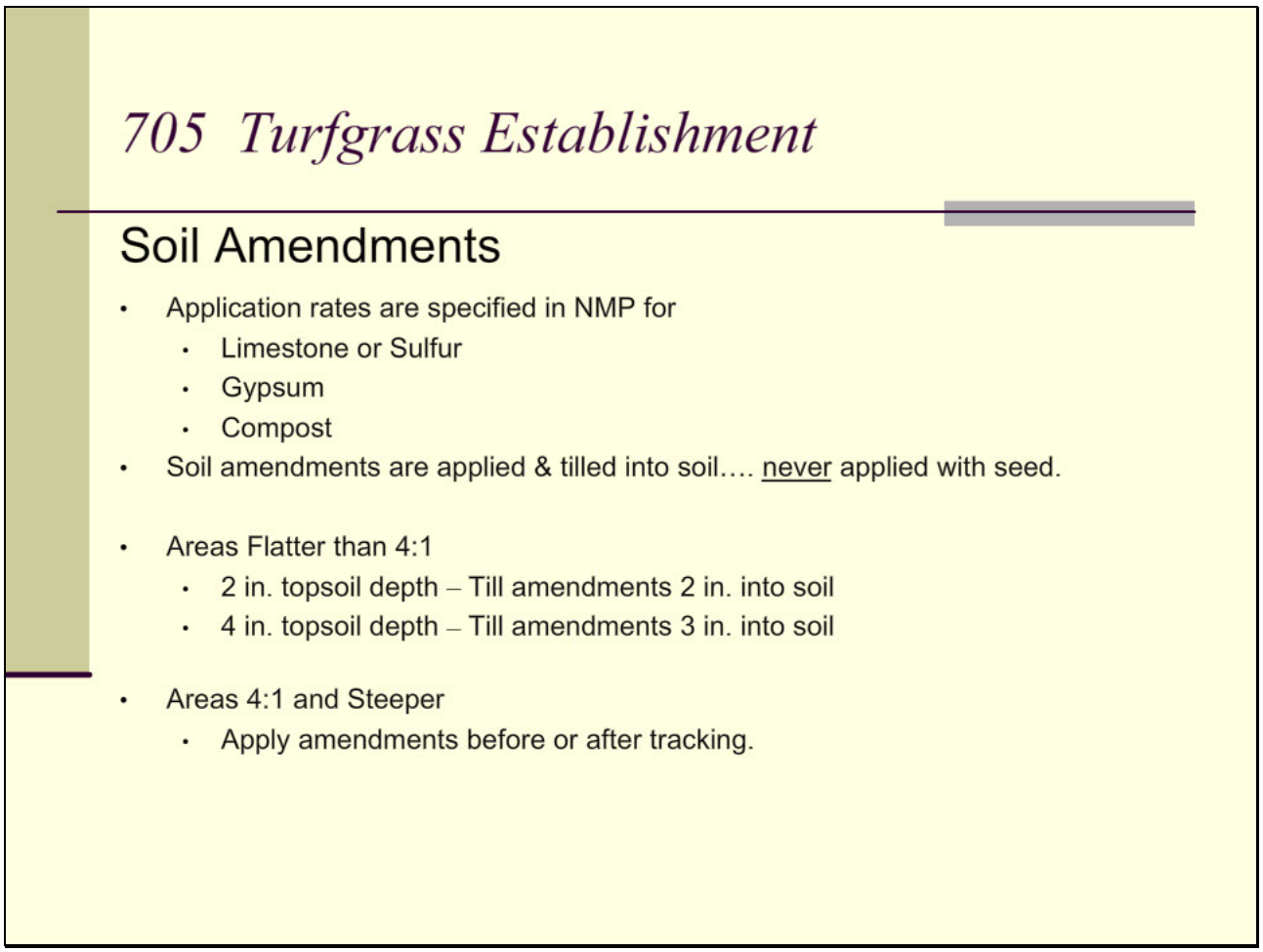
Slide notes

There are multiple steps in placing permanent seed and it starts with soil preparation.

Proper soil preparation is an important step in turfgrass establishment. The areas should be at the finished grade, free of weeds and debris, and tilled or tracked as specified.

Notes

Slide 17 - 705 Turfgrass Establishment



Slide notes

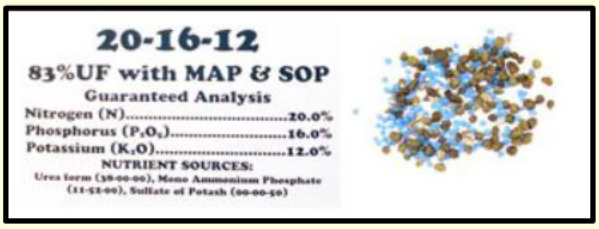
Any necessary amendments should be applied separately from the seed mixture. These amendments will be specified by the nutrient management plan. On flat areas of the site the amendments are tilled into the soil.

Notes

Slide 18 - 705 Turfgrass Establishment

705 Turfgrass Establishment

Fertilizers



MATERIAL	LB PER 1000 FT^2	LB PER ACRE
FERTILIZER AT SEEDING		
Topsoiled Areas		
20-16-12 (83% UF with MAP & SOP)	23.0[a]	**1000**[a]
38-0-0 (UF)	0 to 9.2[a,b]	0 to 400[a,b]
0-0-50 (SOP)	0 to 5.7[a,b]	0 to 250[a,b]
Nontopsoiled Areas		
20-16-12 (83% UF with MAP & SOP)	23.0[a]	**1000**[a]
38-0-0 (UF)	8.0 to 17.2[a,b]	**350** to 750[a,b]
0-0-50 (SOP)	0 to 5.7[a,b]	0 to 250[a,b]

Note: UF = Ureaform MAP = Monoammonium Phosphate SOP = Sulfate of Potash

[a] The NMP will specify the application rates

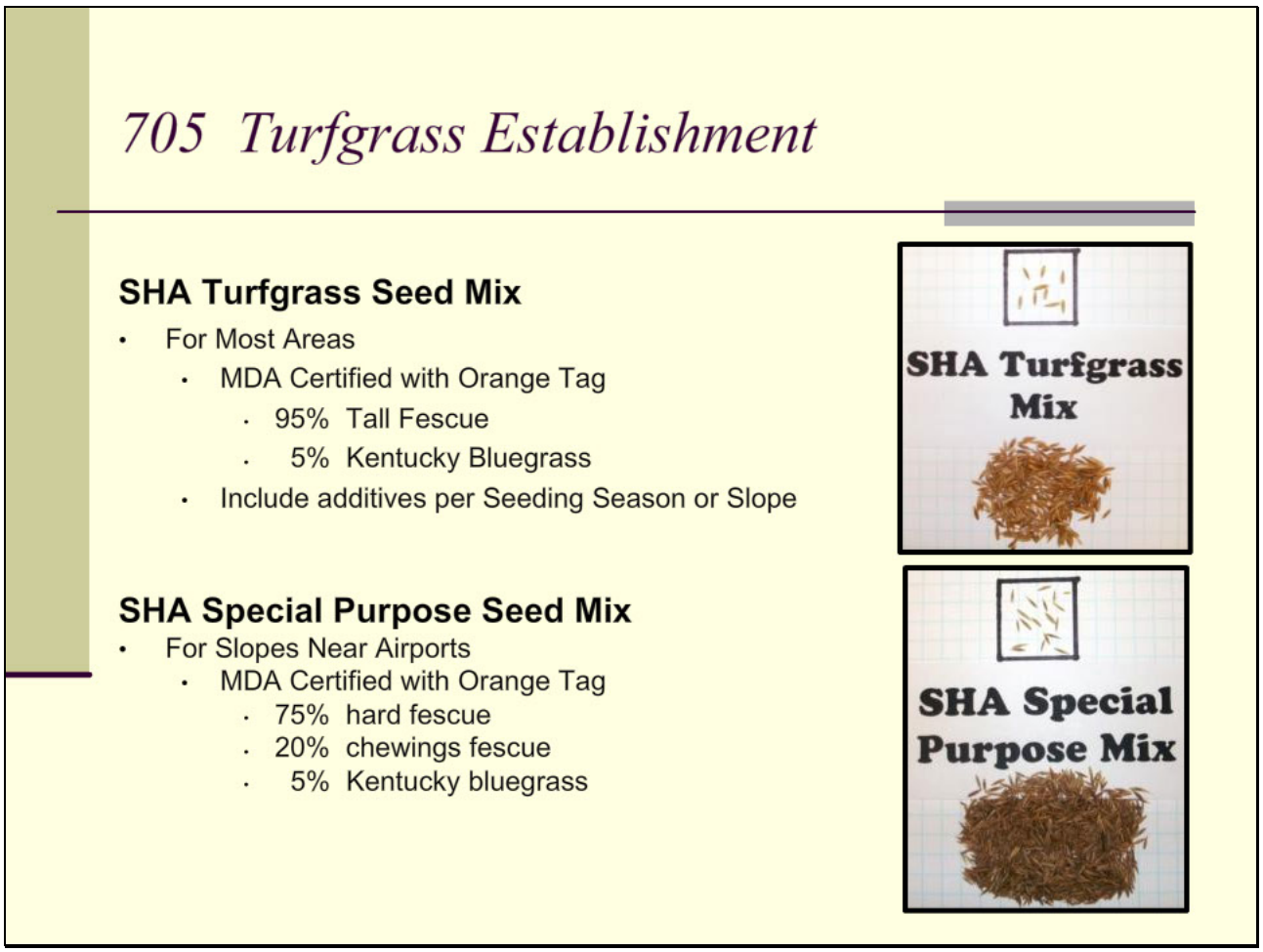
[b] When application of 20-16-12 (83% UF with MAP & SOP) is below 1,000 lb per acre, apply 38-0-0 and 0-0-50 per NMP

Slide notes

Apply fertilizers as specified in section 705 or the nutrient management plan for the project.

Notes

Slide 19 - 705 Turfgrass Establishment

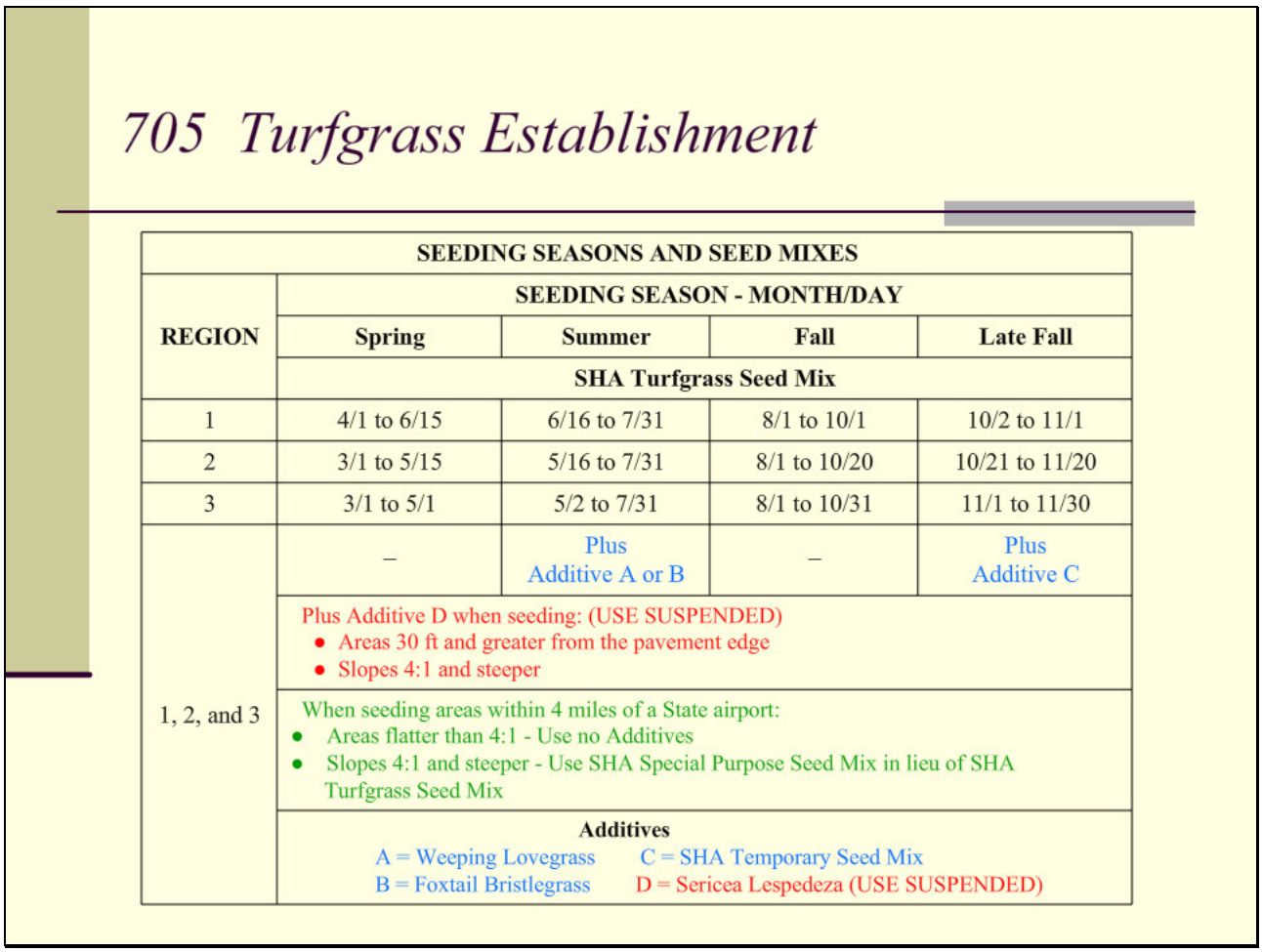


Slide notes

Ensure to proper seed is being utilized by verifying the information on the Orange tag of the seed mix. Opened or partially used seed mix's should not be accepted.

Notes

Slide 20 - 705 Turfgrass Establishment



Slide notes

Seed additives are other seeds that must be added to the turfgrass seed mix. The use of Sericea Lespedeza was suspended in 2010.

200 pounds of SHA Turfgrass Seed Mix is applied in all areas where Turfgrass Establishment is required.

Seasonal seed additives are still required at specified rates.

Be sure to consult the Landscape Operations Division when seeding within 4 miles of a State airport. This is because S.H.A. special purpose seed mix and additives must be used on slopes and no seed additives may be used within these areas when seeding along State roads.

Notes

Slide 21 - 705 Turfgrass Establishment

Slide notes

There are several methods to apply permanent seed to the ground. Additives are to be included in the seed mix as specified.

Notes

Slide 22 - 705 Turfgrass Establishment

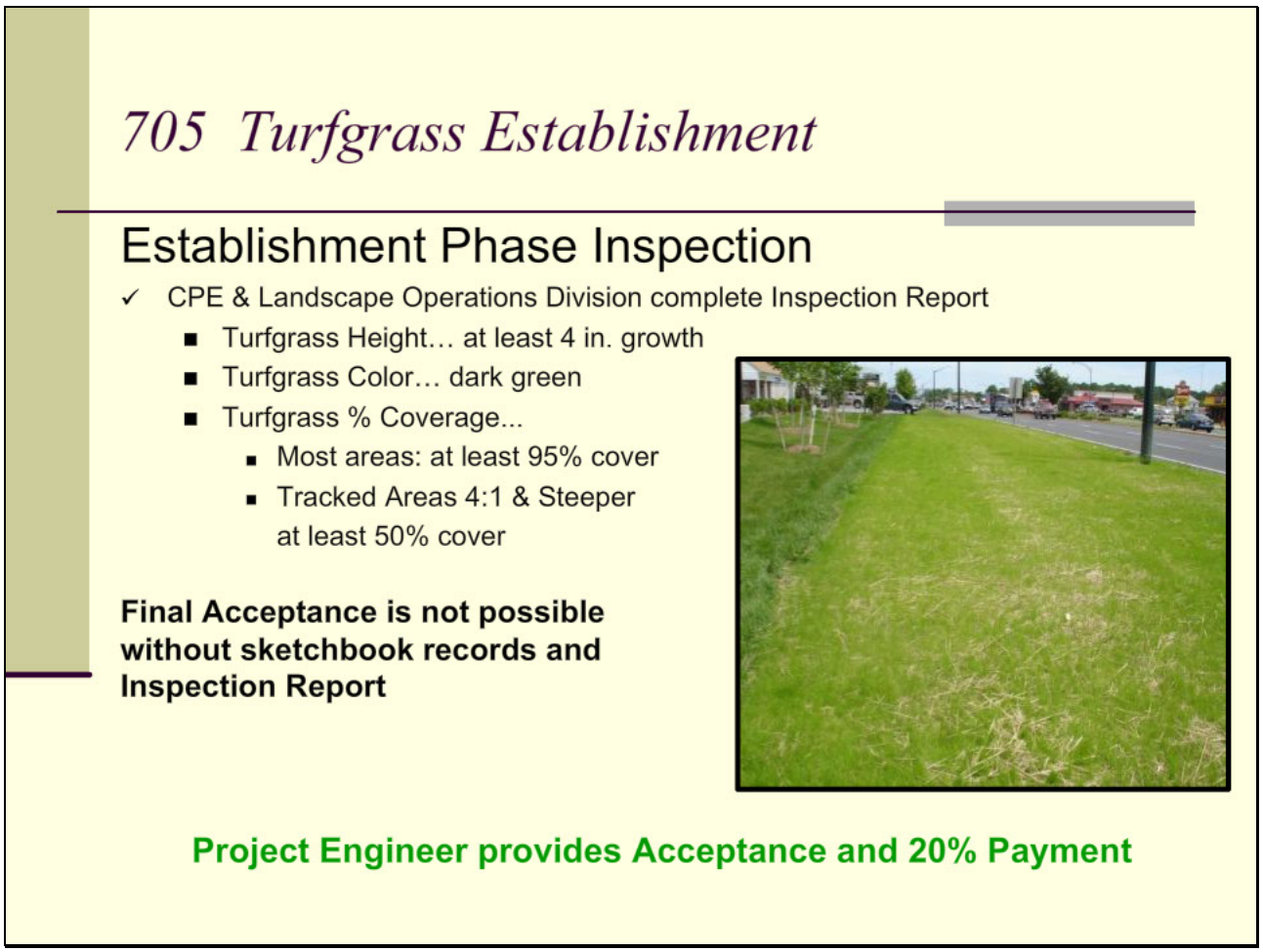
Slide notes

Straw mulch and the wood cellulose binder should be applied just as they were done for temporary seeding.

When all the seeding operations are completed, the Project Engineer is authorized to pay 80% of the Contract price for the Turfgrass Establishment.

Notes

Slide 23 - 705 Turfgrass Establishment



Slide notes

However, Final Acceptance for Turfgrass Establishment requires an Inspection Report. The Landscape Operations Division and Project Engineer complete the Inspection Report.

For areas flatter than four to one, the grass must be 4 inches in height, dark green color, and have at least 95% coverage of SHA seed mix species.

Notes

Slide 24 - Section 708 Turfgrass Sod Establishment

Slide notes

Turfgrass Sod is often specified in urban areas, channels and inlets.

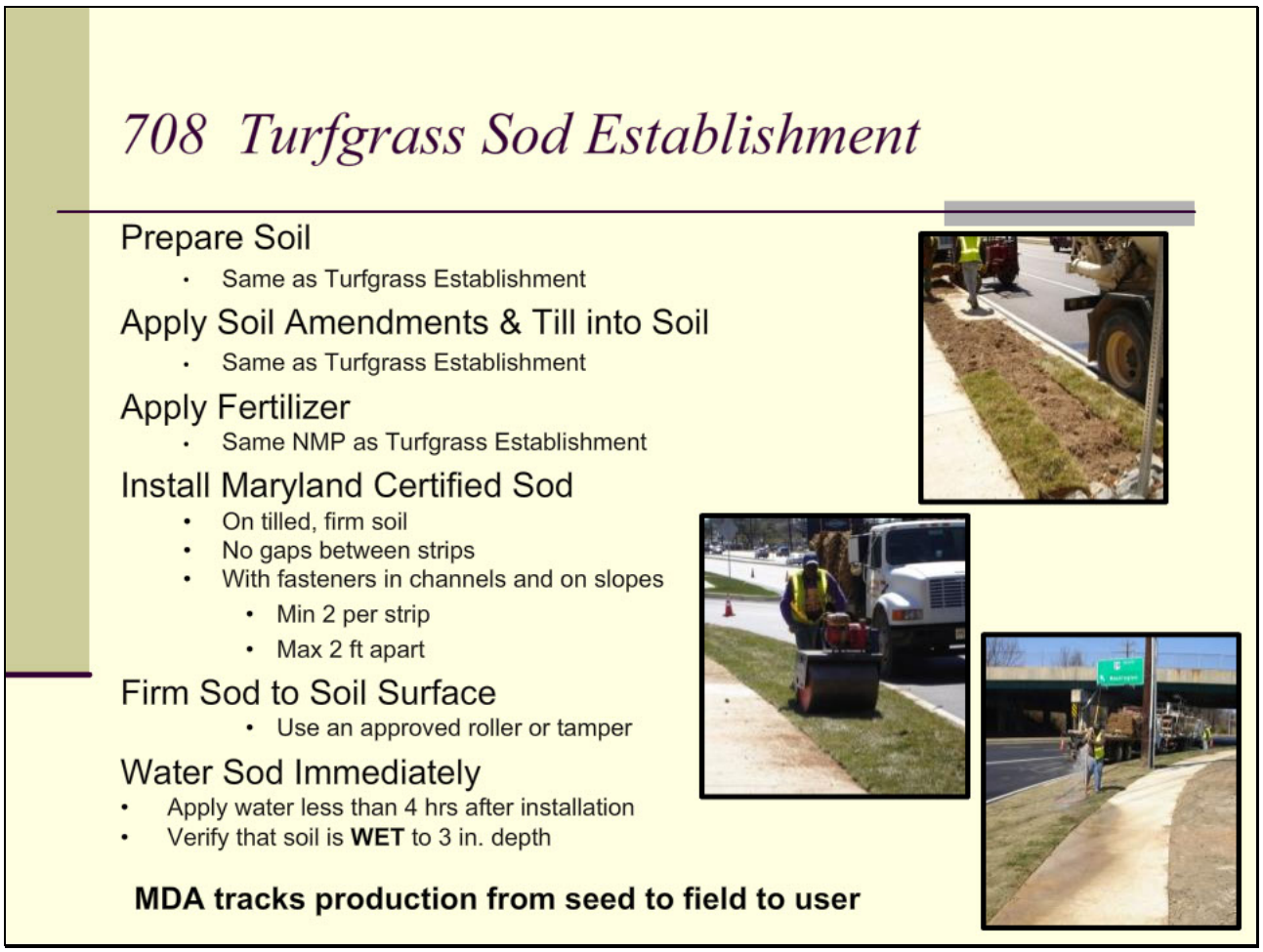
Like Turfgrass Establishment, Turfgrass Sod Establishment is installed when the area will not be disturbed for at least 12 months.

The sod installation season is august fifteenth thru May thirty first. Sod is not installed in June, July or the first two weeks of August.

80% of the contract price is paid when the sod is installed, and the final 20% is paid when the sod meets the standards for Turfgrass Sod Establishment

Notes

Slide 25 - 708 Turfgrass Sod Establishment



Slide notes

Section seven oh eight requires Maryland Certified Sod.

Be sure to roll or tamp the sod and install staples where sod might move because of water flow.

Sod must be watered within 4 hours after installation. The initial watering must wet the soil to a depth of 3 inches.

Notes

Slide 26 - 708 Turfgrass Sod Establishment

Slide notes

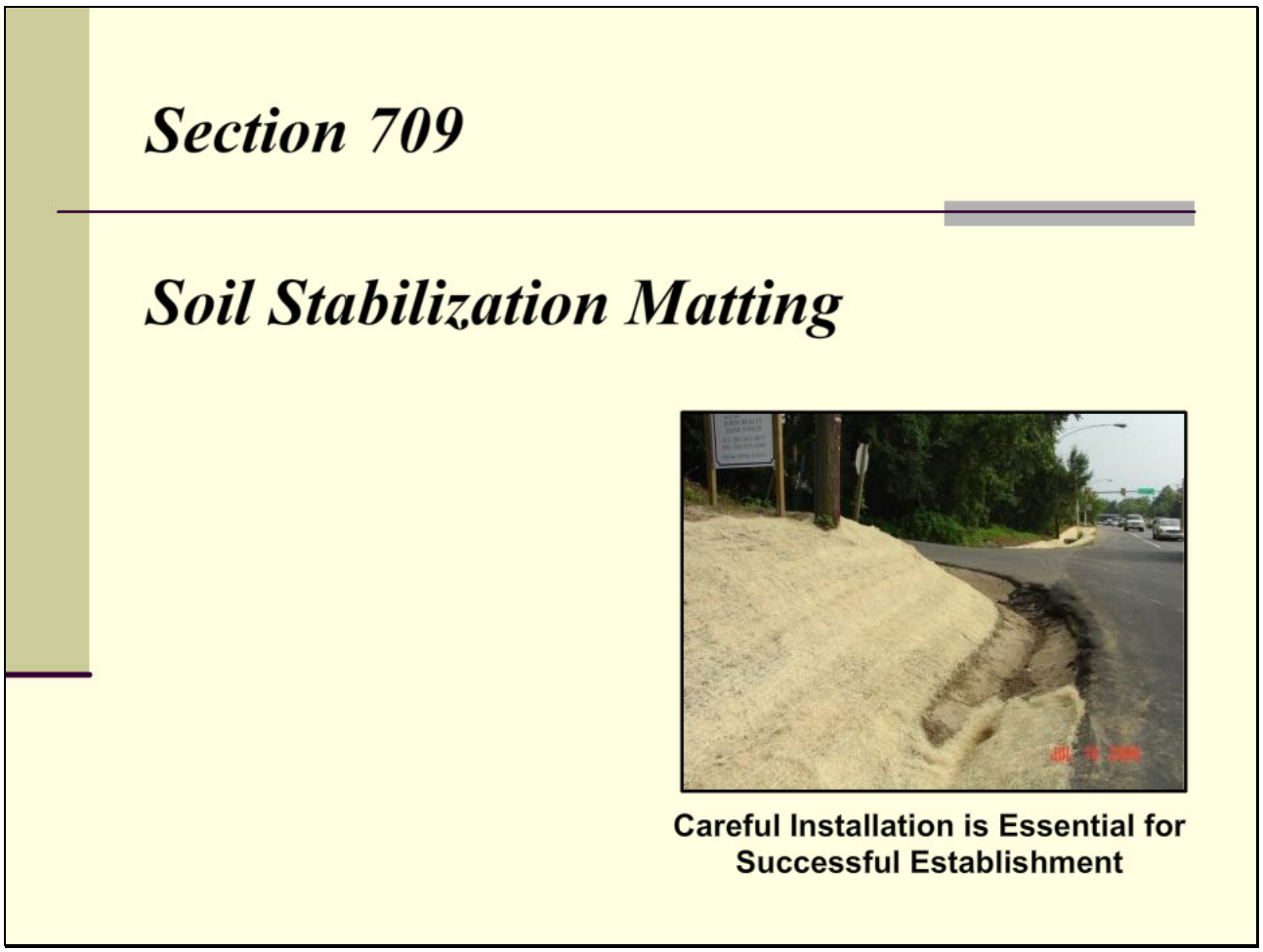
When sod is installed, the Project Engineer is authorized to pay 80% of the Contract price.

However, just like Turfgrass Establishment, Final Acceptance for Turfgrass Sod Establishment requires an Inspection Report. The Landscape Operations Division and Project Engineer complete the Inspection Report together.

For acceptance, the sod must be rooted into the soil, 4 inches in height, dark green color, and 99% coverage of turfgrass.

Notes

Slide 27 - Section 709 Soil Stabilization Matting

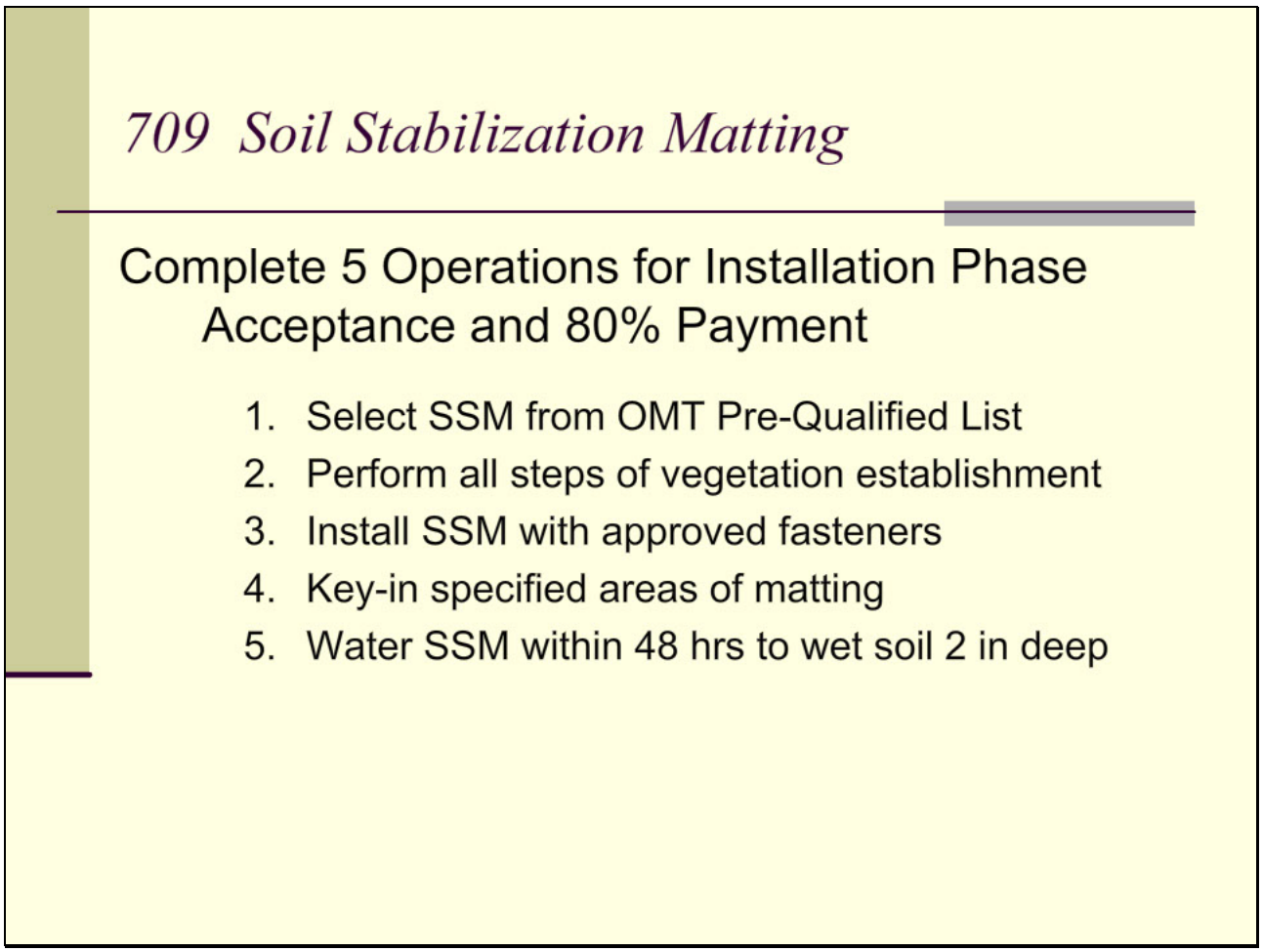


Slide notes

There are 5 types of soil stabilization matting. However, because most types are used with Turfgrass Establishment, the payment for soil stabilization matting follows the split payment system used for Turfgrass Establishment.

Notes

Slide 28 - 709 Soil Stabilization Matting



Slide notes

There are a few key points about soil stabilization matting that should be remembered for installation and payment:

Select Soil stabilization matting from the OMT Qualified Products List.

Perform all steps of vegetation establishment.

Smooth the soil and roll as required for the matting.

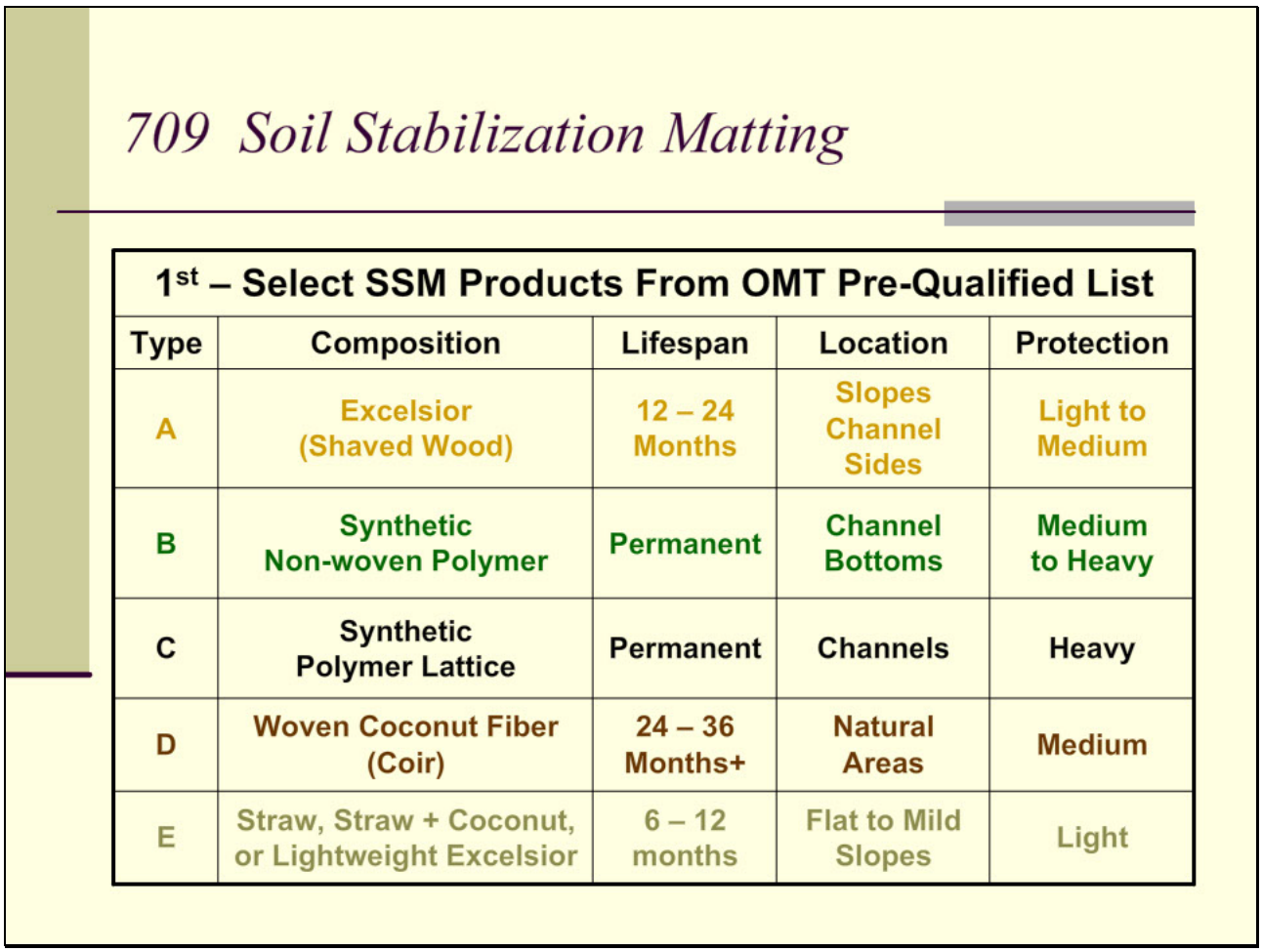
Install the correct size & spacing of fasteners.

Key-in the edges required for the type of matting.

Apply water within 48 hours to wet the soil to 2 inches in depth.

Notes

Slide 29 - 709 Soil Stabilization Matting



Slide notes

Most Type A is shaved wood, sometimes called excelsior.

Type A is installed on slopes and channel sides where it gives light to medium erosion protection.

Type B is a synthetic non-woven polymer matting. Type B is a permanent mat used in channel bottoms that gives medium to heavy turfgrass reinforcement and erosion protection.

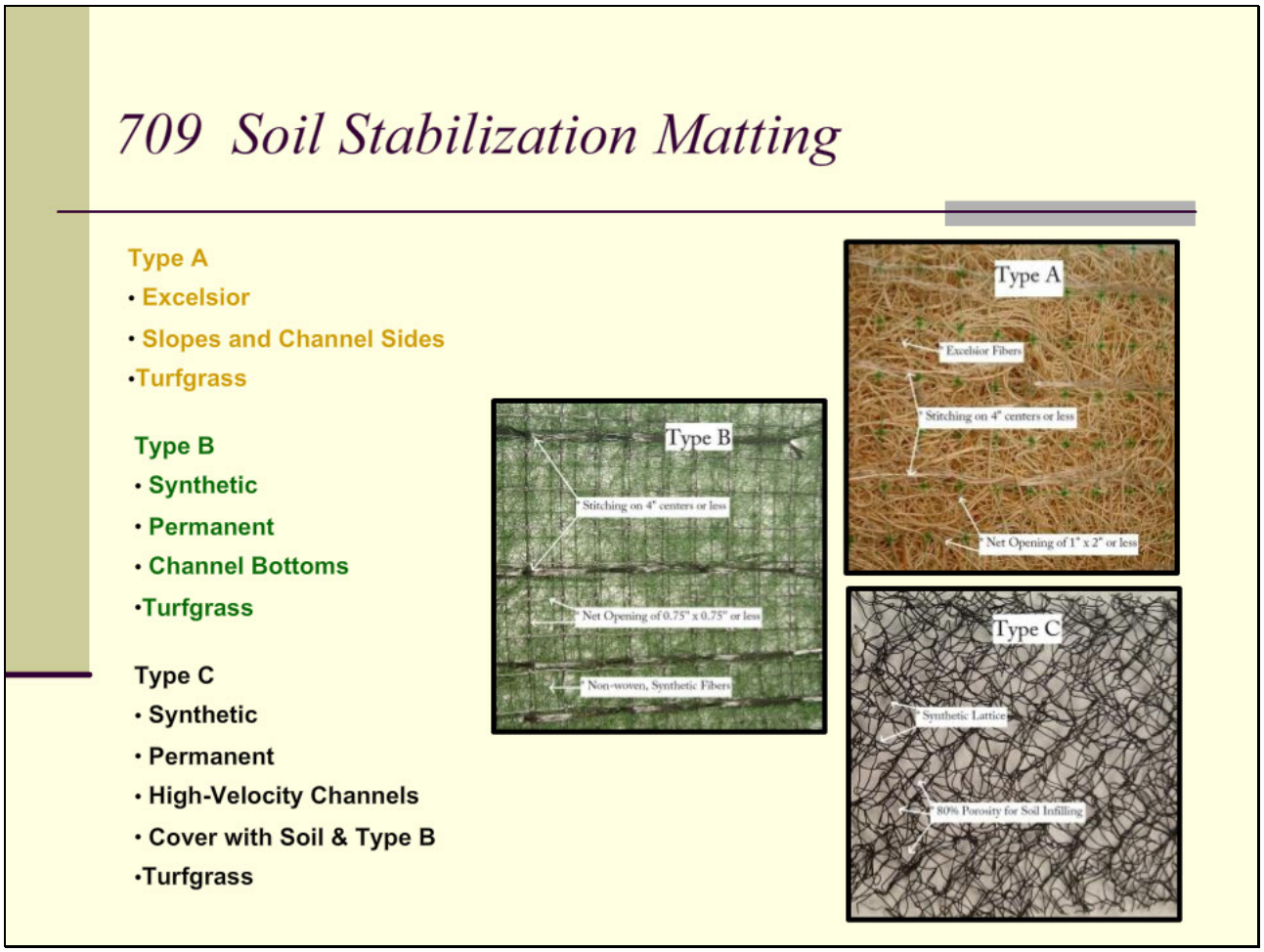
Type C is a synthetic polymer lattice that is used for permanent root zone reinforcement in channels and slopes.

Type D is a woven mat made of coconut fiber. Type D is used in natural areas.

Type E is a lightweight mat made of straw, or straw and coconut fiber, or even lightweight excelsior. Type E is only used in flat or mildly sloping areas. It may be used as a substitute for straw plus wood cellulose fiber tackifier.

Notes

Slide 30 - 709 Soil Stabilization Matting



Slide notes

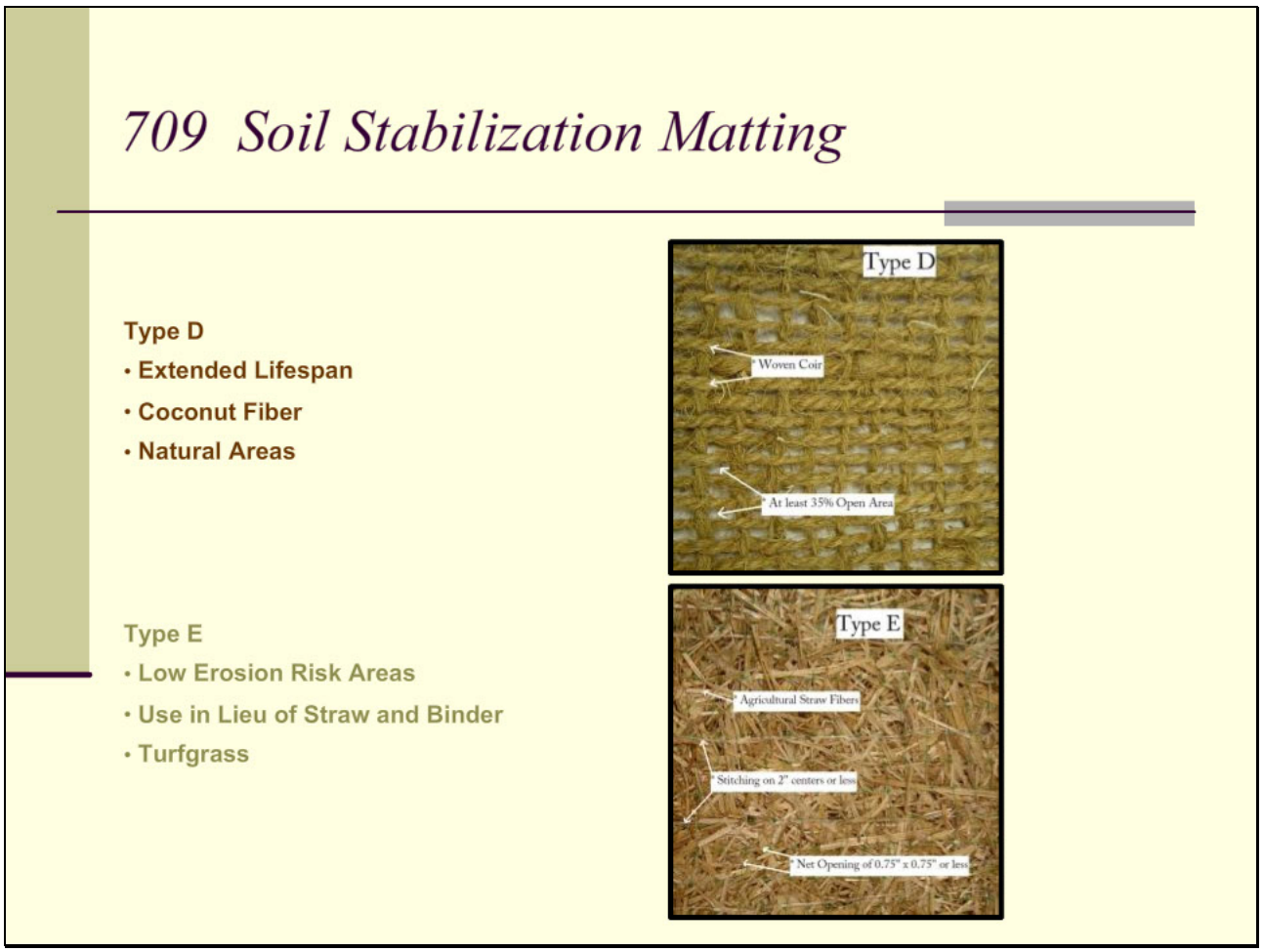
Type A is degradable, used on slopes and channels with Turfgrass Establishment where straw mulch would not be stable.

Type B is synthetic, used in channels and slopes with Turfgrass Establishment where permanent reinforcement is needed.

Type C is synthetic, used in high velocity channels and slopes for permanent reinforcement of Turfgrass Establishment.

Notes

Slide 31 - 709 Soil Stabilization Matting



Slide notes

Type D is woven coconut fiber, used with Meadow Establishment, Liev Stakes, and Plugs (not turf). This degradable mat is installed in stormwater management ponds, along stream banks and wetlands.

Type E is lightweight, degradable, used with Turfgrass Establishment in flat areas. This mat is installed in areas as specified, or in lieu of Straw plus tackifier when approved by the project Engineer.

Notes

Slide 32 - 709 Soil Stabilization Matting

709 Soil Stabilization Matting

- ✓ Remove debris and grade soil
- ✓ Don't install over debris or weeds
- ✓ Seedlings won't grow through tented areas
- ✓ Use fasteners approved for matting
- ✓ Make sure edges are secure
- ✓ Soil smoothness is critical for Type B and C

Install SSM with Approved Fasteners

Type A, B, D, and E
- Share many aspects of installation
- Install over prepared and seeded soil

Type C is a 'sandwich'
- Install over soil, then "infill" with soil
- Apply seed or specified cover

FASTENER SELECTION

MATTING TYPE	FASTENER SHAPE	APPROVED FASTENERS			
		6 in. Length	8 in. Length	12 in. Length	18 in. Length
A and E	U-Shaped Staple	X	X		
	Circle-Top Pin	X	X		
	Round Head Pin	X	X		
	T-Head Pin	X			
	Wood Peg	X			
B, C, D	U-Shaped Staple		X	X	
	Fabric Pin			X	X

FASTENER PLACEMENT

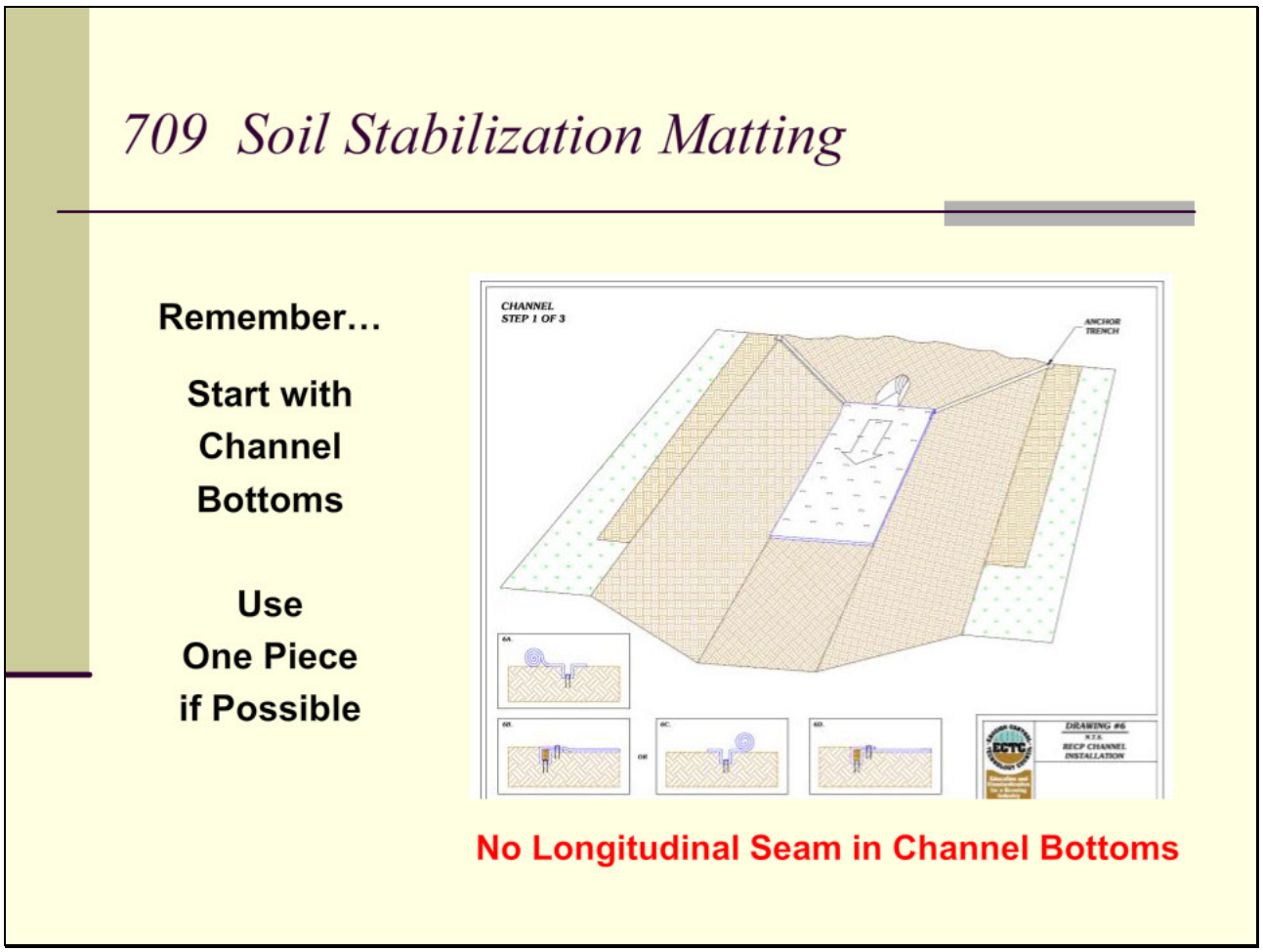
MATTING TYPE	AREA OF MATTING	MAXIMUM DISTANCE BETWEEN FASTENERS In.
A, B, C, D	Uppermost or Leading-Edge of Matting	6
A, B, C, D, E	Overlapping Edges of Matting	18
A, B, C, D	Center of channel/ditch	18
A, B, C, D	Lowermost or Toe-Edge of Matting	18
A, B, C, D, E	Throughout Matting	24
B	In Folds Every 40 to 45 ft	12
C	In Folds Every 20 to 25 ft	12

Slide notes

Ensuring the fabric is tight to the ground is very important. Remove anything that may cause the material to tent and fasten with the approved staples.

Notes

Slide 33 - 709 Soil Stabilization Matting



Slide notes

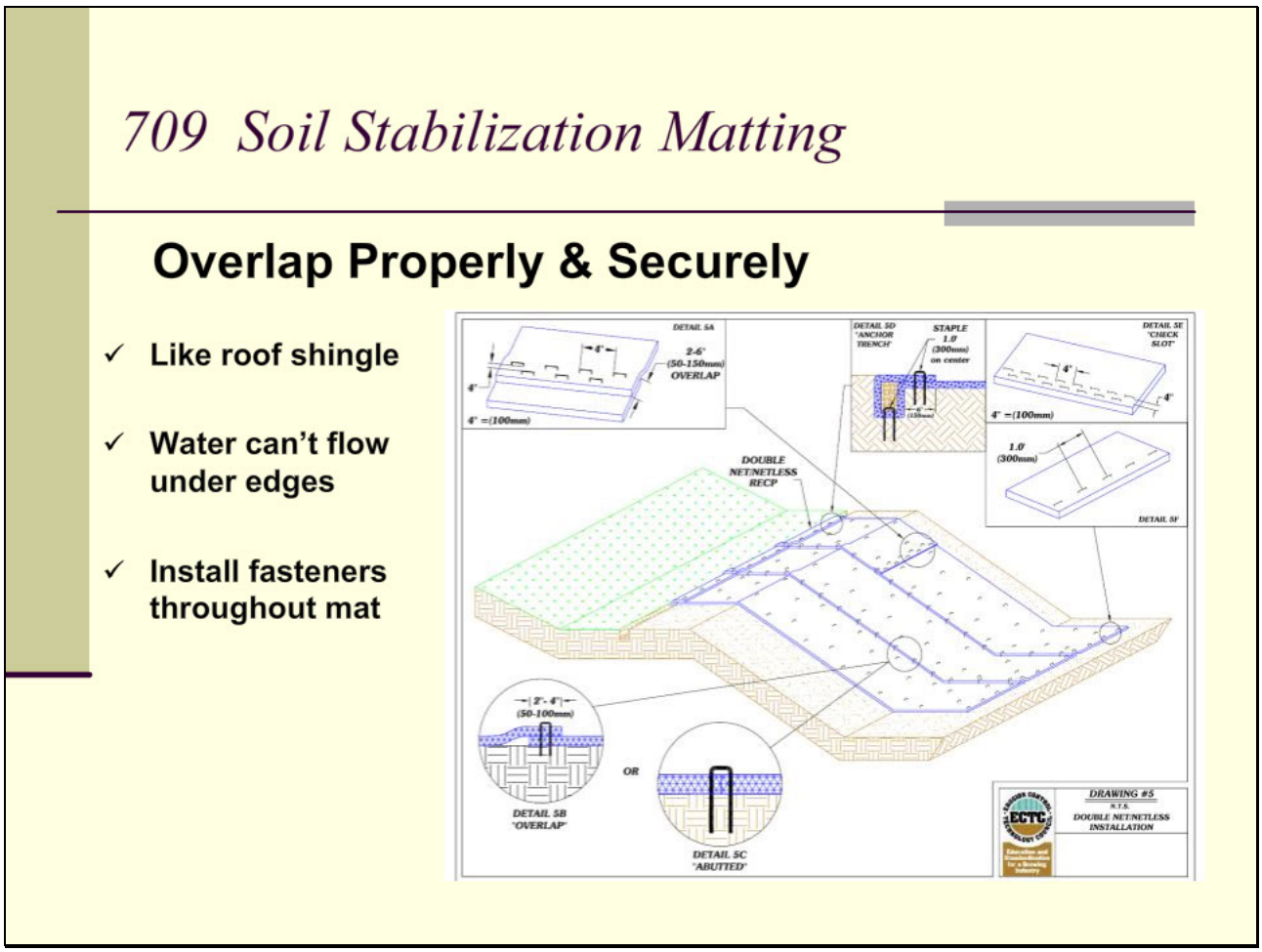
When installing soil stabilization matting, be sure to install the matting in channel bottoms first. Use one piece of matting when possible.

If you must use more than one piece of matting, be sure to avoid installing a longitudinal seam in channel bottoms.

A longitudinal seam that runs down the channel is very vulnerable to blow out.

Notes

Slide 34 - 709 Soil Stabilization Matting



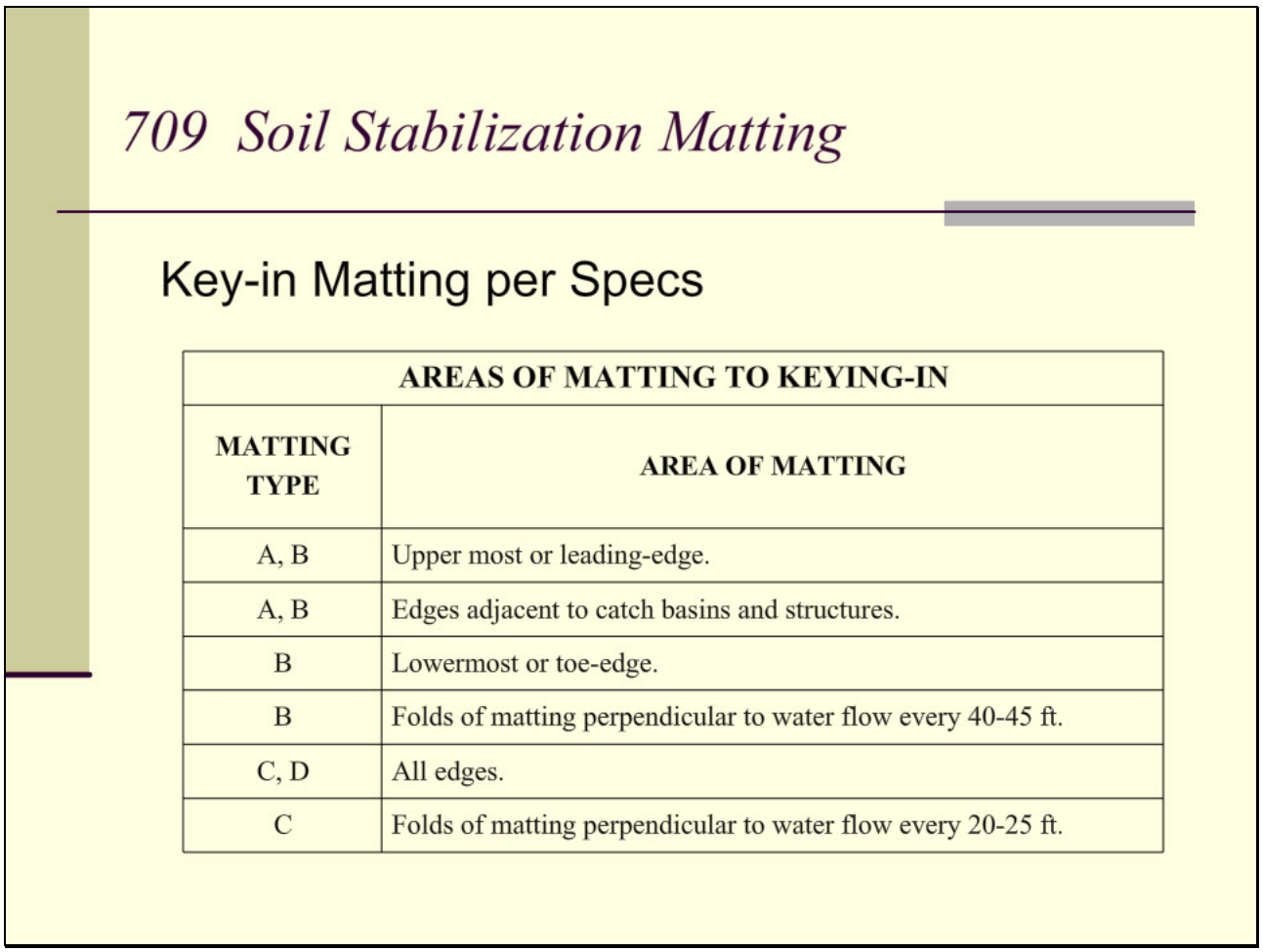
Slide notes

When channel bottoms cant be covered with one piece of matting, then the matting must be installed across the channel and overlapped like roof shingle. This method requires more time and effort, but is much more secure.

Always overlap securely so water can't flow under edges.

Notes

Slide 35 - 709 Soil Stabilization Matting



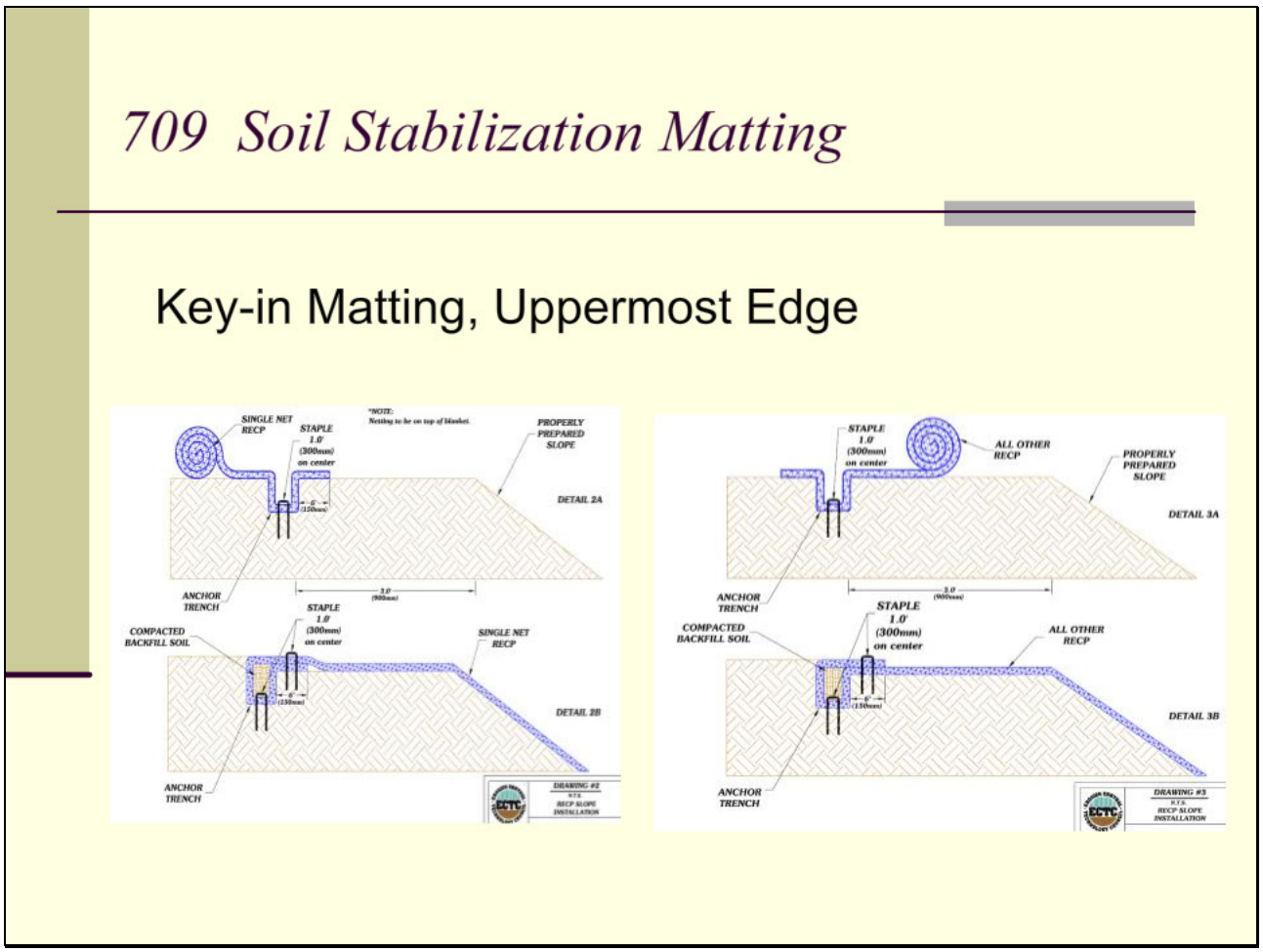
Slide notes

The 2008 Specifications require that certain edges of soil stabilization matting be keyed in.

Keying in is the process of fastening an edge of the matting in a 6 inch deep trench into the soil.

Notes

Slide 36 - 709 Soil Stabilization Matting



Slide notes

The uppermost edge of all mats except Type E are keyed in.

The lowermost edge of Type B is also keyed in.

All edges of Type C and D matting are keyed in.

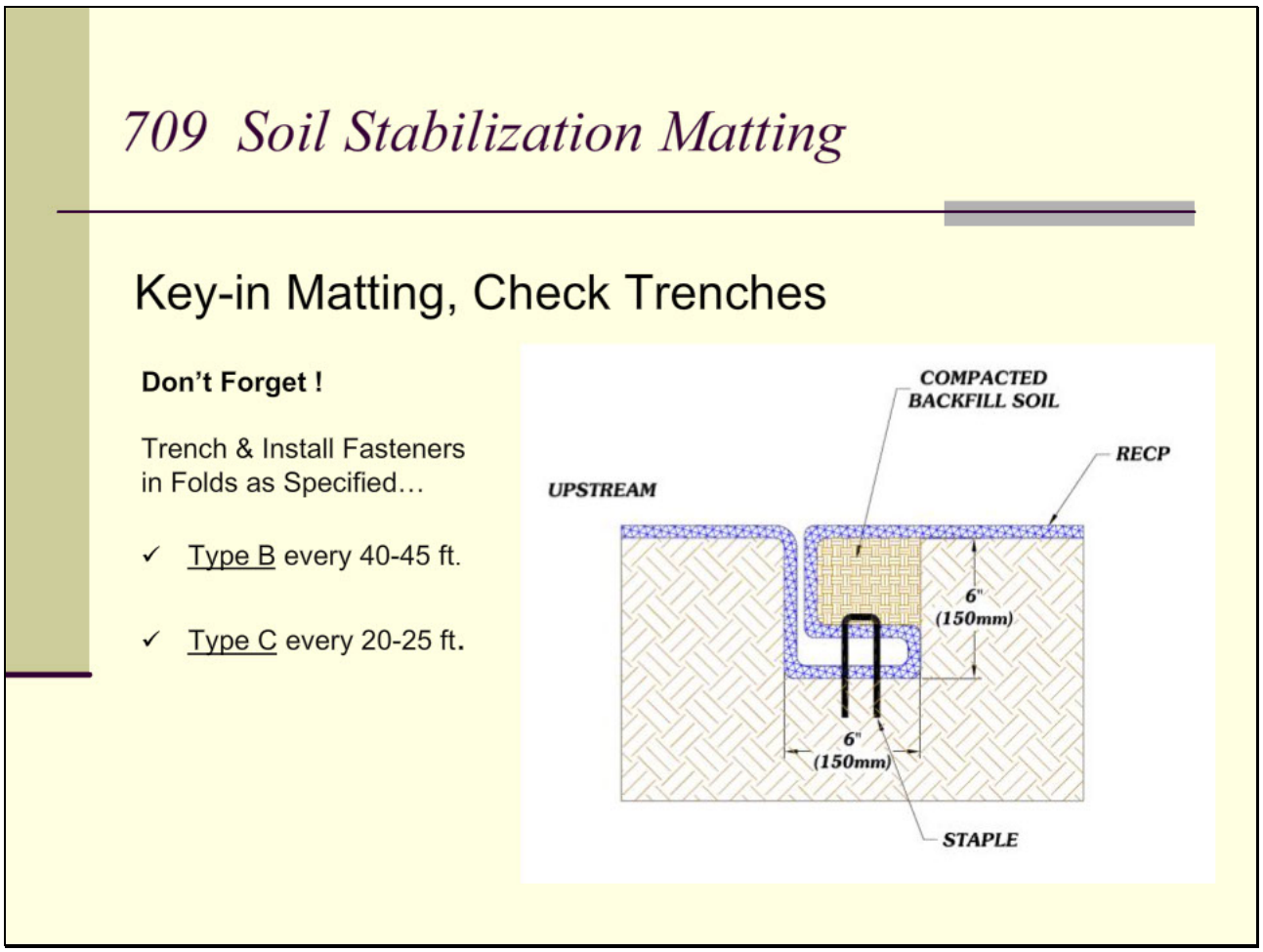
Please examine the diagrams carefully. There are two ways to do it.

The method on the left involves rolling the mat over the keyed in area. The method on the right involves securing a flap of matting over the keyed in area.

In both cases, it is difficult for water to run under the edge of the matting, and because the edge is buried it is also very difficult for the matting to be pulled out of the soil.

Notes

Slide 37 - 709 Soil Stabilization Matting



Slide notes

Both Type B and Type C matting must be installed with check trenches.

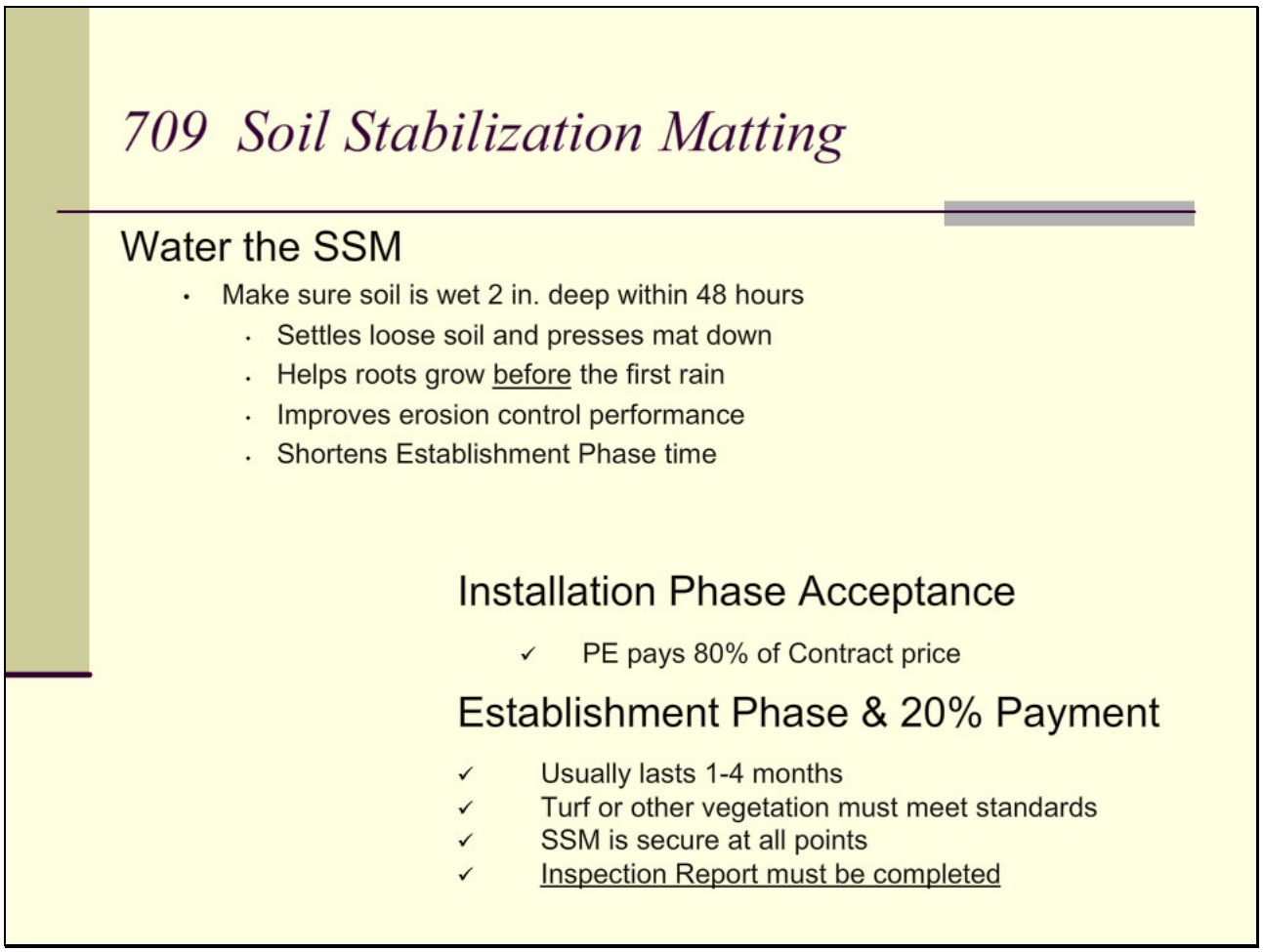
Check trenches provide additional erosion protection for permanent synthetic mattings installed across the channel bottom.

For Type B the check trench must be installed every 40 to 45 feet.

For Type C the check trench must be installed every 20 to 25 feet.

Notes

Slide 38 - 709 Soil Stabilization Matting



Slide notes

Watering the newly matted area is critical to successful establishment.

For soil stabilization matting, the Installation Phase Acceptance receives 80% Payment, and the Final Acceptance receives 20% Payment of the contract price.

The Landscape Operations Division and project Engineer will complete the Inspection Report for Final Acceptance.

Notes

Slide 39 - End

Slide notes

This concludes the vegetation establishment portion of the training. Please select the next module to continue the training

Notes