

Arizona Department of Transportation Guidelines for Highways on Bureau of Land Management and U.S. Forest Service Lands 2008



Chapter Overview Presentations

Twelve Chapter Overview presentations supplement the Guidelines document. Chapters 1-11 each have a Chapter Overview and an additional one summarizes appendices A-O.

These self-paced presentations are designed for individual use or for small group presentations where discussion can be accommodated. It is helpful to have the Guidelines document as a reference when viewing the presentations.

The Chapter Overview presentations are available on the ADOT Roadside Development Section website.

<http://www.azdot.gov/business/engineering-and-construction/roadway-engineering/roadway-design-standards-and-guidelines/guidelines-for-highways-on-bureau-of-land-management-and-us-forest-service-lands>

Navigate the Chapter Overview by scrolling through the pages.



Arizona Department of Transportation Guidelines for Highways on Bureau of Land Management and U.S. Forest Service Lands 2008

Chapter 7: Landscape Restoration



Acknowledgments:



Arizona Department of Transportation

**Guidelines for Highways
on
Bureau of Land Management and
U.S. Forest Service Lands**



Steering Committee Members & Contributors

ADOT Members:

LeRoy Brady
Richard Duarte*
Doug Forstie
John Louis*
Mary Viharina
Todd Williams

Contributors:

Thor Anderson
Nicole A. Carpenter
Lonnie Hendrix
Paul Langdale
Siobhan Nordhaugen



FHWA Members:

Ken Davis
Steve Thomas

Contributors:

Layne Patton



BLM

Members:

Carol Kershaw*
Angela Mogel

Contributors:

John Reid



USFS

Members:

Marjorie Apodaca
Mathew O'Grady*
Bill Woodward*

Contributors:

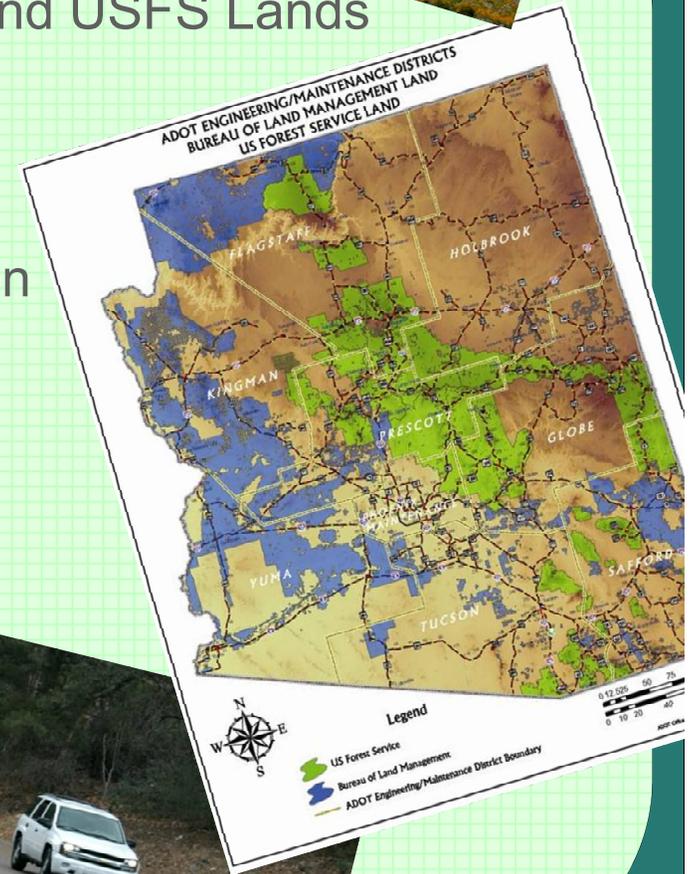
Terry Brennan
Rob Ingram

* Past Member

Guidelines Contents



- 1 Introduction
 - 2 ADOT Development Process on BLM and USFS Lands
 - 3 Habitat Connectivity
 - 4 Roadway Design and Construction
 - 5 Major Structure Design and Construction
 - 6 Drainage Design and Construction
 - 7 Landscape Restoration**
 - 8 Storm Water and Pollution Control
 - 9 Material Sites
 - 10 Construction
 - 11 Maintenance Operations
- Appendices A - O



After reviewing the Chapter 7 Tutorial you should...



- Be able to define landscape restoration.
- Understand the criticality of earthform design in achieving successful reclamation, revegetation and stabilization of disturbed soils.
- Be familiar with slope design considerations.
- Know methods to use to protect existing vegetation.
- Be familiar with vegetation removal or salvage considerations.
- Be able to list appropriate disposal methods for vegetation.
- Know the goals of revegetation.

And you should also...



- Be familiar with these Revegetation Considerations:
 - Slope ratios
 - Topsoil Salvage
 - Slope Finishes
 - Seeding
 - Native Plant Salvage
 - Container-Grown Stock
 - Live Cuttings, Pole Plantings
 - Noxious/Invasive Vegetation
- Know that the application of storm water BMPs must be coordinated with slope construction and revegetation.
- Understand and be able to list successful restoration considerations.
- Be able to access websites for additional information on noxious weeds, ADOT Methodology for Determining Final Stabilization, and Context Sensitive Solutions.

Chapter 7 Contents



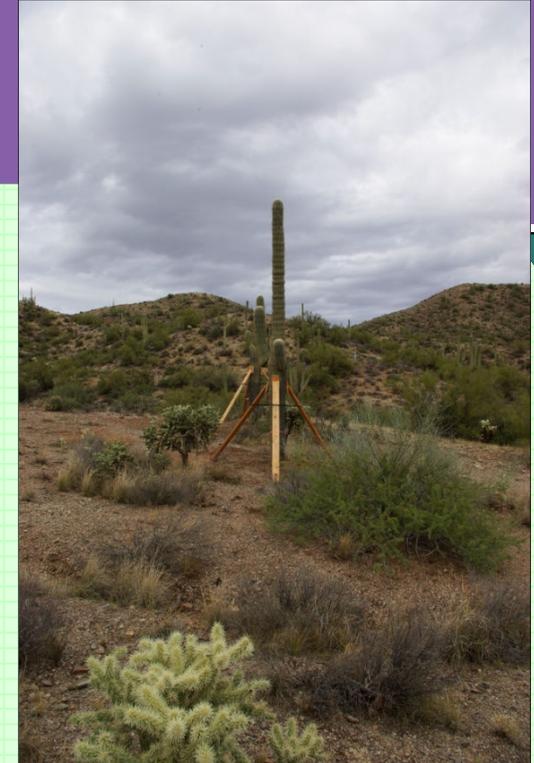
7.1 Chapter Goals

7.2 Scoping and NEPA Processes

7.3 Design

7.4 Construction

7.5 Additional Resources



Landscape Restoration



- Is the integration and blending of the highway facility with the surrounding natural landscape.
- Includes aesthetic considerations in earthform design of slopes, rounding and transitions between cuts and fills.

Reclamation, revegetation and stabilization of disturbed soils for the purposes of erosion control are predicated on successful earthform design.



7.1 Chapter Goals



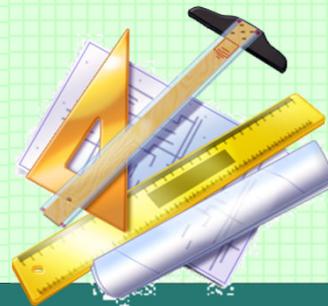
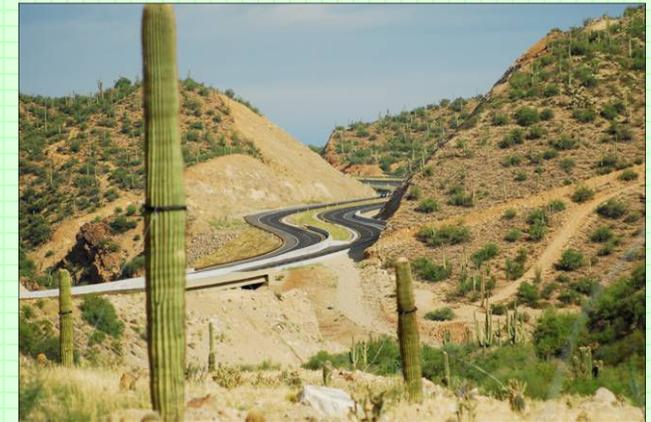
- Describe the issues relating to preservation and restoration of native vegetation that are critical to the visual integration of the highway corridor with the surrounding landscape.
- Define the steps necessary to achieve successful restoration of disturbed soils.



7.2 Scoping and NEPA Processes



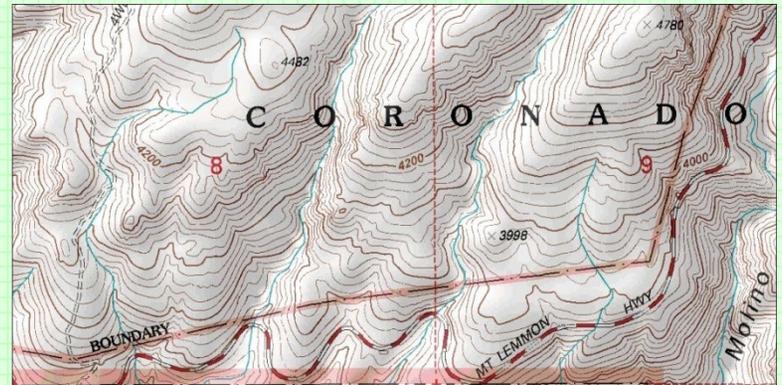
- Successful integration of the highway corridor begins with the Scoping Document and continues through the design and construction process.
- The Document provides preliminary information from which Context Sensitive Solutions are developed and incorporated into the design construction documents.
- These Solutions must be clearly defined to be biddable and constructable.



7.3 Design



- Slope Design Considerations
 - Geotechnical soil and rock stability information
 - Existing topography and natural landforms
 - Revegetation potential and limitations
 - Management of storm water run-off



7.3 Design



- Existing Vegetation

- Protect

- Stake, flag or fence to protect existing vegetation
 - Consider damage penalties in the construction documents
 - Use retaining structures to protect outstanding specimens

- Removal or Salvage Considerations

- Potential root damage
 - Hazard trees
 - Sight distance requirements
 - Diseased or poor condition plants
 - Maintenance access
 - Presence of noxious/invasive species



7.3 Design



- Disposal Methods for Vegetation are typically described in the project contract documents.
 - Noxious plant species must be disposed of such that plants and seeds are not dispersed.
 - Vegetation may be piled and burned and/or burned within an incinerator. **Burning does not kill all seed.**
 - Vegetation may be shredded or chipped for use as mulch on project slopes.
 - Smaller, more easily decomposed leaves, needles and small branches, etc. may be salvaged and stockpiled with salvaged topsoil for redistribution over finished slopes.
 - Vegetation can be buried.

7.3 Design



- Revegetation

The goal of revegetation is to stabilize disturbed soils against erosion, reduce sedimentation and improve visual quality.

- Revegetation Considerations

- Slope ratios
- Slope Finishes
 - Mini-Benching
 - Slope Roughening
 - Tillage as slope is constructed



7.3 Design



- Revegetation Considerations

- Seeding

- Fertilizers and soil amendments
 - Seed mixes
 - Seed application rates and techniques
 - Mulches
 - Tackifiers
 - Mobilization
 - NOT requirements



7.3 Design



- Revegetation Considerations (continued)
 - Native Plant Salvage
 - Container-Grown Stock
 - Live Cuttings and Pole Plantings
 - Noxious and Invasive Vegetation
- Existing Boulders
 - Salvage for reuse



7.4 Construction



- Application of storm water BMPs must be coordinated with slope construction and revegetation.
- Successful restoration considerations
 - Condition of the finished grade (compacted/loose, crusted/friable)
 - Timing of seed applications
 - Inspection of seed mixes, tackifiers and composts
 - Review of proper seed application techniques



7.5 Additional Resources



- ADOT Roadside Development Section
<http://www.azdot.gov/business/engineering-and-construction/roadway-engineering/roadside-development>
- ADOT Stored Specifications
<http://www.azdot.gov/business/ContractsandSpecifications/Specifications>
- ADOT Methodology for Determining Final Stabilization
[http://www.azdot.gov/docs/default-source/roadway-engineering-library/methodology-for-determining-final-stabilization-\(not-criteria\).pdf?sfvrsn=2](http://www.azdot.gov/docs/default-source/roadway-engineering-library/methodology-for-determining-final-stabilization-(not-criteria).pdf?sfvrsn=2)
- Visual Impact Assessment for Highway Projects
<http://contextsensitivesolutions.org/content/reading/visual-impact-2/?>
- ADOT Erosion and Pollution Control Manual
<http://www.azdot.gov/business/engineering-and-construction/roadway-engineering/roadside-development/erosion-and-pollution-control-manual>
- State Noxious Weed List (R3-4-244 and R3-4- 245)
http://http://www.azsos.gov/public_services/Title_03/3-04.htm

7.5 Additional Resources



- Federal Noxious Weed List
<http://plants.usda.gov/java/noxious?rptType=Federal>
- Executive Order 13112
<http://www.invasivespeciesinfo.gov/laws/execorder.shtml>

Highlights



- Read Chapter 7.....
 - For an overview of preserving existing native vegetation to integrate the highway corridor with the surrounding landscape.
 - To understand considerations for salvage of existing vegetation.
 - For detailed information on revegetation considerations and the steps necessary to achieve successful restoration of disturbed soils.



Knowledge Check: Do you.....



- ✓ Know the definition of landscape restoration?
- ✓ Understand the criticality of earthform design in achieving successful reclamation, revegetation and stabilization of disturbed soils?
- ✓ Understand slope design considerations?
- ✓ Know methods to use to protect existing vegetation?
- ✓ Have an understanding of vegetation removal or salvage considerations?
- ✓ Know appropriate disposal methods for vegetation?
- ✓ Know the goals of revegetation?

And do you.....

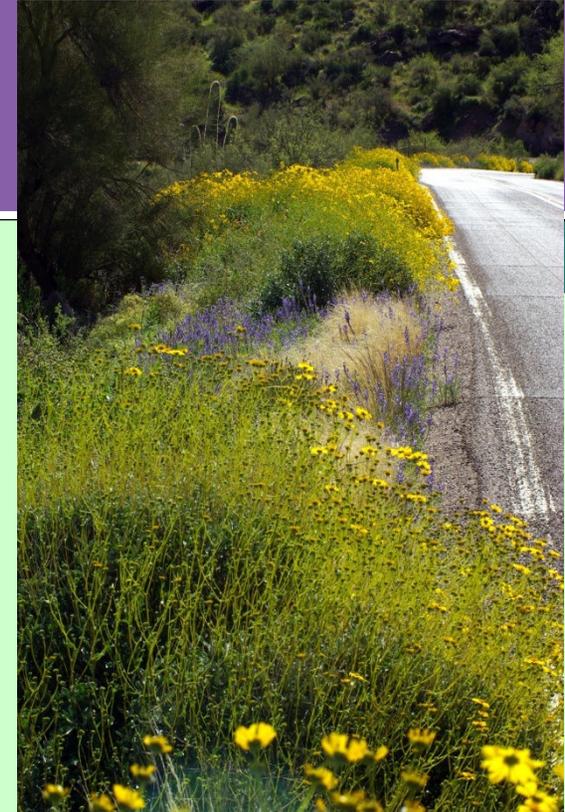


- ✓ Understand these Revegetation Considerations:
 - ✓ Slope ratios
 - ✓ Topsoil Salvage
 - ✓ Slope Finishes
 - ✓ Seeding
 - ✓ Native Plant Salvage
 - ✓ Container-Grown Stock
 - ✓ Live Cuttings, Pole Plantings
 - ✓ Noxious/Invasive Vegetation
- ✓ Know that the application of storm water BMPs must be coordinated with slope construction and revegetation?
- ✓ Understand successful restoration considerations?
- ✓ Know how to access websites for additional information on noxious weeds, ADOT Methodology for Determining Final Stabilization and Context Sensitive Solutions?

Guidelines Appendices



- Acronyms and Abbreviations
- Glossary of Terms
- ADOT-FHWA-USFS MOU
- ADOT-FHWA-BLM MOU
- Slope Design Details
- Easement Development
- Section 106 Process on Forest Service Lands
- Typical Blasting Plan Content
- Comparison of Permit Processes for Material Sites
- Signing
- Project Reference Fact Sheet
- Native Plant Salvage & Replanting Evaluation Guidelines
- References and Photography Credits
- Additional Photos (online appendix)
- Document Revision History



Document Availability



Purchase from:
ADOT Engineering Records Section
1655 W. Jackson Room 175
Mail Drop 112F
Phoenix, Arizona 85007-3217
Telephone: 602-712-8216 or 712-7498
Fax: 602-712-3235

For availability and cost:
[http://www.azdot.gov/business/Contracts
andSpecifications](http://www.azdot.gov/business/ContractsandSpecifications)

Download from:
[http://www.azdot.gov/business/engineering-and-construction/roadway-
engineering/roadway-design-standards-and-guidelines/guidelines-for-
highways-on-bureau-of-land-management-and-us-forest-service-lands](http://www.azdot.gov/business/engineering-and-construction/roadway-engineering/roadway-design-standards-and-guidelines/guidelines-for-highways-on-bureau-of-land-management-and-us-forest-service-lands)

Arizona Department of Transportation

**Guidelines for Highways
on
Bureau of Land Management and
U.S. Forest Service Lands**



