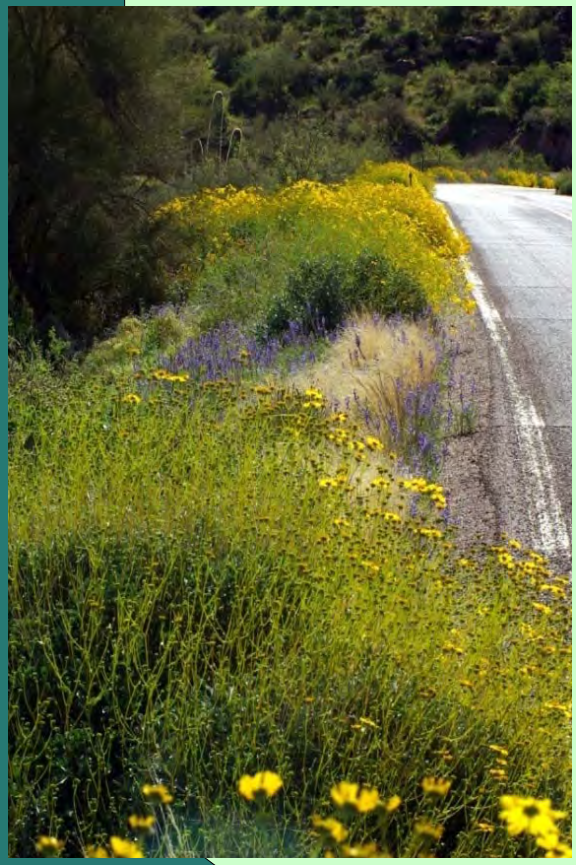
Arizona Department of Transportation

Roadway Group

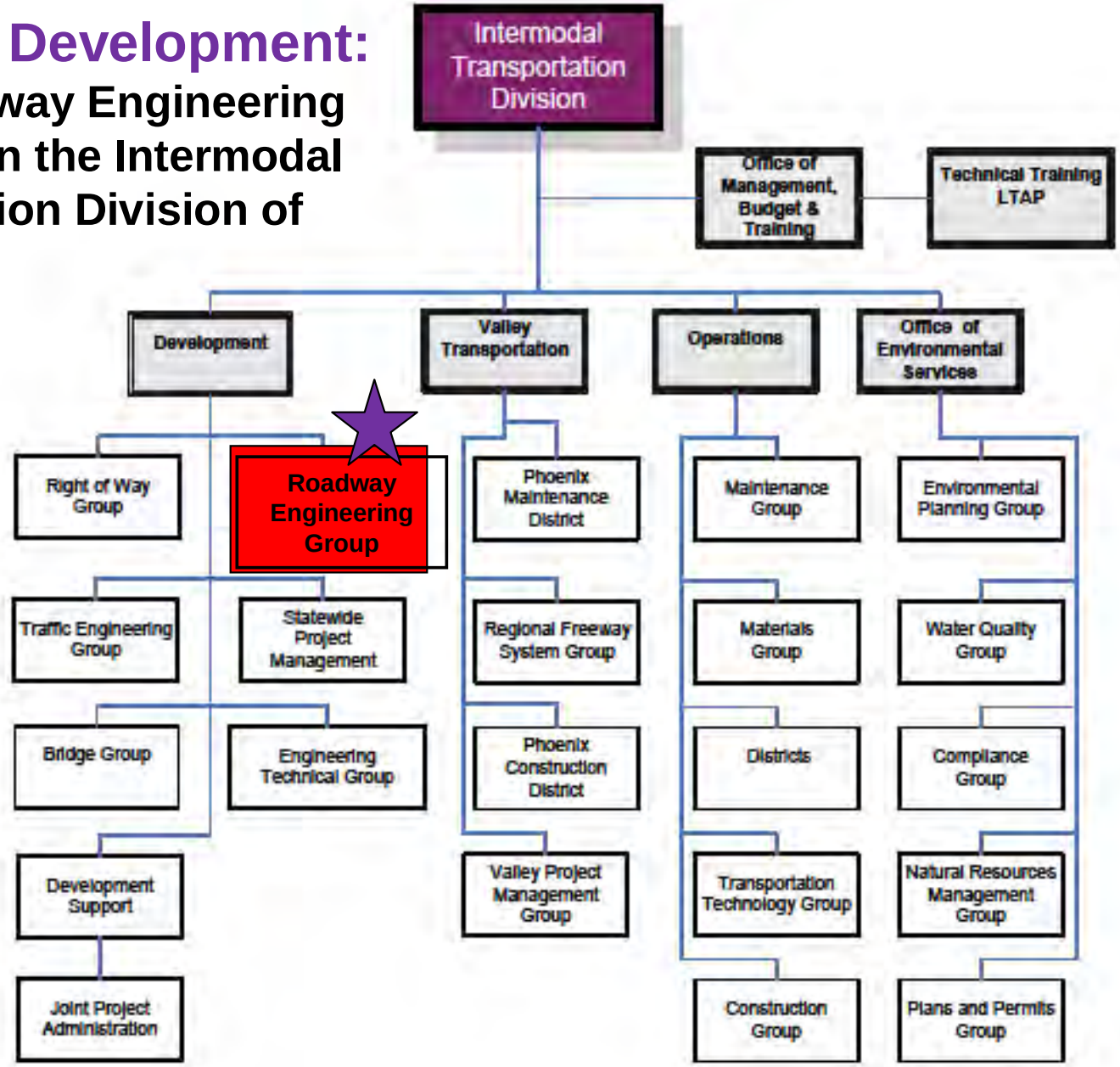
Roadside Development Section



For Educational Use Only

ADOT Intermodal Transportation Division

Roadside Development:
in the Roadway Engineering Group within the Intermodal Transportation Division of ADOT.



Roadway Engineering Group

Contact Us

Roadway Engineering Group

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Roadside Development Section

Roadside Development

Personnel

Areas of Responsibility	Name	Phone
Arizona Parkways, Historic & Scenic Roads Advisory Committee	LeRoy Brady	602.712.7357
Erosion/Sediment Control Design, Pollution Prevention, and	LeRoy Brady	602.712.7357
Water Quality Protection	Tao Fong	602.712.8476
Landscape Architectural Environmental Design and Planning	Joseph R. Salazar	602.712.7077
	Han Meng	602.712.8626
Revegetation and Native Seed Mix Design, Environmental	LeRoy Brady	602.712.7357
Mitigation and Landscape Ecological Design, Native Plant	Tao Fong	602.712.8476
Salvage and Replanting	Han Meng	602.712.8626
Statewide Rest Area Design	LeRoy Brady	602.712.7357
Xeriscape/Smartscape and DesertWise Landscape Architectural	LeRoy Brady	602.712.7357
Irrigation Design	Joseph R. Salazar	602.712.7077
	Tao Fong	602.712.8476

Mission Statement

Roadside Development provides landscape architectural and environmental technical design direction and expertise for Arizona Department of Transportation projects statewide.

Technical direction and expertise include development of plans and specifications and review of consultant plans involving:

- **aesthetic enhancements and design**
- **environmental mitigation and landscape ecological restoration**
- **stormwater quality and erosion/sediment control**
- **seeding and revegetation**
- **native plant salvage and replanting**
- **landscape and irrigation design**
- **as well as statewide rest area program and design**

Landscape Architecture Practice and Design

450 Landscape Architectural Practice and Design

From ADOT Statewide Dictionary of Standardized Work Tasks

http://www.azdot.gov/Highways/SWProjMgmt/PDF/DictionaryStandardTasks.pdf

A. The Landscape Architect shall be responsible for performance of professional services such as **investigation, reconnaissance, research, planning, design or responsible supervision** in connection with the development of land and incidental water areas where the dominant purpose of such services is the **preservation, landscape ecological restoration, enhancement** of proper land uses, natural land features ground cover and planting, naturalistic and aesthetic values, the settings and approaches to building, structures, facilities or other improvements, natural drainage and the consideration and the determination of inherent problems of the land relating to erosion wear and tear, light or other hazards.

Landscape Architecture Practice and Design

450 Landscape Architectural Practice and Design
Continued

B. Landscape Architecture services to accomplish the above mentioned may result in the preparation of the following work products:

- Reports for Site Analysis and Planning
- Visual Analysis
- Resource Planning Inventory and Evaluation
- Research Information and Documentation
- Design and Construction Documents
- Specifications
- Constructability Reviews
- Post Design and Responsible Construction Supervision

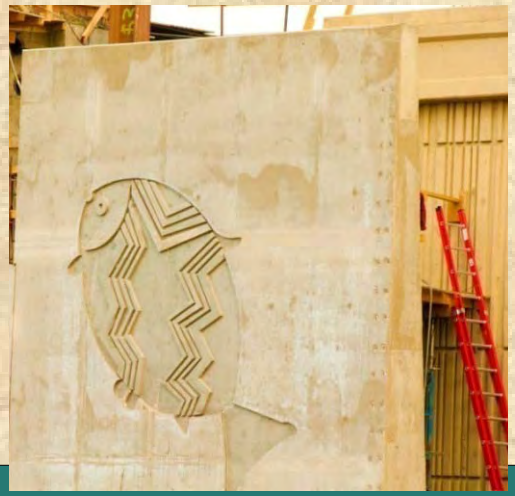
Landscape Architecture Practice and Design

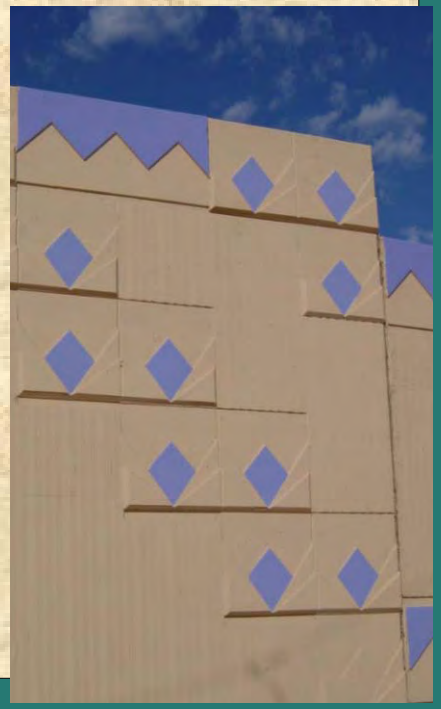
450 Landscape Architectural Practice and Design
Continued

C. Investigation, Reconnaissance Research, Planning, Design and Responsible Supervision Work may include but not be limited to:

- Aesthetic evaluations and Visual Quality & Impact Analysis
- Design of Structure and Wall Aesthetic Treatments
- Landscape & Irrigation Systems, when possible Sustainable Design
- Landform Grading & Graphics
- Water Conservation Measures, Audits; Water Harvesting
- Landscape Ecological Planning - Resource Conservation & Protection
- Habitat Mitigation and Restoration
- Reclamation and Revegetation
- Native Plant Inventory, Salvage, Replanting & Establishment
- Noxious Weed and Invasive Non-native Plant Control
- BMPs for Erosion/Sediment Control, Water Quality Protection
- Design Construction Plans, Documents, Specifications & Estimates

Aesthetic Enhancements and Design





Aesthetic Enhancements and Design

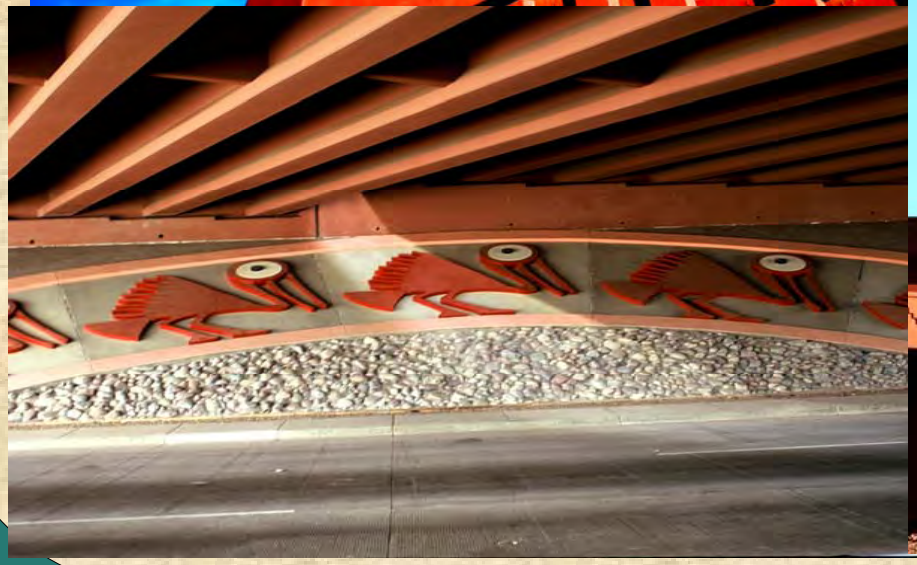
Aesthetic Enhancement Design/Construction Guidelines

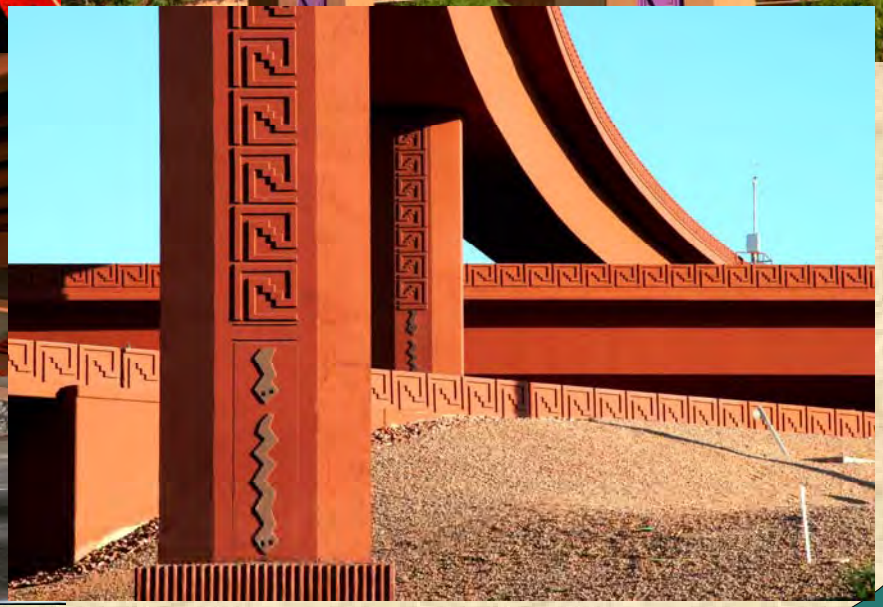
Corridor themes are defined for the ADOT regional freeway systems. Local communities desiring aesthetic enhancements to these established themes shall comply with the following aesthetic design guidelines for consideration of development and incorporation of local community aesthetic enhancements along with the ADOT corridor architectural design patterns.

Guideline topics include:

- Funding
- Design Concepts and Design
- Review Process
- Color Palettes
- Maintenance Responsibility
- Approval Sequence
- Bid Items
- Artist Copyright
- Rendering and Mockups
- Cost Estimating

Aesthetic Enhancements and Design

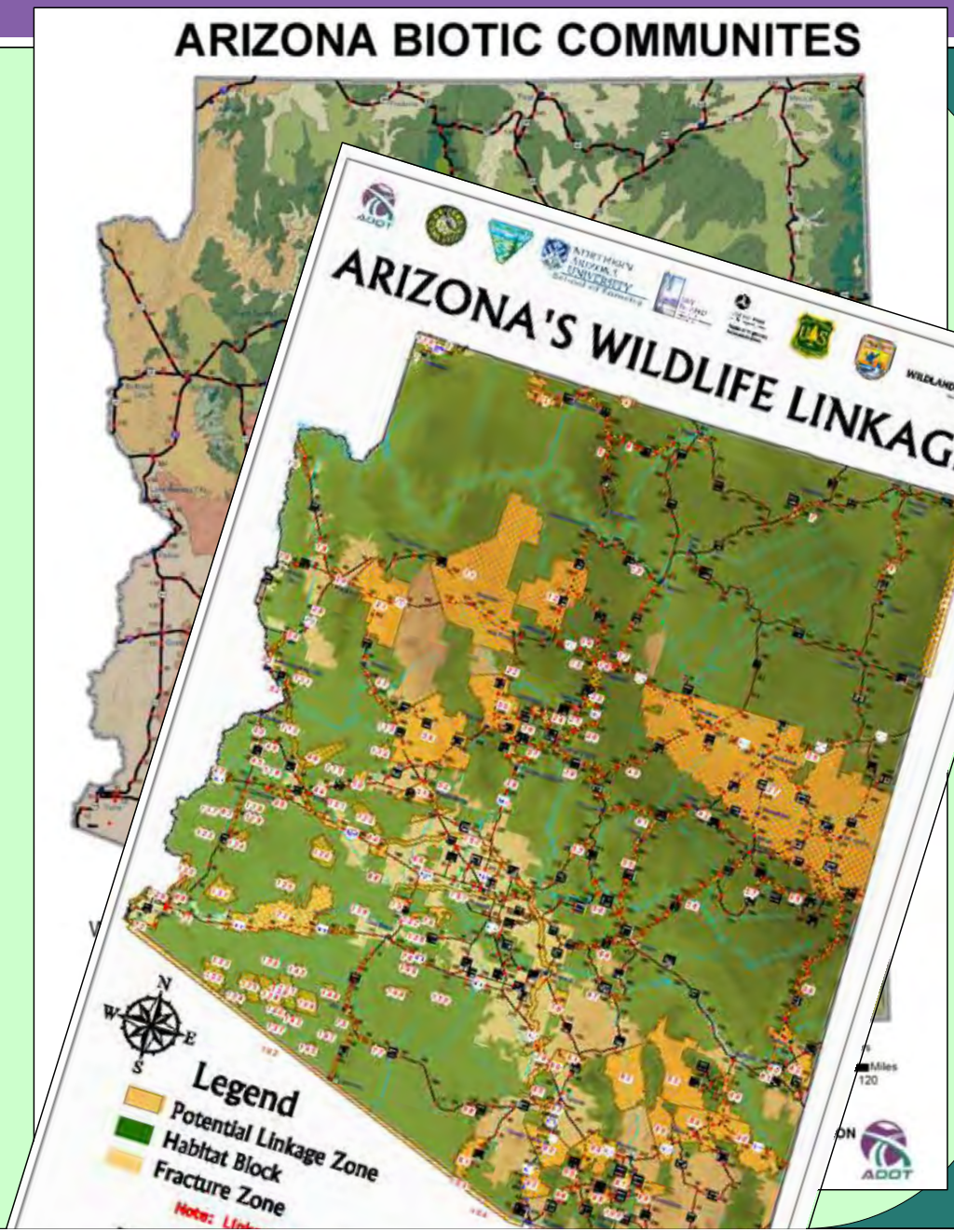




Environmental Mitigation & Landscape Ecological Restoration

Environmental Mitigation

- Restoration of degraded habitat.
- Restoration of damaged wildlife corridors (i.e. riparian areas).
- Combination of techniques to improve connectivity among isolated habitat patches.

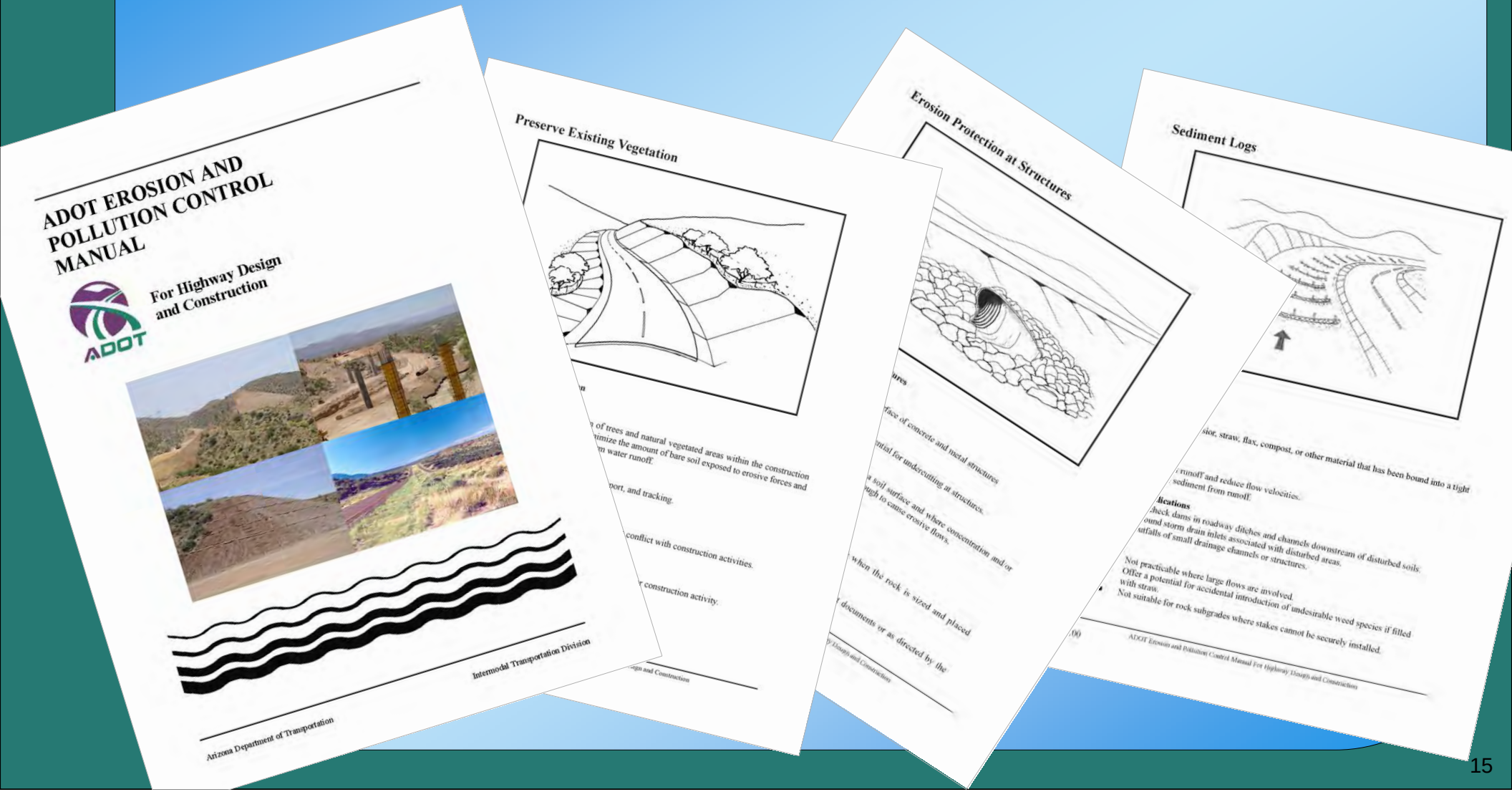


Environmental Mitigation & Landscape Ecological Restoration

Environmental Mitigation & Landscape Ecological Restoration

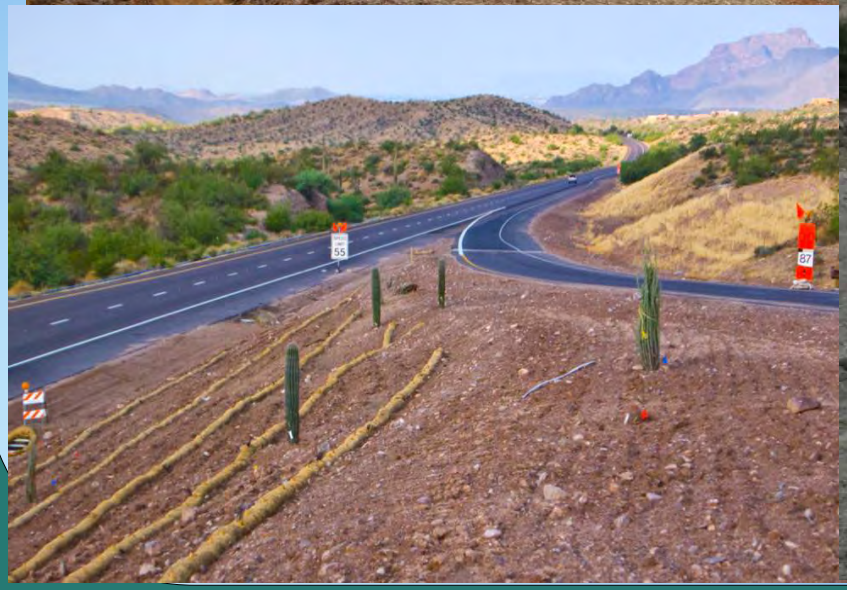
Stormwater Quality & Erosion/Sediment Control

ADOT Erosion and Pollution Control Manual



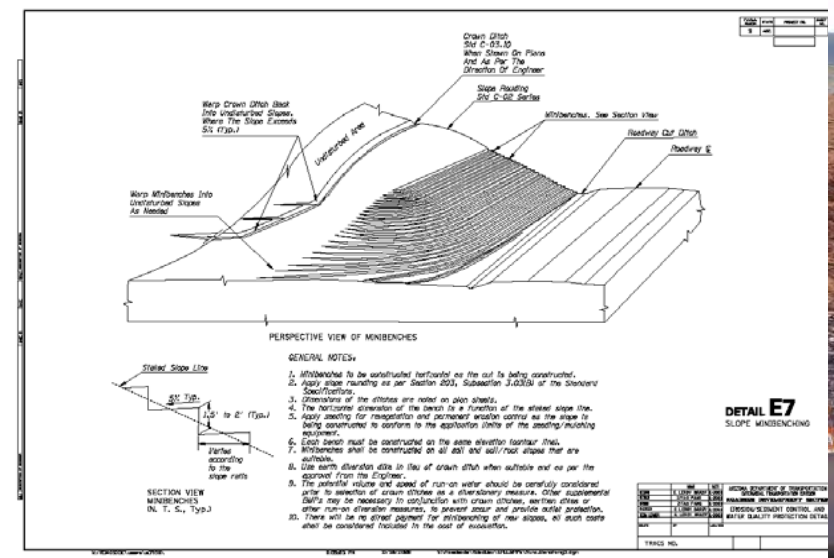
Stormwater Quality & Erosion/Sediment Control

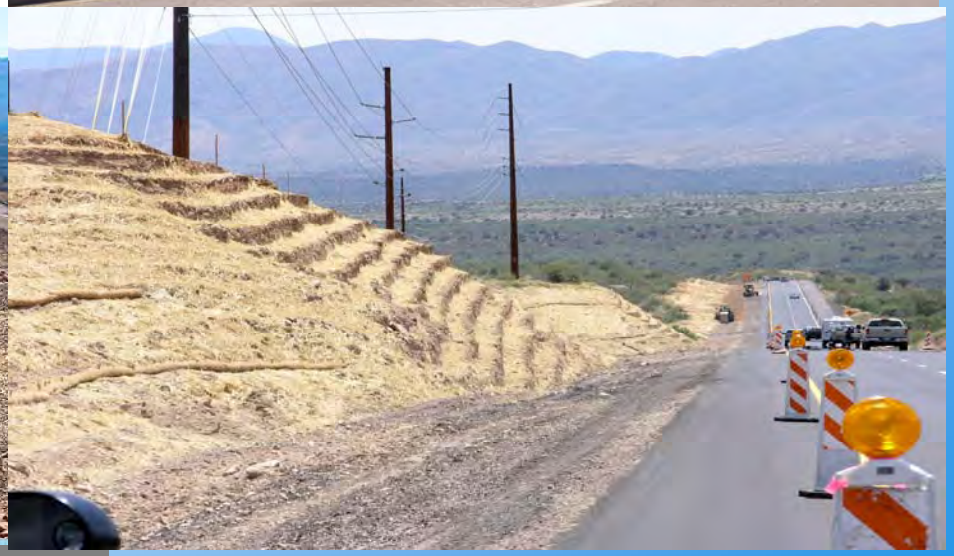
Stormwater Quality & Erosion/Sediment Control



Stormwater Quality & Erosion/Sediment Control

Mini-Benching BMP Detail



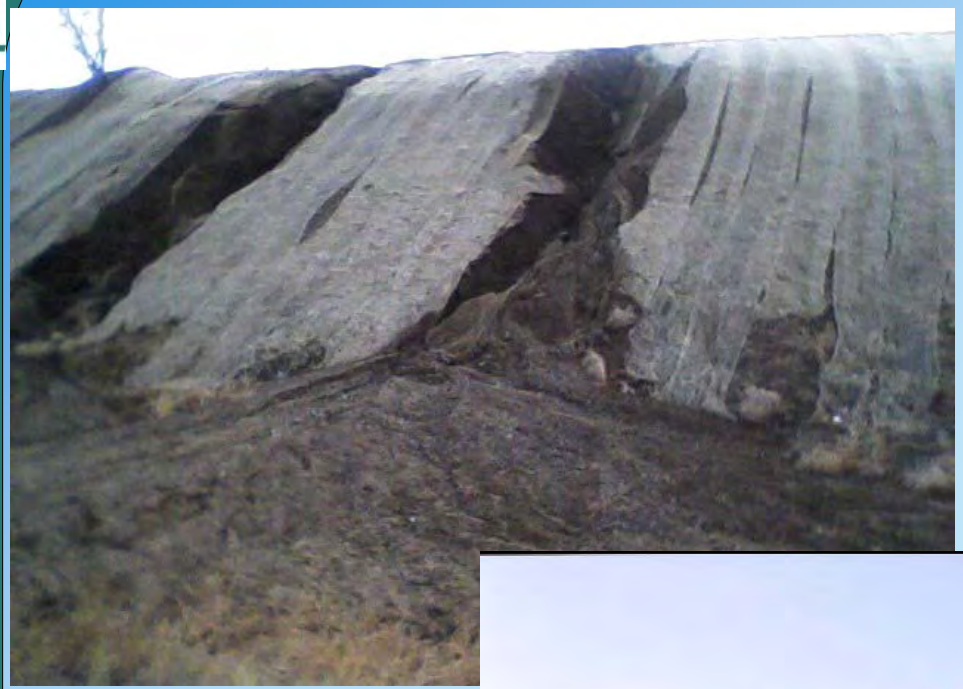


Stormwater Quality & Erosion/Sediment Control

Unbenched Slopes
VS
Benched Slopes

Stormwater Quality & Erosion/Sediment Control

Limitations of Erosion Control Blankets



Stormwater Quality & Erosion/Sediment Control

ADOT Post-Construction Best Management Practices Manual for Highway Design and Construction

Stormwater Quality & Erosion/Sediment Control

Comply with requirements for control of storm water quality as described in the National Pollution Discharge Elimination System (NPDES) and the Arizona Pollution Discharge Elimination System (AZPDES).

Employ Best Management Practices (BMPs).

- Construction (Temporary)
- Post-Construction (Permanent)

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.

Landscape Restoration

Design Considerations

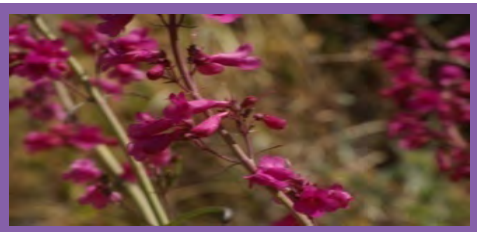
- Slopes
- Existing Vegetation
- Revegetation
  - Topsoil Salvage
  - Slope Finishes
  - Native Plant Salvage
  - Container-Grown Stock
  - Noxious and Invasive Vegetation
- Existing Boulders
  - Salvage for reuse

Landscape Restoration

Successful Restoration Considerations:

- Condition of the finished grade (compacted/loose, crusted/friable)
- Timing of seed applications
- Inspection of fertilizer, compost, mulch, tackifier and seed mixes
- Adherence to proper seed application techniques

Seeding & Revegetation



Specification:

Item 8050003- SEEDING (CLASS II)

(805SEED, 07/27/05)

ITEM 8050003 - SEEDING (CLASS II):

1.0 Description:

The work under this item shall consist of furnishing all materials, preparing the soil, applying Class II seed, and establishing the seeded areas.

Areas to be seeded are those disturbed or unvegetated areas listed herein, shown on the plans, called for in the contractor's erosion control plan, or designated by the Engineer.

Seeding may be included as part of a landscape project as specified in Section 807, or used for erosion control as part of a Storm Water Pollution Prevention Plan (SWPPP) as specified in Subsection 104.09 of the specifications, or both.

In either case, seeding shall be accomplished in two stages. The first stage shall consist of tillage, furnishing and applying chemical fertilizer, furnishing and planting the contract-specified seed mix, and furnishing, applying and affixing mulch. The second stage, beginning after the first stage has been accepted by the Engineer, shall be a 45 calendar-day period during wh ch time the contractor shall be responsible for maintaining and stabilizing the seeded and mulched areas, and restoring damaged or eroded areas.

Seeding used as part of a SWPPP shall be completed, including the 45 calendar-day maintenance period, before the end of the contract time, or sooner as specified in the SWPPP. Seeding used as part of a landscape project shall be completed, including the 45 calendar-day maintenance period, before the end of the Construction Phase. When seeding is part of a landscape project, the maintenance activities described herein shall be in addition to the work specified in Section 807 for landscape establishment. No time extension will be granted for seeding not completed as specified herein, including the 45 calendar-day maintenance period, before the end of the contract time or Construction Phase as applicable.

2.0 Materials:

2.01 General:

Appropriate documentation, as specified below, shall be submitted to the Engineer a minimum of 30 calendar days before the start of a scheduled seeding activity. No materials shall be delivered to the site until the documentation has been approved by the Engineer.

805SEED - 1/12

Seeding & Revegetation

Methodology for Determining Final Stabilization

Arizona Department of Transportation
Methodology for Determining Final Stabilization

(Last updated in January 2006)

'Final Stabilization' is a stipulation that must be met in order for an operator of a construction site to submit a Notice of Termination (NOT) to the Arizona Department of Environmental Quality (ADEQ) under the Arizona Pollutant Discharge Elimination System (AZPDES) Permit Program (Permit No. AZG2003-001) or to the U.S. Environmental Protection Agency under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). AZPDES is applicable to projects that disturb greater than one (1) acre on non-Tribal lands; NPDES is applicable for projects on Tribal lands. A NOT is submitted by the operator to terminate coverage for discharges from construction activities to Waters of the United States.

According to AZPDES, "Final Stabilization" means that:

1. All soil disturbing activities at the site have been completed and either of the two following criteria are met:
   a. A uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or
   b. Equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.
2. When background native vegetation will cover less than 100 percent of the ground (e.g., arid areas, beaches), the 70 percent coverage criteria is adjusted as follows: if the native vegetation covers 50 percent of the ground, 70 percent of 50 percent (.70 X .50 = .35) would require 35% total cover for final stabilization. On a beach with no natural vegetation, no stabilization is required.

According to NPDES, "Final Stabilization" means that:

1. All soil disturbing activities at the site have been completed and either of the two following criteria are met:
   a. a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70 percent of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or
   b. equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

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Seeding & Revegetation

North American Weed Free Forage Certification Program

282201

Certified to the North American Standards
by
The Arizona Crop Improvement Association
2120 E. Allen Rd. • Tucson, AZ 85719
(520) 318-7271

The hay/straw was produced and field inspected in accordance with the certification standards of the Arizona Crop Improvement Association, Inc. IN CONNECTION WITH THIS PRODUCT, ACIA MAKES NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR PURPOSE, OR OTHERWISE, UNDER NO CIRCUMSTANCE OR EVENT SHALL ACIA BE RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

North American Weed Free Forage Certification Program

282200

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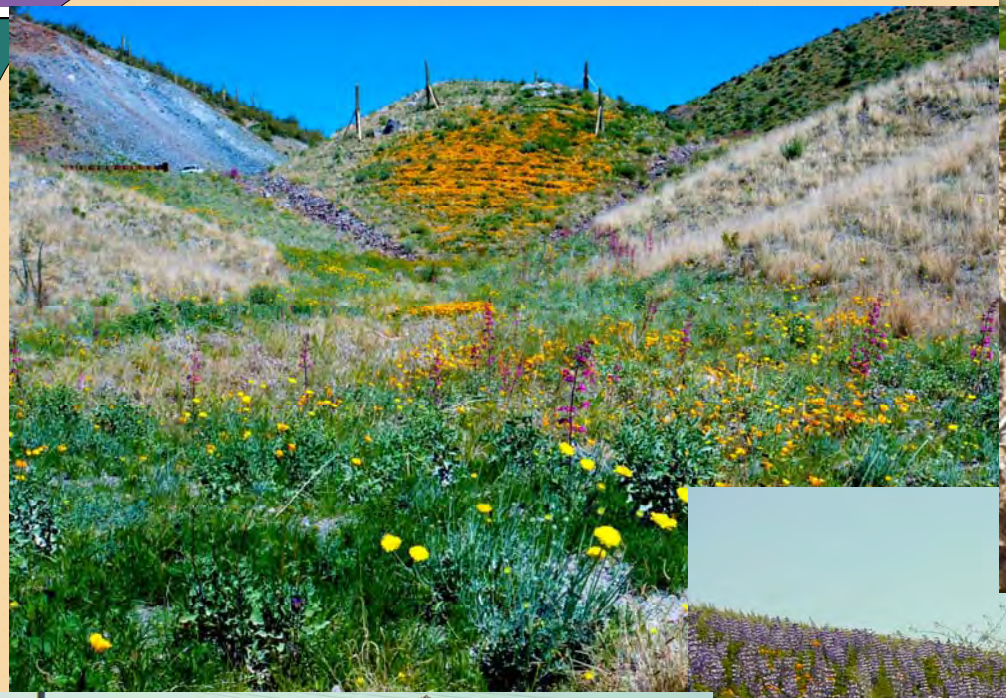
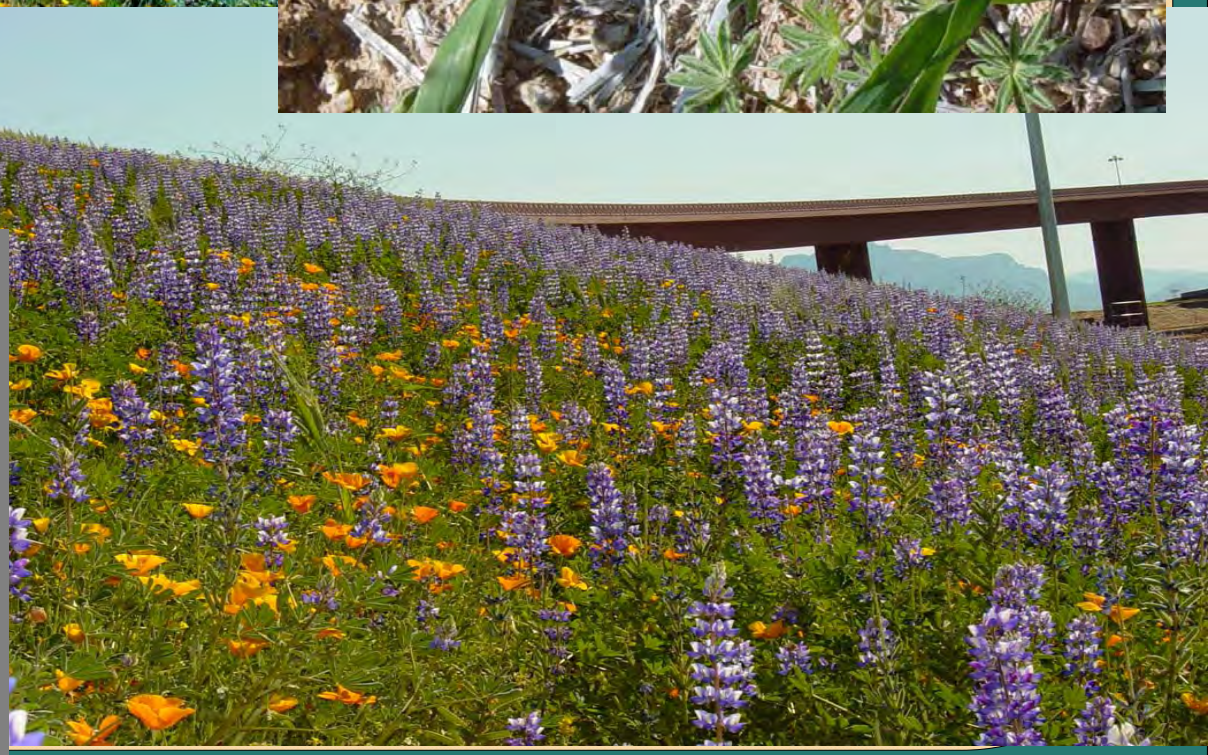
Seeding & Revegetation





Native Plant Salvage & Replanting

Native Plant Salvage & Replanting Evaluation Guidelines

ADOT Roadway Engineering Group
Roadside Development Section

Native Plant Salvage & Replanting Evaluation Guidelines

Arizona vegetative zones include many rare and unusual plant species that may be found only in limited numbers, geographic areas and in some cases limited to the State. Native plant salvage and replanting on a project must be in conformance to the requirements of Arizona Native Plant Laws.

Mitigation requirements, project stipulations and impacts require during the design development that appropriate evaluation of project area vegetative cover be made using the following and other additional project specific criteria as appropriate in the evaluation for plant salvage and replanting within the highway right of way.

Plant salvage, nursery establishment and maintenance and replanting on the project under usual conditions should be limited to $200,000 per mile not including a one or two year establishment period. Exceptions would be in cases where Saguaros, Barrels, Ocotillos and other primary or climax species such as Ironwood may require additional funding to accomplish the ADOT approved level of plant salvage and replanting.

Non Discretionary Evaluation Requirements:

1. Conformance to requirements of Arizona Native Plant Laws.
2. NEPA Decision Document requirement.
3. Highway safety would not be compromised.
4. Mitigation for 404 permit requirement.
5. Plants must be species that would be self-sustaining after planting and establishment.

Discretionary Evaluation Requirements:

1. Replanting of salvaged or planting of nursery plant materials would maintain or restore wildlife habitat value for cover and movement connectivity between habitat areas crossing the highway.

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ADOT Roadway Engineering Group
Roadside Development Section

2. Plant species that exhibit difficulty in regenerating naturally or establishing from seeding.
3. Designed replanting quantities should not exceed the area's existing density for individual species and area plant spacing which are good indicators of the areas capacity for sustainable plant survival.
4. Maintain or enhance the visual resource quality of the highway right of way, professional judgment should be used to achieve an appearance similar to the surrounding area and at the same time self-sustaining with the available natural moisture.
5. Required maintenance activities would not be affected such as ditch and culvert cleaning, mowing, shoulder repair and vegetative management and erosion control within a vehicle recovery area.
6. Plants are in good condition with high level of assurance for survival and reestablishment. Locations of plants are accessible for equipment.
7. Salvage and transplanting of primary or climax vegetation is emphasized over transitional or secondary species.
8. Unique species, densities and site conditions that result in estimated plant salvage, nursery and planting costs above $200,000 per mile requires project specific justification and cost increase approval.

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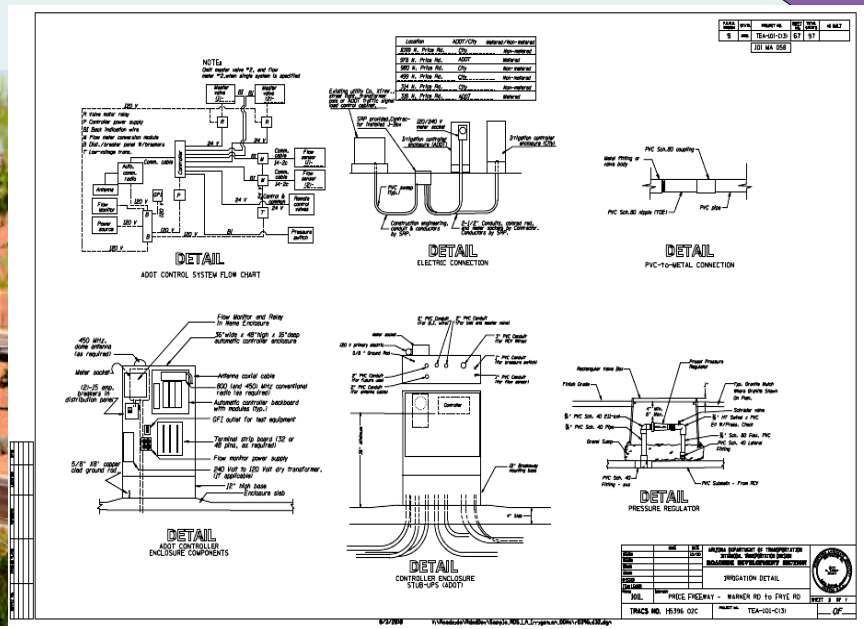
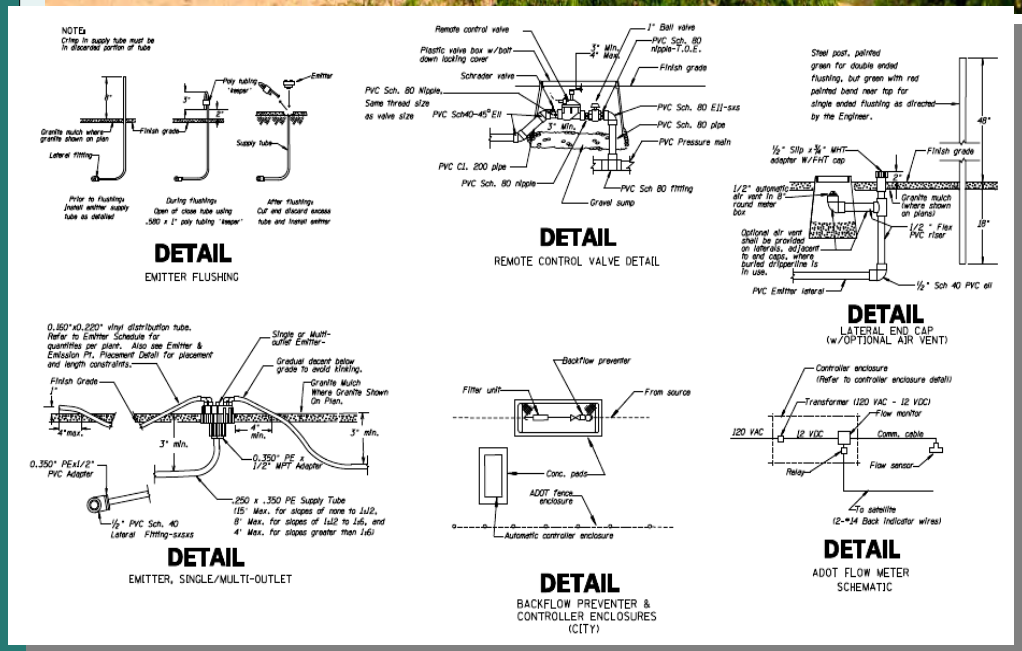
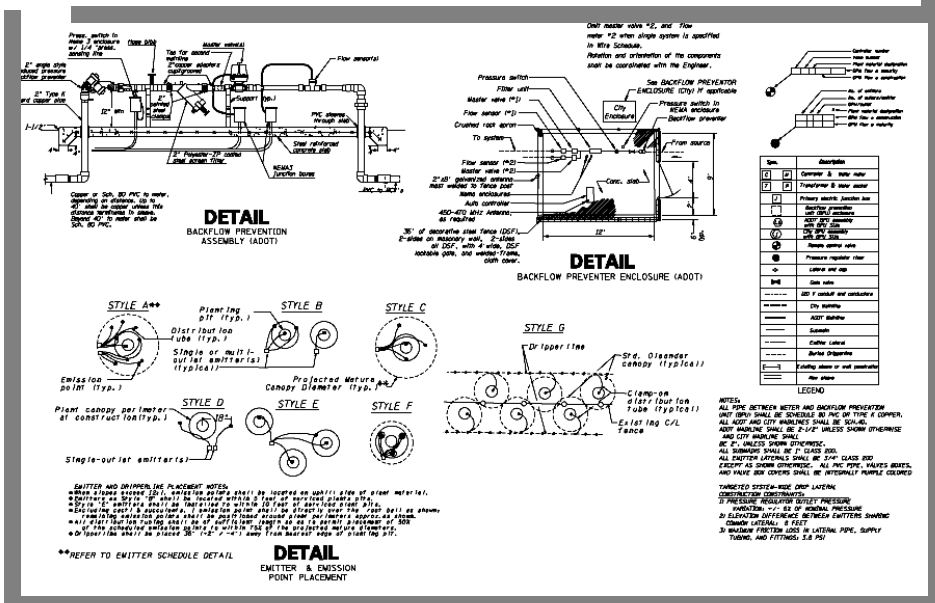
Native Plant Salvage & Replanting

Landscape & Irrigation Design

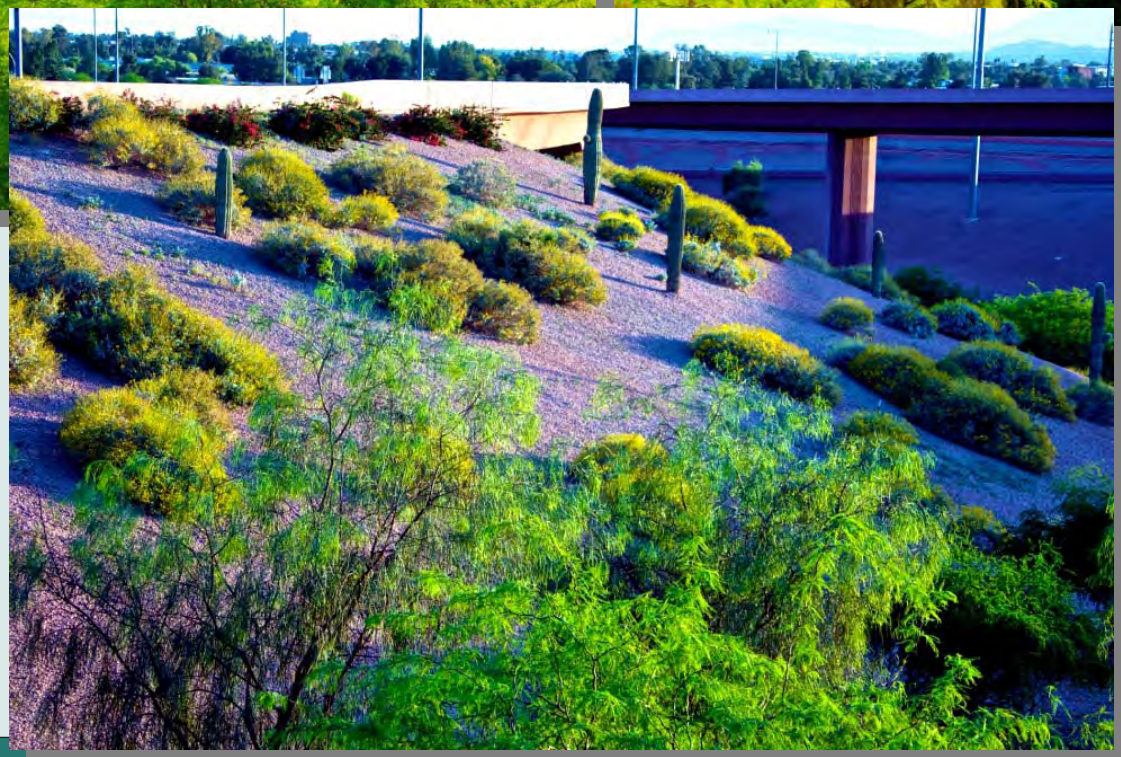






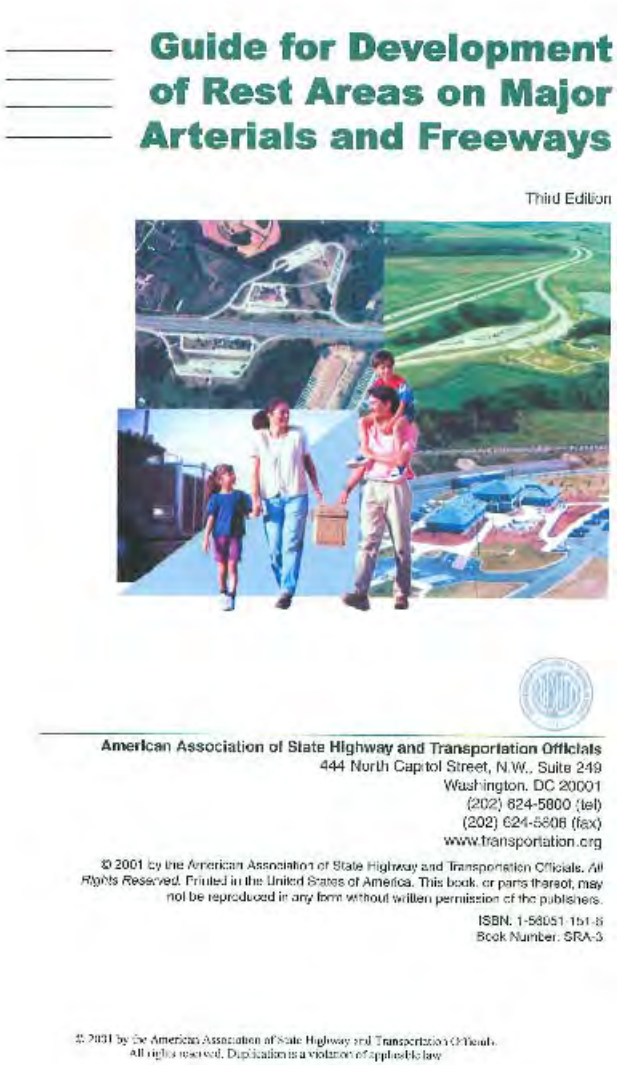
Landscape & Irrigation Design

Landscape & Irrigation Design



Statewide Rest Area Program & Design

AASHTO



Guide for Development of Rest Areas on Major Arterials and Freeways

Third Edition

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(202) 624-5806 (fax)
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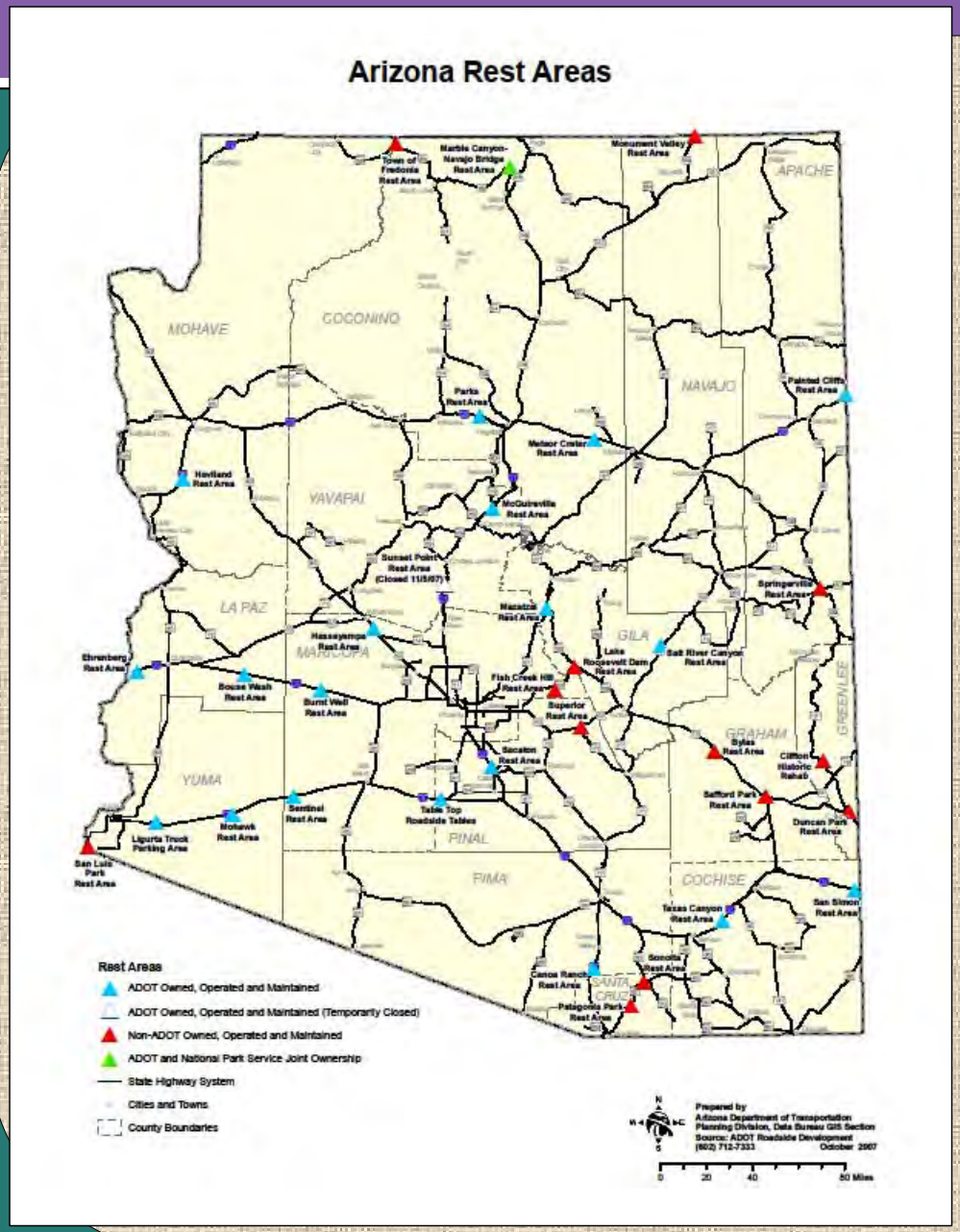
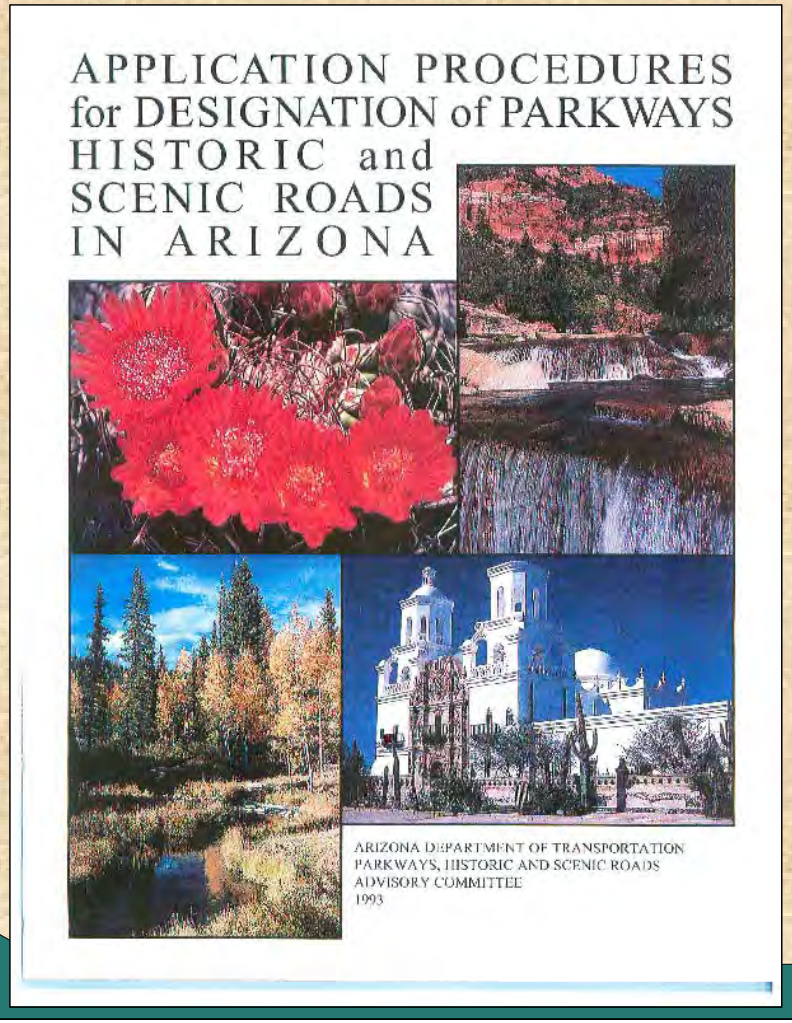
Statewide Rest Area Program & Design



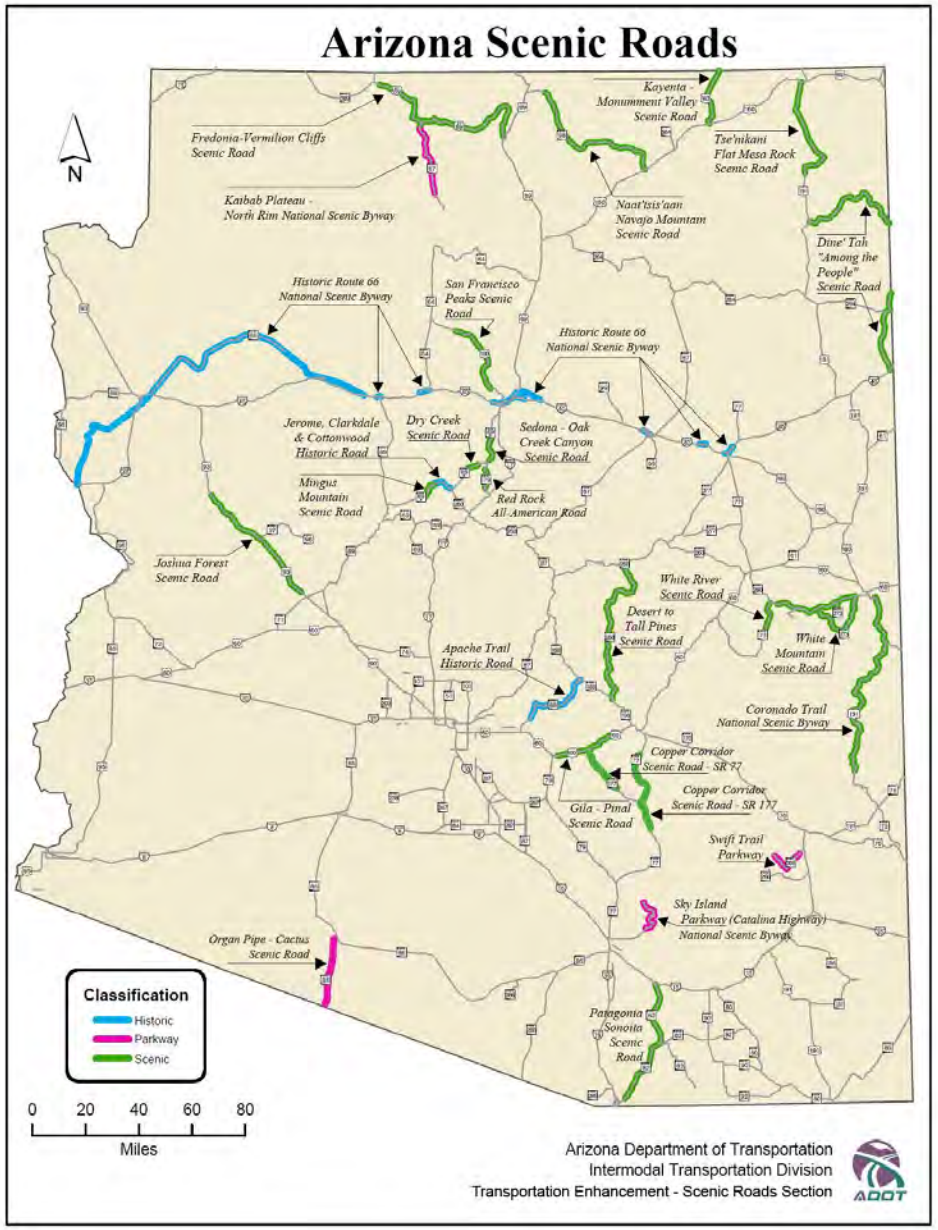
Arizona Parkways, Historic & Scenic Roads Program

ADOT is charged with nomination, designation and maintenance of Parkways, Historic and Scenic Roads.

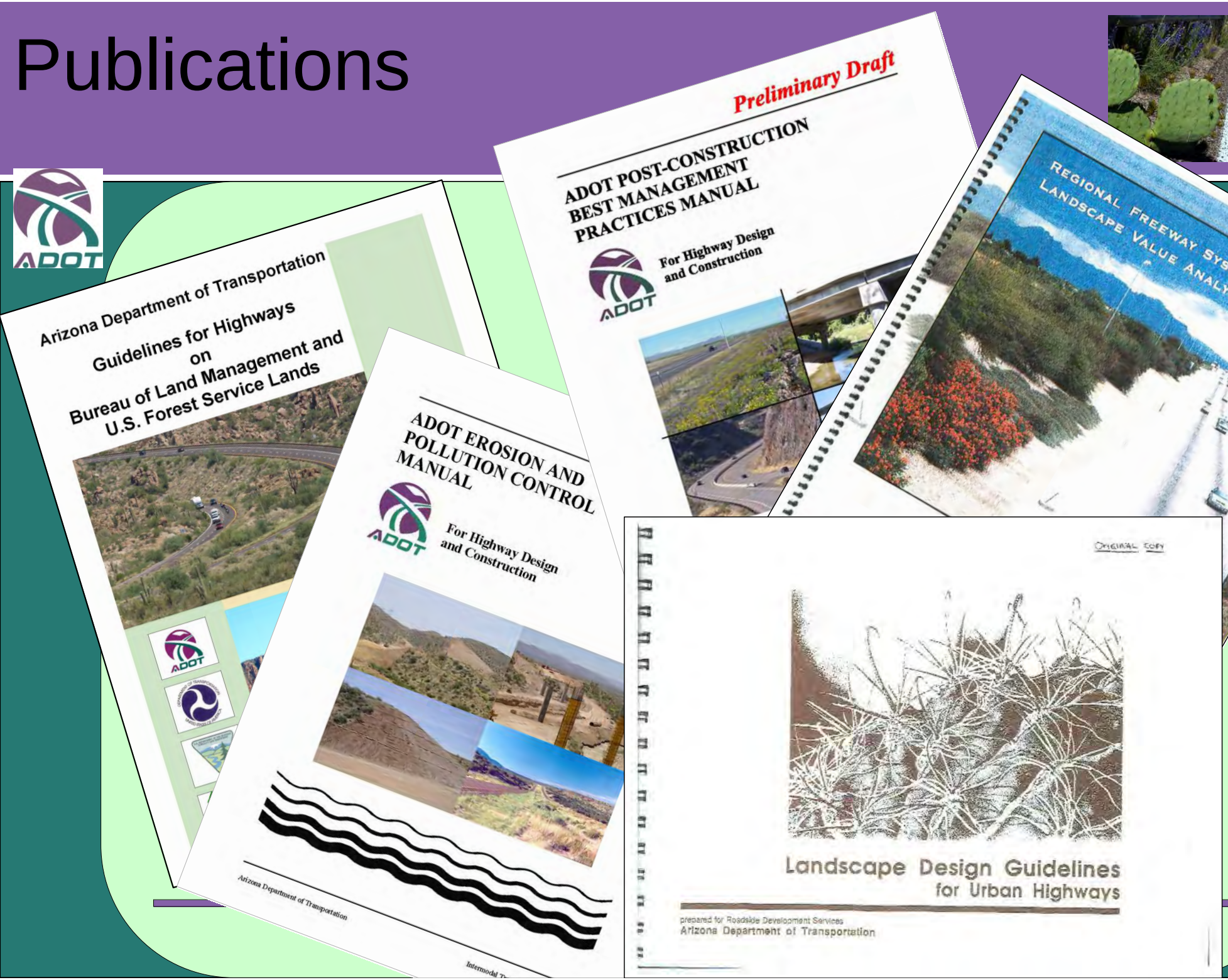
Roadside Development administers this program.



Arizona Parkways, Historic & Scenic Roads Program



Publications



Looking to the Future

What's Ahead…….

- Increased emphasis on Context Sensitive Design and Functional Landscape Ecological Design of new highway projects and surrounding environments
- Improved handling of stormwater quality features such as infiltration beds, water harvesting for sustainable landscapes
- Implementation of the next phase of EPA Stormwater Regulations, anticipated to be more stringent in protection of stormwater quality
- Combination of Rest Area and Public/Private Partnership "Oasis Rest Areas"
- Improved Noxious and Invasive Non-native Plant Species Control measures during construction
- Better revegetation results with improved Specification enforcement
- Emphasis on Low Impact Development (LID) for stormwater quality control and Sustainable Projects
- Design/Construction features and construction methods to enhance sustainability and reduce maintenance

Summary



Look to Roadside Development for Guidance in…….

- Aesthetic enhancement and design
- Environmental mitigation and landscape ecological restoration
- Stormwater quality and erosion/sediment control
- Seeding and revegetation
- Native plant salvage and replanting
- Landscape and irrigation design
- Statewide rest area design and management
- Designation of Parkways, Historic and Scenic Roads in Arizona
- Noxious and Invasive Non-native Plant Species management